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Auditing Symposium VIII: Proceedings of the 1986 Touche Ross/University of Kansas Symposium on Auditing Problems

University of Kansas, School of Business

Rajendra P. Srivastava

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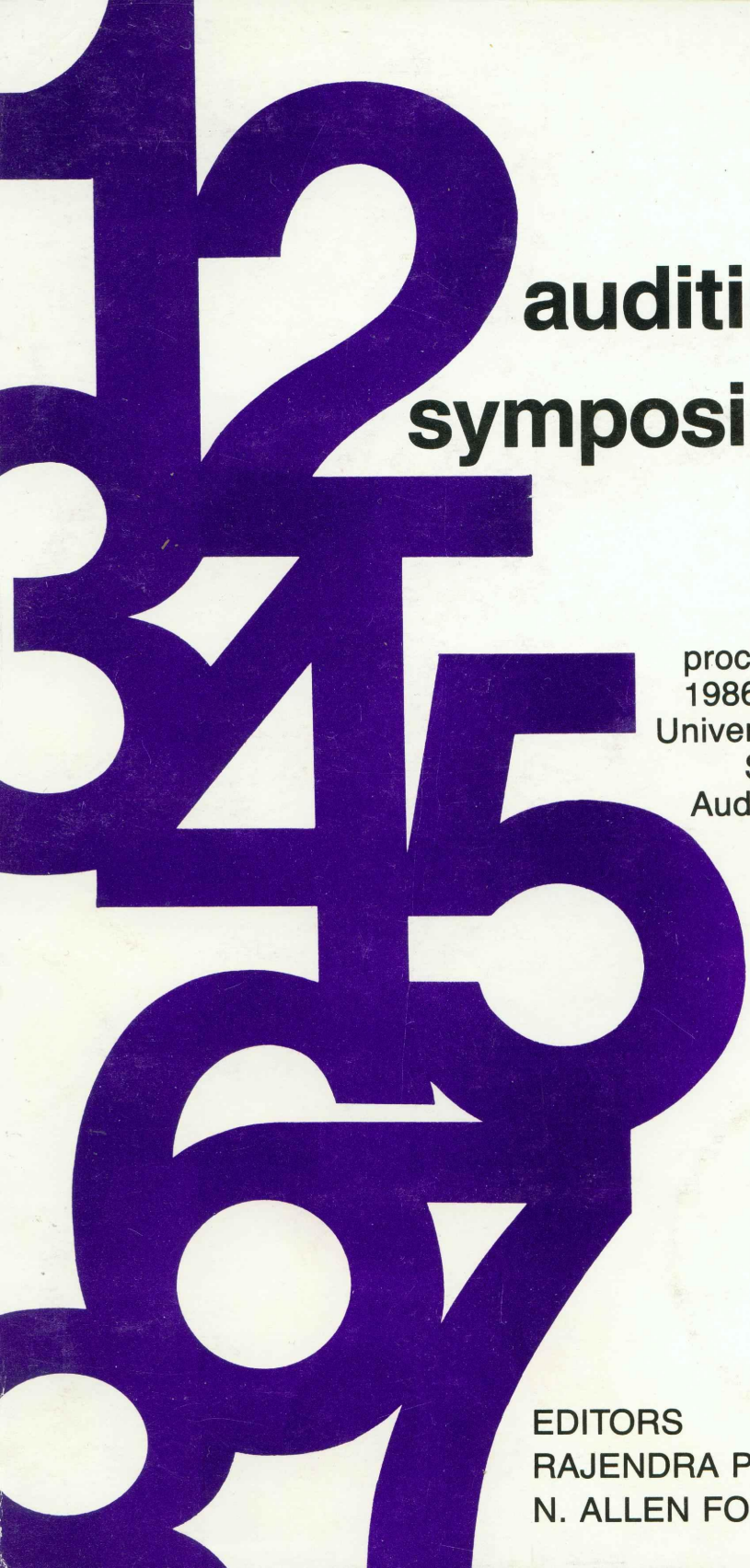

auditing symposium viii

proceedings of the
1986 Touche Ross
University of Kansas
Symposium on
Auditing Problems

EDITORS
RAJENDRA P. SRIVASTAVA
N. ALLEN FORD

Auditing Symposium VIII

Proceedings of the 1986
Touche Ross/University of Kansas Symposium on
Auditing Problems

Edited by
Rajendra P. Srivastava
N. Allen Ford

May 22 and 23, 1986
School of Business
University of Kansas
Lawrence, Kansas 66045

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Preface

Auditing Symposium VIII was made possible by the generous financial support provided by the Touche Ross Foundation. The 1986 symposium was the eighth of the series of biennial auditing symposia held at the University of Kansas. The origination, development and growth of the symposia can be directly traced to and identified with Howard Stettler who retired from the faculty of the University of Kansas in May of 1984. Howard was the chairman for the first symposium in 1972 and served as chairman or co-chairman for the following six symposiums. Our job as co-chairmen was made substantially easier by following the format so meticulously developed and implemented by Howard over the past 14 years.

Topics for the symposium and individuals to serve as presenters and discussants were selected by us after extensive consultations with members of the faculty at the University of Kansas and professionals in the auditing area at other universities and in practice. We are indebted to our colleagues in the accounting area at the University of Kansas, Francis Bush, Harold Cook, Mike Ettredge, Emeka Ofobike, Wiley Mitchell, Art Thomas and Chet Vanatta, for their able assistance in planning the symposium and accommodating the many guests to our campus.

Holding steadfast to tradition, the first paper presented at the symposium was devoted to the historical coverage of auditing. The primary criteria used to select topics for the other papers was current interest and relevancy to the profession. When an academician was selected as the presenter, a practitioner was selected as the discussant and vice versa. All papers, except for the paper presented during the evening after dinner, were distributed in advance. Because of the opportunity for advance preparation by all participants, the presenter was allowed only ten minutes to make summary remarks and observations about the paper. After the discussant's comments, which generally were limited to 20 minutes, an hour was available for open discussion. As expected, the opportunity for leading academicians and practitioners in the auditing area to interact in discussion and debate with respect to many of the major issues confronted by the profession provided for lively discussion and debate. Unfortunately, it has not been feasible to record and reproduce these discussions for the benefit of others.

About fifty invited practitioners and academicians participated in the two-day symposium, and those individuals are listed prior to the contents page. Many observers such as doctoral graduate students, faculty members from accounting and other disciplines, and practitioners in the area attended parts of the symposium as observers. For those who might like an opportunity to participate in the discussions at 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

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Proceedings are shipped only on a prepaid basis. The prepaid price covers mailing costs with the exception of orders outside of 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, the authors of those papers, and the prepaid price of each volume from the Kansas Union Bookstore are given below for the benefit of those who may wish to refer to a paper in one of the previous volumes.

Contemporary Auditing Problems (1974) $5.00

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

Rajendra Srivastava
N. Allen Ford

CONTENTS

1

"Under the Spreading Chestnut Tree" Accountants' Legal Liability— A Historical Perspective

Paul J. Ostling*
Arthur Young & Co.

I. Introduction

It is difficult these days to read a week's worth of newspaper financial sections and business magazines without finding an article, sometimes lurid, discussing the role and liabilities of the public auditor. Those within the profession often view this attention as an undeserved, new development. Certainly the frequency, scope, and magnitude of civil suits against auditors have grown. There has, however, always been a close connection between the legal liabilities imposed upon auditors and the standards adopted by the profession—as well as its perceived scope and responsibilities of practice.

This paper describes some present and recent legal challenges facing the profession, their historical perspective, and predictions as to possible future developments. Taken in perspective, current attacks on the profession may be no more than a maturation and reevaluation of the auditor's standards and role. As the investor community becomes more sophisticated in its appreciation of the limitations in the auditor's role pursuant to generally accepted auditing standards (GAAS), and better understands the "gray areas" where generally accepted accounting principles (GAAP) permit more than one treatment of certain financial transactions, a credibility gap looms. To reduce the gap, the courts and legislators are attempting to regulate the profession and impose more "watchdog" responsibilities. Because of the gap, insurance companies and bright young graduates, fearful, respectively, of large legal judgments and less rewarding career opportunities may avoid the accounting profession.

Counter-productive activities of the professionals themselves and their representative associations may be complicating this trend. Nearly predatory competition drives the price of audit services downward at the very same time that the attendant risks are skyrocketing. Legislative "overseers" lambast the profession, often inaccurately and unjustifiably, but the associations often seem timid by comparison in their response. Public auditors must act quickly and affirmatively to resolve these conflicts in order to assure the future growth and profitability of the profession.

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* The views expressed herein are those of the author individually.

II. Development of Standards and Liabilities

It is now settled that the role and responsibilities of the public auditor include the supply of accurate financial information to facilitate the function of the free markets, including the securities markets. This was not always accepted by the profession as such. Indeed, our predecessors in practice initially viewed their audience as including only their direct, paying clients. Auditors vociferously resisted the expansion of their role and responsibilities, and changes were frequently the result of litigation losses and/or government intervention.

A. Our United Kingdom Roots

While there are reports of "auditors" having counting responsibilities during biblical times, the analysis of the evolution of accountants' legal liabilities must commence in the United Kingdom. It comes as no great surprise to even the less scholarly students of the profession that the modern auditing profession as we know it evolved in England and Scotland.

Laws permitting the formation of corporate entities (whose ownership was represented by and transferable through stock) and the concept of "limited liability" (that a shareholder is liable to the extent of his capital invested in purchasing stock, but is not "personally liable") were passed there during the 1840's and 1850's. The Joint Stock Companies Act of 1844[1] required that a "full and fair" balance sheet be sent to shareholders before their meetings and filed with the Registrar of Companies. Auditors (who were to be non-office-holding stock-holders) were required to be appointed to report on the balance sheet. There were no meaningful legal requirements or standards as to the form or content of the balance sheets or the manner of the conduct of the auditors' reviews. There were no enforcement provisions relating to the content or the filing of the balance sheet with the Registrar of Companies. The 1844 Act should not be thought of as anything approaching our own federal or state securities laws.

Because the balance sheets were standardless and the "audits" were a perfunctory checking of support for disbursements there was little faith by third parties in either the fullness or fairness of the balance sheets.[2] The balance sheet requirement was dropped in 1856,[3] and the matter of accounting and auditing was left up to the corporations themselves. It was not until 1900 that all registrants under the Companies Act were again required to have annual audits conducted. In 1907, they were again required to file their balance sheets.[4]

In the fifty-year interim, however, certain industry-specific requirements were enacted. During the late 1860's railroad companies were required to publish their accounts; during the 1870's banks were required to audit their accounts and gas companies to publish theirs; and in the early 1880's electrical companies were to publish their accounts. These industries were regarded as special because of the public trust in their operations, or the speculative nature of their early operations. In the meantime, the accounting profession was beginning to organize and establish standards. In Scotland, the Society of Accountants in Edinburgh was granted a royal charter in 1854. In England, a charter was granted to The Institute of Chartered Accountants in England and

Wales in 1880. Two other associations were formed in Scotland, and in England the Society of Incorporated Accountants and Auditors was formed in 1885. In both Scotland and England these groups agreed upon uniform examinations for new members (designated chartered accountant or C.A.) as well as apprenticeship programs.[5]

The British audit during the 1880's evolved as having the primary goal of uncovering fraud. Detailed bookkeeping-type examinations reviewed the numbers in the books of account. Courses in study evolved in auditing, and a textbook was prepared. Customs developed for the preparation of the auditors' "certification". The Scots and English auditors had acquired some status and had established some commonly accepted auditing and accounting "standards" by 1900, when all registered companies were required to have audits conducted. For example, the use of the term "certificate" to describe the report, and the representation that financial statements "present fairly" were English customs. This is not to say, however, that auditors' "legal liabilities" had been yet fully examined.

For the most part the manner of report and the procedures applied were determined by the corporation's articles of incorporation and the engagement contract between the auditor and the client. In most cases the company's articles required that the balance sheet be "full and fair" and prepared to display the "true and correct" picture of the company's "state of affairs." This requirement was based upon the model articles of incorporation appended to the 1856 Companies Act.[6] The earliest reported losing cases involving auditors arose in England prior to 1900, and focused upon whether the auditor's certificate had adequately communicated the "state of affairs" of the company.[7]

In the case of *Leeds Estate,* the auditor's certificate for seven years, 1874 through 1880, said:

> I certify that I have examined the above accounts and find them to be a true copy of those [shown] in the books of the company.

While escaping damages because that statute of limitations had run, the auditor was found guilty of negligence to its client for failing to actually go behind the numbers presented by management to ascertain their accuracy.

In *In re London* the auditor's 1892 certificate said:

> We have examined the . . . balance-sheet and compared it with the books of the company; and we certify that it is a correct summary of the accounts therein recorded. The value of the assets as [shown] on the balance-sheet is dependent upon their realization.

Again the auditor was found liable for negligence in breaching its duty to its clients—the shareholders—because the Court felt the words "subject to realization" was not a qualification which adequately communicated the company's true state of affairs.

Thus, by 1900, some rudimentary legal reporting requirements had been imposed upon their clients, and the court had just begun to impose a legal duty

upon auditors to carry out an audit in accordance with their engagement contracts. The duty was a narrow one by today's standards, but the auditors gave those clients some level of comfort with regard to detecting fraud which was on the clients' books. To be sure, the primary purposes and benefits from the audit were to assist the client's management in monitoring its financial matters, ward off defalcations, and secure financial support from bankers.

B. Migration to America

In 1776, America was essentially an agrarian society. While the revolution removed the yoke of British governmental rule, the financial connections which had already been formed by British financiers provided much of the capital for the American industrial revolution. American states passed laws permitting the formation of corporations. The industrial revolution, corporate growth, and British investment all led to the birth of the accounting profession in America—but as a child of the United Kingdom practice.

Individuals, such as Arthur Young, came to America in growing numbers during the 1880's and 1890's to look after the interests of English investors, and then began their own practices here—evolving into firms of accountants. English firms, such as Price Waterhouse & Co., sent agents of the firm to the United States to conduct examinations on behalf of English investors. By 1900, Price Waterhouse's activities were significant enough here that Arthur Lowes Dickenson came to manage them. A young English auditor on his staff at the time, George O. May, succeeded Dickenson as senior partner in America in 1911, remained in the post until 1940, and had an incredible influence upon the manner of practice and the development of standards in America. An American of the day, Colonel Robert Montgomery, was also an early leader in establishing the American practice. He was a CPA, a lawyer, a military figure, a Columbia University professor, and president of the associations which eventually became the AICPA. In 1905, he edited the first American textbook on auditing (called, simply *Auditing*) which was, naturally, an adaptation of the leading English text of the day.

In 1896, New York was the first state to pass a law designating the professional title of Certified Public Accountant. Other states quickly followed. Likewise, uniform tests for CPAs were developed early in this century. Through this period, however, the American practice, in terms of procedures and process, was little more than an extension of the Scots and English methodologies. Indeed, most of the leading U.S. firms were led by Scots and Englishmen until the early 1960's. For at least the first quarter of the century, the bulk of audit "staffmen" were imported from the United Kingdom. Thus, as in England, the focus in America was initially upon auditing as a report *to* management rather than as a review of management's report to investors and lenders of its own stewardship. Much of the development of the auditor's legal liabilities over the past 53 years has focused on this change in the audit's emphasis to a review of the managment's financial report to third-party users of financial information.

C. Early Development of Standards in America

Pressure for a change in emphasis in the purpose of financial reporting and auditing began early in this century. Before the great stock market crash of 1929, ownership of stocks and bonds became more than a game for the wealthy. Many small, individual purchasers—relatively unsophisticated and in large measure financing their purchases with borrowed money—entered the stock market. Investors wanted more and more accurate financial information, and critics wanted more standardization of accounting and reporting practices. The new investing audience was more interested "in the income statement and less in the balance sheet."[8] Despite this need for more standardization, practices varied substantially on subjects such as depreciation and reporting of income statements. Critics of the profession complained of the lack of standardization, the inadequacy of financial information, and the manipulative practices which abounded.[9]

Three developments between 1916 and 1934 went far in the United States to formulate standards and define the duties and liabilities of auditors. In 1916 the Secretary of Commerce (William Redfield), the Federal Trade Commission (FTC) and the Federal Reserve Board (FRB) requested the American Institute of Accountants (AIA) to prepare a memorandum on balance sheet audits. Since many of the audits conducted had been balance sheet audits done without actual observation of inventories and assets, they were concerned about the integrity of financial information of the day.

The AIA committee, which included George May and Robert Montgomery, adopted a Price Waterhouse internal memorandum entitled *Memorandum on Balance Sheet Audits*. This memorandum was approved and accepted by the FTC and the FRB and published initially in 1917 in the Federal Reserve Bulletin. It was revised and republished several times before 1930. The AIA itself revised the memorandum and published it in 1936 as *Examination of Financial Statements by Independent Public Accountants*. While this effort resulted in some standardization and definition of the auditor's role, it still did not require observation or testing of inventories or the confirmation of receivables. It would be left to a major scandal for that to occur.

The second major occurrence in the development of standards began from a 1927 AIA initiative, when it approached, but was turned down by the New York Stock Exchange (NYSE), to jointly develop financial reporting requirements for NYSE registrants. After the 1929 crash, the NYSE reversed itself and asked for the AIA's help in developing accounting principles. George May was called into service yet again to chair two separate committees to cooperate with exchanges and develop accounting principles.

May's committees did not support the adoption of a set of specific directives of accounting treatment, but suggested in 1932 "very broad limits [of accounting treatments within which reporting companies would make] disclosure of the methods employed and consistency in their application from year to year."[10] In 1933 the NYSE required all new registrants to have audited annual financial reports, but made no requirements for disclosure of accounting methods. May's committees published a pamphlet in 1934 called "Audits of Corporate Accounts" and recommended a new form of audit report which used the words: "fairly present, in accordance with accepted principles of account-

ing consistently maintained." In 1940 the reference to "accepted principles of accounting" became "generally accepted accounting principles." From 1934 on, the profession recommended that companies choose accounting methods "within very broad limits" and identify them in the financial statements. Thus the concept of GAAP was born—with the built-in flexibilities upon which many of today's critics harp.

The third major occurrence in the period was the enactment of the Securities Act of 1933[11] and the Securities Exchange Act of 1934.[12] Before these enactments, no laws in the U.S. required audited financial statements for "public companies." When initially passed, the Securities Act was enforced by the FTC, which quickly published regulations for the determination of independence of auditors and uniform accounting rules. The Securities Act requires registration of new securities via a registration "statement" including financial statements certified by an independent accountant. The 1933 Act imposes significant legal liabilities upon experts identified in the registration statements for false statements in the portions of the report as to which they are experts. It also prohibits fraud in connection with the sale of new securities.

The 1934 Act is an overlay beyond the 1933 Act which created the SEC to enforce both Acts. It prohibits false statements in connection with the sale of securities, and was particularly significant in its impact upon public auditors in the context of private securities fraud suits. The 1933 and 1934 Acts and the regulations promulgated thereunder clearly established concrete standards, roles, and liabilities for American auditors.

D. The Agony of Defeat

The late 1930's marked the beginning of litigation in the United States which had direct impact upon the duties and liabilities of auditors. This paper cannot relate *all* cases which have historical significance, but several have had "landmark" results upon the profession.

1. Testing Inventories and Assets

The *McKesson & Robbins* case is the most significant "early" auditing case in America. Philip Musica, alias Frank Donald Coster, was a con man. His first scrape with American justice in 1909 resulted in conviction and a prison sentence for bribing customs officials and preparing fraudulent invoices and customs documents. Within three years of leaving prison, he was caught for bilking twenty-two banks on loans obtained with collateral he did not own. He spent three years in prison and was placed on probation.

In 1920, Musica claimed to be in the drug business but was actually a prohibition bootlegger. In 1923, he became the sole owner of Girard & Company, a manufacturer of drugs. Despite being sole owner, he hired Price Waterhouse to conduct audits. He studied auditing procedures and noted that auditors did not observe physical inventories unless requested to do so. In 1926, with financial support from bankers, he purchased McKesson & Robbins which was merged with his company.

In December 1938, Musica was confronted by his treasurer and director who had uncovered fraud, waste, mismanagement and inclusion of fictitious inventories and assets exceeding $10 million. A receiver was appointed by a

federal judge, and that same day the ever present George May of Price Waterhouse met with the company's executives and assured them that, as far as he knew, the books were in order. Eleven days later Musica committed suicide. Investigation revealed that on stated assets of over $87 million, $10 million in inventory and $9 million of receivables were fictitious.

Price Waterhouse settled the trustee's claim by refunding $522,402.29 representing five years' audit fees. The SEC commenced an investigation which exposed the lack of agreement among auditors as to what the appropriate audit procedures were with regard to inventories and receivables. In the wake of the scandal, but before the SEC could issue its final report, the AIA established a committee in January 1939, to examine audit procedures. In October 1939, the AIA issued its Committee on Auditing Procedures' *Statement on Auditing Procedure No. 1: Extensions of Auditing Procedure,* which required observation and testing of physical inventory and confirmation of receivables.

The SEC's report, which was issued in 1940[13] contained the following:

- Price Waterhouse was found to be derelict in failing to follow procedures which a diligent auditor would have used in the circumstances, and which were called for in the authoritative works on auditing (*e.g.*, Montgomery, *Auditing Theory and Practice* (1934), p. 157 and 182).
- While auditors claimed not to be insurers of financial health, "discovery of gross overstatement in the accounts is a major purpose of an audit. . . ."
- Management's activities are within the scope of an audit, so auditors should be elected by shareholders.
- The profession did well to publish SAP No. 1, but it should also distinguish between auditing "standards" and "procedures."
- Regulation S-X was amended so that the auditor's report states whether the audit was made in accordance with appropriate GAAS.

The profession responded by having the AIA Committee on Auditing Procedure prepare a statement defining audit standards. In 1947, the AIA published a brochure incorporating the Committee's memorandum "Tentative Statement of Auditing Standards—Their Generally Accepted Significance and Scope." We now know this as *Statement on Auditing Standards No. 1.* The statement distinguished between standards (which deal with "quality of performance and objectives to be attained") and procedures (which "relate to acts to be performed"). While over the years the interpretations have been amended from time to time, the three original auditing standards ("General Standards," "Standards of Field Work" and "Standards of Reporting") remain the same.

The *McKesson & Robbins* case is a graphic illustration of how scandal and litigation can result directly in long-term advances in the definition of a profession's role, standards, and legal liabilities. Since this case resulted directly in SAP NO. 1 and SAS No. 1, it is difficult to find a more seminal example.

2. Go Directly to Jail, Do Not Pass "Go"

Perhaps the most image-shattering cases for the profession have been those which resulted in criminal convictions for independent auditors. Recently, in connection with a federal investigation and indictments relating to a major financial scandal, a picture of a Big Eight partner being led to his arraignment in handcuffs appeared on page 1 of the *New York Times* Business Section. More recently, a managing partner of a Florida practice office of a major accounting firm pleaded guilty to several counts of fraud and criminal securities conduct, including taking a payment from ESM Securities and giving a clean opinion in the face of fictitious collateral securing millions of dollars of ESM's securities transactions. In the same case, the company's lawyer (the son-in-law of ESM's major benefactor) committed suicide. The lurid headlines created by these criminal financial scandals have a far-reaching impact upon the public's perception of and respect (or lack thereof) for the profession.

Three such criminal cases have had far-reaching impact upon the profession's self-image and its view of the attendant duties and liabilities. In 1968, a senior partner, a junior partner, and a senior associate of Lybrand, Ross Bros. & Montgomery were convicted (after a jury trial) of mail fraud and securities fraud for certifying the 1962 financial statements of Continental Vending Corporation. The main defense was that the financial statements were in compliance with GAAP. The trial court held, and the United States Court of Appeals for the Second Circuit affirmed[14] that compliance with GAAP was not a complete defense against a charge of criminally certifying a false and misleading financial statement, and that auditors must report major management misconduct.

The Second Circuit took its task of passing on criminal liability of professionals quite seriously:

> While every criminal conviction is important to the defendant, there is a special poignancy and a corresponding responsibility on reviewing judges when, as here, the defendants have been men of blameless lives and respected members of a learned profession. . . .

In a widely quoted passage, the court enunciated an accountant's legal responsibility to investigate management dishonesty:

> [I]t simply cannot be true that an accountant is under no duty to disclose what he knows when he has reason to believe that, to a material extent, a corporation is being operated not to carry out its business in the interest of all the stockholders but for the private benefit of its president. For a court to say that all this is immaterial as a matter of law if only such loans are thought to be collectible would be to say that independent accountants have no responsibility to reveal known dishonesty by a high corporate officer. If certification does not at least imply that the corporation has not been looted by insiders so far as the accountants know, or, if it has been, that the diversion has been made good beyond peradventure (or adequately reserved against) and effective steps taken to prevent a recurrence, it would mean nothing, and the reliance placed on it by the public would be a snare and a dilution. . . .

The defendants were fined and placed on probation. In 1972, President Nixon pardoned them.

In 1974, a partner and an audit supervisor were convicted after a jury trial for criminal violations of the securities law by making false statements in a 1969 proxy statement for National Student Marketing (NSM). On appeal, the conviction of the partner was affirmed, while the supervisor's was reversed.[15] The partner was sentenced to imprisonment for one year and fined $10,000. The jail sentence was suspended to 60 days.

The charges centered upon NSM's policy of recognizing revenue which was selected by the partner and based upon the percentage-of-completion method. NSM was recognizing revenue when it allegedly received "commitments" on fixed-fee contracts to participate in marketing programs developed by NSM which were aimed at the "youth market." NSM's utilization of the method, and its decisions as to when it had "commitments" (*i.e.* recognizing revenue on "unbilled accounts receivable") resulted in overstating "net sales" by approximately $1 million and reporting "net earnings" of $702,270 in its 1968 Annual Report when there were in fact no earnings at all. NSM experienced an incredible stock price rise (from $6 to $80 in less than two years) and used the stock to make a series of acquisitions.

After selecting the percentage-of-completion method for NSM's 1968 financial statements, the partner instructed the supervisor to check on the commitments. The supervisor did so, but in a haphazard manner by telephone. No written verifications were sought or received. The partner permitted NSM to include $1.7 million of such commitments as unbilled receivables for 1968 and this in turn permitted NSM to show a profit instead of a loss. The footnotes to the annual report's financial statements did not disclose the "flimsy" nature of the commitments.

Within five months of the publication of the 1968 financial statements, NSM had to write off $1 million of the $1.7 million of commitments. When the auditors learned of the circumstances of the write-off and the periods they related to, they netted the reduced earnings against a favorable extraordinary tax item instead of reducing earnings and sales for the prior period. Thus, the auditors helped to conceal the actual write-off of profits. NSM then published the Proxy Statement for the nine months following 1968 without disclosing the problems with the earlier period.

The Second Circuit noted that the partner's action in allowing bookings on commitments for 1968 "was contrary to sound accounting practice,"[16] and after discovering the bogus nature of them "[h]onesty should have impelled [him] to disclose" the problems in the updated footnotes in the Proxy Statement. The Second Circuit then enunciated what is now called the "suspicious inquiry doctrine."

Shortly after the *Natelli* conviction, three independent auditors were convicted in the aftermath of the Equity Funding Corporation of America securities scandal. The three were the partner in charge and two audit managers of Wolfson, Weiner, Ratloff & Lapin which had been merged into Seidman and Seidman in 1972. After a jury trial, the three were convicted of multiple counts of securities fraud and filing false SEC documents. The conviction was upheld on appeal.[17] The Equity Funding scandal, which involved widespread use of computers to perpetrate a massive fraud and the spectacle

of issuing new insurance policies to dead people to make Equity Funding's growth track look continuous, was perhaps the most publicized securities scandal of the 1960's and 1970's. Books have been written about the case. Careers of attorneys were made while careers of investment advisors and accountants were destroyed.

These cases, and cases like them, should stand as a beacon for the profession signifying a line beyond which one cannot go for one's client. Moreover, they clearly demonstrate that auditors are not exempt from criminal liability.

3. Expanding Liability to Clients—The "Adverse Interest" Analysis

Even as criticism of the accounting profession by governmental representatives, investors, customers of failed banks and financial services institutions, and the courts grows, the profession's own clients are expanding the auditor's responsibilities and liabilities. The financial statements of a company are, legally and under the accounting literature, management's reports of the company's financial transactions. It often comes as a rude awakening then, when, after the client's officers and directors have set accounting policy, prepared the financial statements, and represented them to be true and accurate to the auditor, the corporate *client* disclaims responsibility for the active fraud of its own officers and directors, and sues the auditor for negligence in failing to discover and/or disclose that fraud. There was a time when clients were unable to make these suits stick, but those days are gone.

The early cases concerning the allocation of blame for financial dishonesty between the client and the auditor often arose where employees made defalcations of the client's assets. The issue was generally addressed from the perspective of whether the client should bear responsibility for failure to properly supervise its employee, or whether the auditor should bear the loss for negligence in not detecting the employee's dishonesty. Under ancient common law theories of "agency" or *respondeat superior* the principal/employer is responsible for the negligent or wrongful acts committed in the course of the agent/employee's employment. When the employee actually steals *from* his employer, the courts have ruled the illegal deed to be outside the "scope of employment" (*i.e.*, it is "adverse" to the "interests" of the employer), and held the agency/*respondeat superior* doctrines inapplicable to place the blame on the employer. Rather, in these cases the courts generally adopted the old contributory negligence standard. Under this approach, even if the auditor were negligent in detecting the fraud, there would be no liability for the loss where the client was "contributorially negligent" and thus could have avoided the loss by the exercise of reasonable care in supervising its own employee.[18] Even in these cases, auditors were sometimes found in "breach of contract" and had to return their fees to the client.

This standard, which was the most favorable for auditors, began to be reduced when courts overlaid a requirement that the auditor would not avoid liability unless the client's contributing negligence somehow contributed to the auditor's inability to detect the employee's fraud.[19] In such cases, the courts acknowledged a belief that part of the function of the audit *was* "detecting

defalcations which the [company's] negligence ha[d] made possible. . . ." Thus, there was no automatic defense for the auditor just because the client's negligence in supervising the errant employee permitted the *loss* to occur, but there was a defense when the client's negligence permitted the *auditor's* negligence or somehow undercut the *auditor's* ability to perform its job.

The tightening of the noose around auditors began in a series of cases which adopted a variant of the "adverse interest" analysis. First, in *Shapiro v. Glekel,*[20] the court utilizing the modified negligence test described above refused to dismiss a case against the auditors of Beck Industries. Beck had become a conglomerate by acquiring numerous companies in the 1960's. The president and chairman of Beck's executive board had fraudulently prepared financial statements which overstated assets and revenues. These inflated statements helped keep Beck's stock price high, and the stock and fraudulent statements were used in the acquisitions. Beck went bankrupt. The trustee for the estate sued the auditors on behalf of Beck arguing that the "outside" directors would never have authorized the aggressive acquisition program had they known Beck's true financial condition.

The court found that however negligent or unlawful the conduct of Beck's officers had been, it had not prevented the auditors from performing their audit. In analyzing the case it is difficult to see how the actions of the president and his cohorts were not on behalf of Beck and in the scope of employment. They did not steal *from* Beck *per se,* rather they launched a scheme which aggrandized the company and allowed *it* to acquire new assets (although surely their own stock holdings and positions were benefited as well). If the auditors were able to utilize the *respondeat superior* argument, they would certainly have been able to avoid or significantly cushion liability.

To date the courts have refused to permit auditors to use such arguments. A prime example is *In re Investors Funding Corp.,*[21] where the company's officers' attempted bribes led directly to the company's failure. In suing the auditors after the company failed, the trustee claimed that the officers' fraud and mismanagement would not have continued "but for" the auditor's actions. The auditor staked its defense on the claim that it was a *victim* of the officers' fraud, and not *responsible* for it. The court referred to the principles of *respondeat superior* and observed that the adverse interest test (which lets the employer *off* the hook when the employee's acts are "adverse" to the employer") does not apply when the employee is acting at least partly for the employer's benefit "even though the agent's primary interest is inimical to that of the principal."

Nevertheless, the court refused to dismiss the trustee's case and found that the officers' scheme to keep the company afloat was not even partly for the benefit of the company. It accepted the trustee's allegations that the officers' false financial statements prolonged the company's "artificial solvency," and this was "predominantly antagonistic" to the company's interests. The court held that this benefited *only* the officers and not the company.

Auditors have had a bright moment in the interim, such as in a case where the court found a company's officers had turned the company into "an engine of theft against outsiders" and refused to permit recovery on behalf of the company against its auditors.[22] But for the most part, the courts have refused to follow such logic, and refuse to saddle a client with the fraudulent or even

criminal acts of its own officers and directors, and do permit recovery against auditors.[23]

An interesting irony has developed with regard to the auditor's legal liabilities as opposed to those of the officers and directors of America's larger public companies. The former have come to be regarded as having a higher standard of diligence and care—they are the "watchdogs"[24]—than the officers and directors of their clients who have the underlying duty to honestly and faithfully account to the public for their stewardship. Auditors have not been permitted to avoid the acts of their own employees who have been found to have had fraudulent intent (even where no partners have such intent) again, because the special duties of auditors require them to be even more vigilant in monitoring their employees.[25]

In essence, the courts have permitted corporations whose downfall is attributable to their own leaders to disclaim responsibility because the leaders' acts were so wrongful as to be *"ultra vires"*—even though the corporation may have been aggrandized, incurred increased assets, and grown in share price as a result of those acts before the acts were discovered. The very shareholders and creditors of the corporations have then been permitted to collect millions of dollars in damages from auditors and their insurers to pay for the ensuing drop in share price, the debts, and the shortfalls created by the wrongdoers. On the contrary, the courts have not permitted auditing firms to escape liability where the acts of partners or junior auditors are clearly and undeniably contrary to the audit firms' overall interests and their own published policies and procedures.[26] Has the pendulum swung too far? Should corporations, their shareholders and creditors (who frequently have significant corporate governance power through debt covenants and agreements) share in the responsibility for ensuring that their corporate leaders prepare and release accurate financial statements?

III. Expansion of the "Protected" Class

The subject of the expansion of class of those who will be permitted to bring suit against the auditor always begins with a discussion of *Ultramares Corp. v. Touche,*[27] even though *Ultramares* was not the first case to restrict the class of those entitled to sue an auditor.[28] In *Ultramares,* Touche, Niven & Co. was retained to prepare and report on the balance sheet of Fred Stern & Co. as of December 31, 1923, as they had done for three prior years. Fred Stern financed his company through extensive borrowings, and Touche knew how Stern financed the company. Touche was aware that Stern would show its certified balance sheet to creditors. Touche supplied Stern with 32 copies of the balance sheet, each as a counterpart original. There was, however, no specific agreement with Touche as to who would see the balance sheets or how many times they might be used. There was no identification of Ultramares, no communication between Touche and Ultramares, and Ultramares had not been a Stern creditor in earlier years. The subject of who would look at the balance sheet was left indefinite.

The audit was finished and a net worth of more than $1 million was indicated in the balance sheet. Touche issued a clean opinion. The books had been falsified, and Stern was actually insolvent. Ultramares saw the balance sheet and extended substantial credit to Stern before discovery of the insolvency. It

sued Touche claiming the audit was negligent or fraudulent. There was no indication of fraudulent intent ("scienter") and the trial judge dismissed the fraud claim, but the jury found Touche negligent. The judge granted Touche a dismissal judgment notwithstanding the verdict. The Appellate Division reversed the judge's holding and held Touche negligent.

On appeal, New York's highest court reversed and found for Touche. In an eloquent opinion the famous Judge Cardozo rejected "the assault on the citadel of privity." "Privity" is the close relationship which exists between parties to a contract. Cardozo was concerned to prevent the expansion of liability for "negligent words" from growing to duplicate an action in fraud in the absence of the "indispensable element" of *scienter.* In this sense he was four decades ahead of the United States Supreme Court's decision in *Ernst & Ernst v. Hochfelder.*[29]

Dispensing with the issue of fraud since there was none, Cardozo turned to negligence. He held that auditors cannot be liable for negligence to third parties where the auditor could only foresee the third-party plaintiff in a general way. This was the case where plaintiff's loans to the audit client were within a "wide range of transactions in which a certificate of audit might be expected to play a part." Cardozo refused to unnecessarily enlarge the class of third parties which might sue auditors:

> If liability for negligence exists, a thoughtless slip or blunder, the failure to detect a theft or forgery beneath the cover of deceptive entries, may expose accountants to a liability in an indeterminate amount for an indeterminate time to an indeterminate class. The hazards of a business conducted on these terms are so extreme as to enkindle doubt whether a flaw may not exist in the implication of a duty that exposes to these consequences.

Judge Cardozo made it clear that he had no intention of "emancipating" auditors from liability. He simply would not extend it to an "indefinite" group of third parties in the absence of more than mere negligence. Much of what has happened in the auditor's legal liability during the last fifty years can be viewed as ebbs and flows in the application of the privity doctrine.

A. Privity and Unaudited Financial Statements

Conflicting opinions as to the range of accountants' liability have led courts to issue confusing decisions where unaudited statements are involved. In a number of cases, auditors have been found liable to their *client* for non-audit work,[30] and to the *public* in actions by the SEC or criminal authorities.[31] In *Natelli, supra,* the court adopted what has come to be referred to as the "suspicious inquiry" standard in connection with accountants involved in preparing unaudited financial statements. The auditor has a duty to investigate figures known by him to be suspicious, and to insist upon corrections in published reports, even though no audit is conducted.

In cases involving nonaudited statements, the courts frequently frame the critical issue as the question of extending accountants' liability to third parties who are not in privity. One line of case law continues to accept the *Ultramares* approach, while other courts take issue with *Ultramares* and generally rely on the *Restatement (Second) of Torts* (Restatement) standard in assessing the

extent of the accountants' liability. Section 552 of the Restatement rejects *Ultramares* to the extent that privity is the sole definitional criterion of duty. The Restatement standard for negligent misrepresentation seems to be "knowing reliance" rather than "reasonable foreseeability," the latter being the hallmark of the negligence determination in other areas of tort law. Courts using this analysis to find liability focus on whether the accountant knew the third party would rely upon the financial statement.

In *Bonhiver v. Graff*,[32] the Minnesota Supreme Court found an accountant liable to a third party, a receiver of an insurance company, for failing to discover an embezzlement during a write-up engagement that was never completed. The court based its decision on the fact that the accountant had audited the firm in a prior year and was aware of its poor financial condition. When the accountant personally showed his workpapers and figures to state examiners who relied on such data, such knowledge on the defendants' part "rendered them liable for their negligence" in the preparation of those workpapers. For authority, the court analogized to the *Natelli* case. For additional authority Restatement § 552 was applied.

A classic example of the Restatement reasoning is in *Ryan v. Kanne*.[33] There, the Iowa Supreme Court dealt a blow to the concept of privity, increasing considerably the accountant's potential liability to third parties. Kanne owned and operated certain businesses, including lumber companies, which had incurred considerable indebtedness. He sought the services of an accountant at the insistence of the officers of a creditor. The accountants were to determine the true amount of the accounts payable. The accountant submitted financal statements clearly marked "unaudited," but an accompanying letter described certain confirmation procedures which the accountants had undertaken to verify the accuracy of their figures. When Kanne Lumber and Supply, Inc. was incorporated and took over the assets and liabilities of Kanne's lumber business, it discovered that the accounts payable were incorrect.

The *Ryan* court looked to *Rusch Factors, Inc. v. Levin*,[34] as establishing the guiding principle to be followed for determining auditor responsibility in this context. In *Rusch Factors*, which involved a *certified* financial statement, the federal district court expressed considerable doubt about the wisdom of *Ultramares*:

> Why should an innocent party be forced to carry the weighty burden of an accountants' professional malpractice? Isn't the risk of loss more easily distributed and fairly spread by impositing [sic] it on the accounting profession, which can pass the cost of insuring against the risk on to its customers, who can in turn pass the costs on to the entire consuming public? Finally, wouldn't a rule of foreseeability elevate the cautionary techniques of the accounting profession?

The *Ryan* court concluded that "the test to be adopted is whether the third party to whom the accountant owes a duty of care is actually foreseen and a member of a limited class of persons contemplated." Recovery for negligence is limited "to persons for whose benefit and guidance the accountant knows the information is intended." The court approved the more liberal Restatement position but declined to say whether liability should extend to all foreseeable third parties.

Despite the fact that the statements were clearly labeled "unaudited," the court was unwilling to accept the accounting profession's concept of unaudited services, a rejection which was probably attributable to the court's perception of the public expectation of accountant responsibility in both audit and nonaudit engagements.

Recently in *Seedkem, Inc. v. Safranek,*[35] an Indiana corporate creditor brought a diversity action against a CPA who was a resident of Nebraska. The plaintiff claimed that financial documents prepared for the debtor were "recklessly and wantonly prepared" and the accountant knew that the unaudited, inaccurate statements failed to conform with generally accepted accounting principles. The court rejected the accountant's motion for summary judgment on strict *Ultramares* privity grounds because the case at hand was "qualitatively distinguishable," and because "in light of the overwhelming and subsequent erosion of the viability of the *Ultramares* decision, it is not so readily apparent that the state courts . . . of Indiana and Nebraska would cling to the outmoded and restrictive doctrine of privity as a precondition to a finding of accountant's liability."

The court quoted *Ryan* and noted that the state courts of Indiana and Nebraska might choose to follow § 552 of the Restatement as both have followed the Restatement's positions in other areas.

A second case which relied on the *Ryan* rationale was *Spherex, Inc. v. Alexander Grant & CO.*[36] General Home Products (GHP) engaged Alexander Grant to prepare an *unaudited* financial statement for a twelve-month period based on financial information provided by GHP. Copies of this statement were submitted by GHP to Spherex to obtain credit. When Spherex subsequently sustained a financial loss in its dealing with GHP and sued Alexander Grant, the latter contended that its liability did not extend to a third party creditor not in privity.

The court began its analysis by noting that it had previously expressed disfavor of the privity doctrine in personal injury cases: "Our reluctance to apply the privity rule has extended to allowing a proper plaintiff to recover for mere financial loss resulting from the negligent performance of services." Furthermore, the court noted a resemblance of this case to cases involving contract law in that the duty owed by Alexander Grant to Spherex was "not entirely dissimilar to the duty we have held a promisor owes to an intended third-party beneficiary." Next, the court analyzed the evolution of the *Ultramares* holding and its privity requirement. According to the New Hampshire court's observation, "judges have not hesitated to permit recovery where the plaintiff's identity was specifically known to the negligent defendant." The reason for this, the court stated, was that judges are seeking to link the privity doctrine with Cardozo's "social utility" rationale of protecting professions from the specter of unlimited liability to a virtually limitless class of plaintiffs. The real question, said the court, is whether the defendant has some special reason to anticipate the reliance of the plaintiff.

According to the *Spherex* court, the second reason for distinguishing the *Ultramares* opinion is that it is "a relic of a bygone economic era." Both the sophistication of modern accounting procedures and the accountant's central role in the financing and investment industry are a far cry from the fledgling profession in need of judicial protection that existed at the time of *Ultramares.*

Under this court's theory, if the choice is between the reliant third party and the CPA, the accountant should bear the burdens of legal responsibility. The court buttressed this reasoning by drawing an analogy between an accountant and a manufacturer under product liability law. Both are "in the best position to regulate the effects of [their] conduct by controlling the degree of care exercised during the performance of [their] professional duties." The court concluded that the Restatement harmonizes the accountant's contemporary role and his potential liability, and "represents a reasoned approach to the issue of professional liability for negligent misrepresentation."

B. Potential Widespread Liability to Third Parties

In *Citizens State Bank v. Timm, Schmidt & Co.*,[37] the issue was phrased as a broad question: "May an accountant be held liable for the negligent preparation of an audit report to a third party not in privity who relies on the report?" The court answered in the affirmative, based on the principles of Wisconsin negligence law. The defendant accountants in this case regularly prepared financial statements for their client CFA. In November 1975, Citizens Bank made a loan to CFA after reviewing the statements Timm had prepared. In early 1977, during the course of preparing CFA's financial statement for the previous year, Timm's employees discovered that the 1974 and 1975 statements contained a number of material errors totalling over $400,000. Once informed of these errors, the bank called its loan, resulting in CFA going into receivership and dissolving.

The court characterized the issue as one of first impression in the state of Wisconsin. For authority, the court turned to sources such as *Rusch Factors, Ryan,* and the Restatement § 552. The court also analogized to a Wisconsin state case involving an attorney who was held liable to a beneficiary not in privity for the attorney's negligence in supervising the execution of a will. The court observed that the imposition of liability would make attorneys and accountants more careful in the execution of their responsibilities:

> Unless liability is imposed, third parties who rely upon the accuracy of the financial statements will not be protected. Unless an accountant can be held liable to a relying third party, this negligence will go undeterred.

This "public policy" rationale was the main argument on which the court "hangs its hat." But there were "additional policy reasons to allow the imposition of liability." The court feared that if relying third parties, such as creditors, were not allowed to recover, the cost of credit to the general public would increase. Accountants, on the other hand, might spread the risk through the use of liability insurance. The court concluded that accountants' liability to third parties should be determined under (and limited by) the accepted principles of Wisconsin state negligence law:

> According to these principles, a finding of non-liability will be made only if there is a strong public policy requiring such a finding. . . . Liability will be imposed on these accountants for the foreseeable injuries resulting from their negligent acts unless, under the facts of this particular case, as a matter of policy to be decided by the court, recovery is denied on grounds of public policy.

In *Rosenblum, Inc. v. Adler,*[38] the New Jersey Supreme Court determined on appeal from a motion for partial summary judgment that public policy did not preclude the imposition of liablity on accountants to third parties not in privity. The plaintiff-shareholders acquired stock in Giant Store Corporation, allegedly relying on the correctness of the audits done by defendants Touche Ross. Unfortunately, Giant had manipulated its books by falsely recording assets it did not own and omitting substantial amounts of accounts payable so the financial information that Touche had certified in the 1971 and 1972 statements was incorrect.

While the New Jersey court obviously strained to be methodical and comprehensive, the reasoning of the opinion is tenuous at many points. The court engaged in a two-step process to determine the accountant's liability in this situation. "First, we shall consider whether, in the absence of privity, an action for negligent misrepresentation may be maintained for economic loss against the provider of a service." The case law in New Jersey is split on this issue, according to the court. However, the court did note that the requirement of privity was long ago discarded in product liability cases based on negligence. After a review of the decisions demonstrating that negligent representations referring to products may be the basis of liability irrespective of privity, the court answered the question it had posed:

> Why should a claim of negligent misrepresentation be barred in the absence of privity when no such limit is imposed where the plaintiff's claim also sounds in tort, but is based on liability for defects in products arising out of a negligent misrepresentation? If recovery for defective products may include economic loss, why should such loss not be compensable if caused by negligent misrepresentation? The maker of the product and the person making a written representation with intent that it be relied upon are, respectively, impliedly holding out that the product is reasonably fit, suitable and safe and that the representation is reasonably sufficient, suitable and accurate. The fundamental issue is whether there should be any duty to respond in damages for economic loss owed to a foreseeable user neither in privity with the declarant nor intended by the declarant to be the user of the statement or opinion.

The second question which the court framed was: "what duty [should] the auditor . . . bear to best serve the public interest in light of the role of the auditor in today's economy?" Whether a duty exists, asserted the court, is ultimately a question of fairness. The judicial analysis that must be made "involves a weighing of the relationship of the parties, the nature of the risk, and the public interest in the proposed solution."

The court appraised the fairness of imposing a duty by first reviewing the auditing function of an accountant, concentrating on how it has changed and developed over the years. For example: "It is now well recognized that the audited statements are made for the use of third parties who have no contractual relationship with the auditor. Moreover, it is common knowledge that companies use audits for many proper business purposes. . . ." And: "The auditor's function has expanded from that of a watch-dog for management to an independent evaluator of the adequacy and fairness of financial statements issued by management to stockholders, creditors, and others." The court added that despite expanded liability, accountants have been able to

obtain insurance to cover these risks, leading them to believe that auditors should be able to "purchase malpractice insurance policies that cover their negligent acts leading to misstatements relied upon by persons who receive the audit from the company pursuant to a proper business purpose."

When the court tacked on to the previous discussion the ideas that the imposition of a duty to foreseeable users will "cause accounting firms to engage in more thorough reviews" and the extent of financial exposure already has certain "built-in limits" to protect auditors from too much liability, the fate of the defendant was sealed. The policy arguments made in *Rusch Factors Inc.*, that the accountant can more easily carry the burden of liability were repeated here, but the New Jersey court did add its own philosophy: "it is just and rational judicial policy that the same criteria govern the imposition of negligence liability, regardless of the context in which it arises." The court believed that the investor and the general public will benefit in the long run when the liability of the CPA for negligent misrepresentation is measured by the foreseeability standard.

In applying the above analysis to the facts at hand, the court looked *first* to see whether the entity for whom the audit was being made (Giant) used it for a "proper business purpose." Acccording to the opinion, the defendants should reasonably expect that their client would distribute the financial statements pursuant to matters relating to its business, particularly given that there was no limitation in the accountants' opinion. The second requirement for finding liability is justifiable reliance. "Having inserted the audit in that economic stream" the defendants should be responsible for "their careless misrepresentations to parties who justifiably relied upon their expert opinions."

Rosenblum is a frightening spectre for the profession. At the same time as auditors are unable to secure reasonable insurance coverage, courts assume the fact of that coverage and extend liability even further.[39]

C. The Ultramares Court Speaks Again

The New York Court of Appeals had an opportunity to revisit the privity issue a little less than a year ago in *Credit Alliance Corporation v. Arthur Andersen & Co.*,[40] which considered two different appeals by two different accounting firms. In the *Andersen* case, plaintiff Credit Alliance and others were major financial services companies which financed the purchase of capital equipment through installment sales or leasing agreements. They provided financing to L.B. Smith (Smith), a "capital intensive enterprise that regularly required financing." Plaintiff began to insist in 1978 that Smith provide audited financial statements as a pre-condition to further loans. Smith provided its consolidated financial statements for the years 1976 and 1977 examined and reported upon by Andersen. In reliance on the statements, plaintiff provided substantial loans to Smith. Plaintiff continued to receive, rely, and lend on Smith's financial statements in 1979. Smith petitioned for bankruptcy in 1980 while in default to plaintiff on several million dollars of debt.

Plaintiff sued Andersen alleging negligence and fraud, claiming Andersen knew or should have known that Smith was showing the statements to it for the purpose of obtaining loans. Andersen's motion to dismiss the negligence claim on privity grounds was denied in the lower court. The Appellate Division

affirmed, finding plaintiff fit into a narrow New York exception to the privity rule because the plaintiff was a member of the "limited class" entitled to rely on Andersen's report. The Court of Appeals reversed the decision in favor of Andersen.

In the second case, European American Bank (EAB) sued the firm of Strauhs & Kaye (S&K) because it made large loans to Majestic Electro (Majestic) beginning in 1979, allegedly in reliance upon interim and year-end financial statements reported upon by S&K. S&K allegedly overstated Majestic's inventory and accounts receivable and did not disclose Majestic's poor internal controls. Majestic went into bankruptcy in 1983 after defaulting on the loans to EAB. EAB sued S&K, alleging negligence in auditing and that S&K was familiar with the EAB-Majestic lending relationship and lending agreements, including the fact that EAB was receiving and relying upon the S&K audited financial statements. Indeed, there were allegations that S&K and EAB representatives had been in direct oral and written communication during the entire course of the lending relationship. On S&K's motion in the lower court, the complaint was dismissed for lack of privity. The Appellate Division reversed citing the direct communication between S&K and EAB—using a Restatement § 552 approach—and observing that S&K specifically knew EAB was relying on the financial statements. The Court of Appeals affirmed in S&K's case.

The Court of Appeals reviewed the *Ultramares* case and its rationale and reaffirmed it as expounded upon. The court observed that some relationships are "so close as to approach privity" and that would be a sufficient predicate for finding liability, thus the result in the EAB portion of the case. The Court of Appeals focused on the fact that in *Ultramares* the accountants only knew "generally" that third parties would see the report, and nothing had been said between auditor and client about who would see the reports "or the extent or number of transactions in which they would be used." The court distinguished this situation from one where the facts bespeak "an affirmative assumption of a duty of care to a specific party, for a specific purpose, regardless of whether there was a contractual relationship." It found the Andersen case to fit the *Ultramares* type of fact pattern, while the S&K case fit the latter situation.

The Court of Appeals set forth a test for guidance in determining whether auditors should be held liable to those not in privity:

> Before accountants may be held liable in negligence to noncontractual parties who rely to their detriment on inaccurate financial reports, certain prerequisites must be satisfied: (1) the accountants must have been aware that the financial reports were to be used for a particular purpose or purposes; (2) in the furtherance of which a known party or parties was intended to rely; and (3) some conduct on the part of the accountants linking them to that party or parties, which evinces the accountants' understanding of that party or parties' reliance.

The court observed that different states had adopted different standards in addressing the privity issue. Some like New Jersey and Wisconsin had thrown it out and extended liability to any third party who could be foreseen to rely on the financial statements. Others, like Pennsylvania, Florida, Georgia, Colorado and Kansas follow a strict *Ultramares* privity test. Still others use the Restatement approach. The New York Court of Appeals explanation of what

Ultramares means and how liability may extend to third parties in appropriate factual circumstances is certainly a reasonable, well-thought-out and refreshing consideration of the issue. It is also another end of the historical thread linking the development of today's standards to the earlier precedents.

IV. Where We Are Headed

This paper has considered the historical development of several facets of auditor's responsibilities, standards and liabilities; the interplay between litigation, legislation and professional standards; the broadening of the auditor's responsibilities to its client even in the face of management's criminal activities; the overlay of potential criminal liability to those who close their eyes to suspicious developments and attempt blindly to follow GAAP; and, the incredible expansion of third parties who have been held entitled to rely on financial statements and to sue the auditor. It remains to consider what the future may hold. It would be impossible to consider all ramifications outside the context of a textbook or a novel.

In the ESM litigation referred to *supra,* Alexander Grant is being sued for millions of dollars in damages by numerous customers of ESM including various municipalities from around the country. The allegations of the suits incorporate the expected common law negligence and fraud claims, and securities law violations. They go further and allege violations of the Racketeer Influenced and Corrupt Organizations Act (RICO),[41] that Alexander Grant participated with others through a "pattern of racketeering activity" to use ESM as an enterprise to commit criminal acts. If successful in proving a RICO case, damages to which the plaintiffs would be entitled would be trebled and could theoretically approach $1 billion. While the allegations of ESM present a rather wide departure from appropriate auditing and accounting standards, the spectre of RICO liability for auditors in connection with "garden variety securities fraud" cases looms ahead.

RICO was originally drafted to stem the inroads by organized crime into legitimate businesses. It provides a civil suit remedy and has become a favorite of the plaintiffs' bar. Last summer accountants were hoping for relief when the Supreme Court decided *Sedima S.P.R.L. v. Imrex Co.*[42] Unfortunately, the Court refused to read RICO narrowly and ruled that its civil provisions could be applied to virtually all commercial disputes. Justice White acknowledged the problem, but observed that the cure "must lie with Congress." Congress, however, has shown no serious intention to amend RICO. Certainly, on the heels of the ESM scandal and the media attention given to the E.F. Hutton overdrafting system, the public has not indicated that it favors a narrowing of RICO's targets to accept "legitimate businessmen" such as auditors.

Even the foreign judicial systems and lending agencies have caught the fever. In an Australian case, *Cambridge Credit Corp. v. Hutcheson,* the auditors were found liable for a negligent audit and the plaintiff was awarded approximately $100 million (an amount exceeding the audit firm's assets as well as those of its individual partners). In recent lawsuits in New York a foreign government, England, and at least ninety other plaintiffs have sued Arthur Andersen in several federal actions as a result of the collapse of John DeLorean's automobile venture. The suits allege securities violations as well

as RICO causes of action, and request $270 million in damages to be trebled to nearly $800 million. The British government invested $120 million to finance DeLorean's Belfast, Ireland factory.

Andersen issued a clean opinion for DeLorean Motor Company. The plaintiffs allege that some of their money was diverted through a Swiss bank account of GPD Services, Inc. (a Panamanian company) to DeLorean's personal account. They claim as well that Andersen had ample knowledge of questionable transactions between GPD and DeLorean's company. The plaintiffs suggest that Andersen workpapers indicate an awareness of problems which should have brought the *Natelli* "suspicious inquiry doctrine" into play.[43]

Dramatic, albeit not quite as dramatic, mega-suits have evolved against auditors as a result of the Penn Square National Bank and Drysdale Government Securities scandals. The number of such lawsuits is not likely to decline in the near future, thus making it more difficult for auditors to obtain insurance.

At the same time as these suits appear, our legislators in Washington continue to examine the conflict-of-interest standards and other alleged deficiencies of the profession. Representative John Dingell (D. Mich.) is chairman of a House oversight subcommittee before which witnesses have criticized the peer review system, the SEC's laxity in overseeing the profession, and the fact that audit client's management hire, fire, and pay the auditor. The latter criticism allegedly makes auditors reluctant to report objectively on their client's financial statements and/or to blow the whistle where appropriate. In addition, certain accounting treatments which are justifiable under GAAP have been questioned. Dingell and some of his witnesses are unhappy with the flexibility afforded under GAAP for various methods of depreciation, costing of inventory, as well as for alleged inconsistency of disclosure for various accounting treatments. The subcommittee has been troubled by the issuance of clean opinions just prior to financial debacles which have made front page news.

The Dingell subcommittee required the Big Eight accounting firms to submit detailed disclosure reports relating to litigation losses as well as to internal matters. As of yet, Dingell shows no lack of continued interest in pursuing the oversight hearings. Not even Washington insiders are sure where the subcommittee will end up. The ultimate questions, of course, are: Will there be some form of more direct government regulation of the practice? Will auditors be permitted to continue to practice in the scope of practice which is currently enjoyed? Will more dramatic corporate governance mechanisms become the rule?

Whatever the results of the trends, the pattern is a continuum of what has been happening in the profession for more than 80 years. The financial community's demand for accurate financial information has grown, not abated. Auditors created a business for themselves over the past 130 years of fulfilling the marketplace's financial information needs. Indeed, the CPA's license is a franchise to attest with respect to the market's financial statements. That marketplace, as well as the regulators responsible for oversight, had been allocating greater and greater responsibility—with attendant legal liability—to the profession. In many cases the expansion was based upon a now obsolete

premise that the auditor could, in turn, assess that liability broadly through fee structure and insurance coverage.

As the profession faces this challenge, several actions seem imperative. The profession must reflect upon standards which are unclear, ambiguous, or insufficient. The *wide* flexibility favored by George May is simply so out of favor in several critical areas that it needs to at least be reexamined. The profession must be even more vigilant in applying the suspicious inquiry doctrine. Several more major financial scandals where clean reports have been issued will only spur on the regulators and the plaintiffs' bar. The profession and its representatives must be media-conscious and take initiative to get its message to the public. It should perhaps explain the billions of dollars of financial transactions which are successfully audited year-in-and-year-out. It should lobby and communicate about the problems associated with RICO and the current use of the adverse interest analysis. But, the profession is far from fatally diseased. If history repeats itself, it will make the appropriate accommodations and move forward.

End Notes

1. 7 & 8 Vict., Chapter 110. This was the first comprehensive law allowing corporate development after the repeal in 1825 of the "Bubble Act," which itself was enacted in 1720, after the South Sea Company "Bubble Case" scandal broke, in an effort to restrict speculative investing in chartered companies.

2. A.C. Littleton, *Accounting Evolution to 1900* (1966). *See also,* H.C. Edey and P. Panitpakdi, "British Company Accounting and the Law 1844–1900," reprinted in *Studies in the History of Accounting,* ed. A.C. Littleton and B.S. Yamey (1956), pp. 356–61.

3. 19 & 20 Vict., Chapter 47.

4. 63 & 64 Vict., Chapter 48 § 23; and, Edw. VII, Chapter 50 § 19 (2)(b), respectively.

5. *See generally,* J.L. Carey, *The Rise of the Accounting Profession,* Vol. I (1969); N. Stacey, *English Accountancy 1800–1954* (1954); and *Contemporary Studies in the Evolution of Accounting Thought,* ed. M. Charfield (1968).

6. 19 & 20 Vict., Chapter 47, Table B, art. 84.

7. *In re London and General Bank,* 2 Ch. 673 (C.A. 1895); *Leeds Estate, Building and Investment Co. v. Shepherd,* 36 Ch. D. 787 (1887).

8. D. Causey, *Duties And Responsibilities of Certified Public Accountants* (1979), p. 15.

9. *E.g.,* A. Berle Jr. and G. Means, *The Modern Corporation and Private Property* (1933); W. Ripley, *Main Street and Wall Street* (1927).

10. G. May, *Twenty-five Years of Accounting Responsibility 1911–1936* (1936) pp. 112–144.

11. 15 U.S.C. §§ 77a–77aa.

12. 15 U.S.C. §§ 78a–78jj.

13. SEC Accounting Series Release No. 19, *In the Matter of McKesson & Robbins, Inc.* (1940).

14. *United States v. Simon,* 425 F.2d 796, 799 (2d Cir. 1969).

15. *United States v. Natelli,* 527 F.2d 311 (2d Cir. 1975) *cert. denied,* 96 S. Ct. 1663 (1976).

16. In fact the standards for utilizing the percentage-of-completion method versus the completed contract method for "long-term projects" was an area of great uncertainty in this period, and became more so during the 1970's. One of the collateral results of the NSM litigation had an impact much like *McKesson & Robbins.* As a part of its undertaking pursuant to its consent decree terminating the SEC's litigation against it, Peat, Marwick agreed to prepare a set of guidelines pertaining to accounting for long-term contracts and the percentage-of-completion method. In particular, the resulting Peat, Marwick paper called for tightening up of procedures in the area of recognizing revenues on claims and unbilled receivables. The Peat, Marwick paper was used as one of the starting points by the AICPA for what eventually was published in 1981 as *Audit and Accounting Guide—"Construction Contractors."* Thus, unsuccessful accountant's litigation again led to new standards for the profession.

17. *United States v. Weiner,* 578 F.2d 757 (9th Cir. 1978).

18. *See, e.g., Craig v. Anyon,* 212 App. Div. 55, 208 N.Y.S. 259 (1st Dept. 1925), *affirmed,* 242 N.Y. 569, 152 N.E. 431 (1926).

19. *See, e.g.,* National Surety Corp. v. Lybrand, 256 App. Div. 226, 9 N.Y.S.2d 554 (1st Dept. 1939).

20. 380 F. Supp. 1053 (S.D.N.Y. 1974).

21. 523 F. Supp. 533 (S.D.N.Y. 1980).

22. *Cenco Inc. v. Seidman & Seidman,* 686 F.2d 449 (7th Cir.), *cert. denied,* 459 U.S. 880 (1982).

23. *See, e.g., Schachtt v. Brown,* 711 F.2d 1343 (7th Cir.), *cert. denied,* 464 U.S. 1002 (1983); *Holland v. Arthur Andersen & Co.,* 469 N.E.2d 419 (Ill. Ct. App. 1984).

24. *United States v. Arthur Young & Co.,* 466 U.S. 936 (1984).

25. *Sharp v. Coopers & Lybrand,* 649 F.2d 175 (3d Cir. 1981); *cert. denied,* 455 U.S. 938 (1982).

26. As an aftermath of the ESM Securities scandal, Alexander Grant (now Grant Thornton) is seeking to avoid responsibility for the acts of its wayward general partner—who has pleaded guilty to accepting ESM money—under the *ultra vires* doctrine.

27. 255 N.Y. 170, 174 N.E. 441 (1931).

28. *See, e.g., Landell v. Lybrand.* 264 Pa. 406, 107 A. 783 (1919).

29. 425 U.S. 185 (1976).

30. *E.g., 1136 Tenants Corp. v. Max Rothenberg & Co.,* 36 A.D.2d 804, 319 N.Y.S.2d 1007 (1st. Dept. 1971); *affirmed,* 30 N.Y.2d 585, 281 N.E.2d 846 (1972) (auditor claimed it was engaged to do write-up work but jury agreed with client that there was to be an audit); *Stanley L. Bloch, Inc. v. Klein,* 45 Misc. 2d 1054, 258 N.Y.S.2d 501 (1965) (auditor held liable on preparation of interim unaudited financial statements).

31. *E.g., United States v. Natelli, supra,* 527 F.2d 311 (2d Cir. 1975). *See also Blakely v. Lisac,* 357 F. Supp. 255 (D.Or. 1972) (auditor liable on unaudited financial statements included in a prospectus even though he was performing an unaudited write-up); and *Escott v. BarChris Construction Corp.,* 283 F. Supp. 643 (S.D.N.Y. 1968) (liability *re* an S-1 review—which was treated by the court as a non-audit engagement).

32. 311 Minn. 111, 248 N.W.2d 291 (1976).

33. 170 N.W.2d 395 (Iowa 1969).

34. 284 F. Supp. 85 (D.R.I. 1968).

35. 466 F. Supp. 340 (D.Neb. 1979).

36. 122 N.H. 898, 451 A.2d 1308 (1982).

37. 113 Wis. 2d 376, 385 N.W.2d 361 (1983).

38. 93 N.J. 324 (1983).

39. S.H. Collins, "Professional Liability: The Situation Worsens," *Journal of Accountancy* (November, 1985), pp. 57-66; L. Berton, "Small CPA Firm's Liability Rates Soar," *The Wall Street Journal* (November 19, 1985), p. 6; "Damage Suits Threaten Future of Big Eight Accounting Firms," *The Washington Post* (July 14, 1985).

40. 66 N.Y.2d 812, 498 N.Y.S.2d 362, 489 N.E.2d 249 (1985).

41. Racketeer Influenced and Corrupt Organizations Act. 18 U.S.C. §§ 1961 *et seq.*

42. *Sedima S.P.R.L. v. Imrex Co.,* 105 S. Ct. 3275 (1985).

43. J. Cummings, "An Audit Under Fire," *The New York Times* (March 16, 1986), Business Section, p. 1.

Discussant's Response to "'Under the Spreading Chestnut Tree' Accountants' Legal Liability— A Historical Perspective"

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Paul has done an excellent job of developing the history of accountants' legal liability. The message of the paper is enhanced by his introduction of some of the cast of characters who have helped shape the development of the subject—from the likes of George May of Price Waterhouse to Philip Musica, alias Frank Donald Coster, of McKesson & Robbin's.

My discussion of the content of Paul's paper will not address the factual settings which underlie the "landmark" cases presented nor will it address the general description of the all too well known tightening of accountants' liability. Rather, my comments will be restricted to expanding some topics discussed by Paul and possibly taking issue with respect to a few.

Whose Duty to Whom?—Some General Observations

The author presents the expansion of the role and responsibilities of the public auditor as one resisted and fought aggressively by auditors. Furthermore, he notes that "changes were frequently the result of litigation losses and/or government intervention."

One might respond that the first of these observations is accurate but a realistic occurrance due in part to a rather young profession trying to find its way to maturity while at the same time attempting to avoid the risks that might abate the maturation process. The second comment about change resulting from litigation could apply to many disciplines. Practicing professionals do not allocate resources to develop procedures to prevent problems unless significant problems exist or critical problems are perceived as imminent. Some might criticize this rather sympathetic response by stating that the accounting profession has done too little too late. The Moss-Metcalf and Dingell committees might be among those critics.

Professionalism

I believe the examination of the legal liability of accountants cannot be viewed as a single issue but must be couched in terms of the degree or extent to which we view accounting as a profession. The degree of professionalization of any occupation depends on how many of the following characteristics, and how much of each, it possesses:

a) General, systematic knowledge.
b) Authority over clients.
c) Community rather than self-interest; symbolic rather than monetary rewards.
d) Self-control.
e) Recognition by the public and law of professional status.
f) A distinctive culture.

Eliot Friedson, on the other hand, contends that the sole defining characteristic of a profession is its convincing of the public and the state of its right to self-control over work-related matters (Ritzer, 1972). Students of accounting history would have no problem seeing the relationship between all or part of these two definitions of a profession and their own accounting profession.

A State of Change

A seesawing relationship does exist between the development by CPAs of professional auditing standards and the liabilities of CPAs as public auditors to their clients and the public. This seesawing seems quite appropriate given the dynamic nature of both the accounting profession and our society's social-economic structure. Organizations and institutions, including professions, are expected to be responsive to the changing needs of the society in which they operate. Unobservant, rigid, and less responsive organizations and professions go the way of the dinosaur.

Our mission should be to carry on a continuing dialogue with the users of our products and services in a positive, nonadversarial way. Unfortunately, much of our profession's highly publicized communication with users has been through their representatives, Moss-Metcalf and more recently Dignell, and the judicial system. More has been written on the users' lack of understanding of accountants' products and service than has been written to address and overcome the problem.

Sharing the Blame

The author raises two issues about the responsibility of employers for the acts of employees. The first relates to adverse interest analysis. The second relates to the double standard held by the courts; CPA firms appear to be held to a higher standard of supervision for their employees than do clients in supervising their employees.

Fraud or Poor Quality Control

Originally, the employer was responsible for the acts of his employee (agency theory—respondeat supervisor) when the latter acted beyond the scope of employment (adverse to the interest of the employer) *if* the employer was "contributorily negligent" because of failure to avoid the loss by not exercising reasonable care in supervising employee(s). This standard was diluted by the "modified contributory negligence test" which narrowed the employer's exposure to liability. The employer now must somehow contribute to the auditor's inability to detect the employee's fraud.

I would like to make two comments in response to what Paul has said about adverse interest analysis. First, as much attention as employees' fraud receives and as devastating as it is on employers (clients), the CPA firms, and the shareholders, fraudulent activities by employees account for only a small percentage of the accountants' liability problems. St. Pierre and Anderson undertook a study which showed that of 334 errors found in 129 law cases examined, only 13 percent related to client (employee) fraud while 33 percent and 15 percent related to problems interpreting accounting principles and auditing standards, respectively (St. Pierre and Anderson, 1984).

Second, the GAO recently issued a report stating that CPAs did not satisfactorily comply with standards on 34 percent of the governmental audits they performed, and more than half of the unsatisfactory audits had severe violations of standards. Two prominent problems identified were insufficient audit work in testing compliance with governmental laws and regulations and the evaluation of internal accounting controls. Smaller CPA firms had greater problems in complying with standards (GAO, 1986). One might conclude from the above discussion that CPAs have a problem with the professional characteristic of "self-control" as mentioned earlier in my remarks.

Spotlight on Management and the Board

Let's assume that material employee fraud, regardless of the small frequency cited above, induces a state of trauma for the client, the public auditor, investors and creditors. Are we, as accountants, to accept the courts' shifting of burden to accountants with the formulation of the modified contributory negligence test? I think not! Clearly, the courts and users have fallen into the expectation gap, the area where perceived levels of responsibility for such things as fraud detection and compilation and review services exceed the auditors' actual responsibility as expressed in professional standards and determined by reasonable cost-benefit considerations. We must educate all user groups including primary users such as investors and creditors, as well as the secondary user groups composed of individuals in the judicial and legislative branches of government.

I do agree with the author that the courts have gone too far in holding auditors more responsible than the client's management and board for an employee's action that is clearly beyond the scope of legal and reasonable business practice. Of the four most commonly identified management functions of planning, organizing, directing, and **controlling,** the courts seem to be overlooking the last of the four functions. Broadly stated, controlling is the process by which managers determine whether organizational objectives are achieved and whether actual operations are consistent with plans.

The four management functions are interrelated and should not be viewed as separate or discrete. All management functions may be viewed within the context of control systems with the following objectives (IIA, 1978):

1. reliability and integrity of information;
2. compliance with policies, plans, procedures, laws and regulations;
3. safeguarding of assets;
4. economical and efficient use of resources; and

5. accomplishment of established objectives and goals for operations and programs.

One might assume that the more effectively these control objectives are achieved, the better the firm's managment.

Our socio-economic structure often permits an inbalance, for a certain period of time, before adjustments are subsequently induced to return to what society views as an equilibrium. Forces have been at work for more than ten years to induce changes to check the undesirable behavior of corporate managements and boards. These changes include:

1. passage of the Foreign Corrupt Practices Act of 1977;
2. adoption of audit committees by many corporate boards;
3. introduction and/or enhancement of the internal audit function in corporations; and
4. the collapse of the "good old boys" boardroom environment.

Collectively, these four changes have had, and will continue to have, a dramatic influence on improving corporate accountability. An additional potential influence, but one that has yet to produce benefits because its work is not completed, is the National Commission on Fraudulent Financial Reporting. Recently, the Commission's chairman, James C. Treadway suggested a mandatory expanded role for internal auditors in some circumstances (IAA, 1986).

The items in the two previous paragraphs have heightened the independence and, in a general professional sense, the authority of the public auditor over the client. As a result, CPAs now have a stronger degree of professionalism.

Supervision of Staff

Turning to Paul's comment on the double standard of the court, i.e., CPA firms appear to be held to a higher standard of supervision for their employees than do clients in supervising their employees. My response is: why not? Professionals should be held to a higher level of care than non-professionals.

Firms that are members of the AICPA Division of CPA Firms are obligated to adhere to quality control standards promulgated by the institute. Quality control standards, among other things, call for establishing policies and procedures for supervising the work of firm personnel. Seven of the nine elements of quality control relate directly to firm personnel (AICPA, 1986). The fact that the profession has taken such a step attests to the fact that the profession has attempted to meet its responsibility to society. Unfortunately, membership in the division is not mandatory for all firms.

A Matter of Perspective

Any discussion about expanding the classes of plaintiffs who should be permitted to be successful in their suit against the auditor is always explosive. Discussants generally have a hard time balancing their own economic interests with the general social good.

The courts, social commentators, and critics have had a hard time applying existing responsibility models to the accounting profession. What other

profession gets paid by the party with whom they contracted while the benefits of that relationship flow, in many cases, to their parties, aptly coined by Judge Cardoza, "an indeterminate class"? The courts have had difficulty reconciling the amount of the public auditor's responsibility with the amount of loss suffered by potentially great numbers of people the public auditor himself admittedly intends the product of his attest function to serve. At the extreme, a judge, unfamiliar with all of the variables in play, might, after reading Statement of Financial Accounting Concepts No. 1 (FASB, 1978) think that public policy dictates that liability for ordinary negligence be imposed on accountants for foreseeable injuries resulting from their negligent acts.

The question is, are society's expectations realistic? Let's explore *H. Rosenblum, Inc. v. Adler,* one example that reflects society's expectations through the pen of the judge who wrote the opinion[1]. Although the author first discusses *Citizens State Bank v. Timm, Schmidt & Co., Rosenblum, Inc. v. Adler* is the initial case to hold accountants liable for ordinary negligence to foreseeable third parties. On the surface, the logic underlying the New Jersey Supreme Court decision appears sound. However, it is flawed. The author recounts the court's two-step process to determine the accountant's liability. I would like to use the same process but take a different approach than the author in responding to the court.

The court began "first, we shall consider whether, in the absence of privity, an action for negligent misrepresentation may be maintained for economic loss against the provider of a service." The court continued:

> If recovery for defective products may include economic loss, why should such loss not be compensable if caused by negligent misrepresentation? The maker of the product and the person making a written representation with intent that it be relied upon are, respectively, impliedly holding out that the product is reasonably fit, suitable and safe and that the representation is reasonably sufficient, suitable and accurate.

In response, I believe the differences found in the comparison made between a manufacturer's product and a public auditor's opinion appear to far outweight the similarities. The manufacturer controls, and is responsible for, the process by which the product is made as well as the product resulting from that process. Likewise, as pointed out earlier, the client controls, and is responsible for, the adequacy of the accounting process and its product. The public auditor, on the other hand, is charged to test management's assertions which are articulated in the financial statements. A similar position is also held by Gormley and Minnow (Gormley, 1984; Minnow, 1984).

The author then analyzes the court's second question—"what duty should the auditor . . . bear to best serve the public interest in light of the role of the auditor in today's economy?" The duty found to exist must be equated with what is fair; the analysis of fairness "involves a weighing of the relationship of the parties, the nature of the risks and the public interest in the proposed solution."

In response, the courts judging fairness in terms of the objectives of financial reporting mentioned earlier totally avoid addressing the broader issue which has given rise to the litigation explosion. It appears that the courts have

rejected the idea that when professionals are working at the best of their ability, within the concept of the average prudent auditor, there are chance occurrences that may still befall the client. The rejection of this assumption leads the courts to accept the idea that all losses shall be borne by someone. This, in turn, leads to the notion that the deep pocket has no bottom; a fountain of funds for all those who, by mere chance, have suffered a loss. Courts in New Jersey, Wisconsin, and most recently California, in *International Mortgage Company v. John P. Butler Accounting Corporation,* view insurance as a readily available vehicle for making the plaintiff whole and have extended the accountant's liability to foreseeable parties. Resultant insurance premium increases, the courts believe, can be passed along to all consumers.

The insurance public policy argument has been successfully employed in many other segments of our society. So successful has been its use that the insurance piggy bank is nearly empty.

Between 1975 and 1984 product liability cases have increased 600 percent to approximately 10,500; suits against officers and directors have increased more than 200 percent during the same time period (Samuelson, 1986). This significant increase in liability cases is due primarily to the self serving interests of the members of the Association of Trial Lawyers, whose ranks tripled in the last 15 years to 60,000. This group has placed its own economic interests ahead of the "public interest," or so many believe. A wave of reforms are under consideration in state capitals and Washington. In Washington, the Kasten bill limits the amount of contingency-fee lawyers can earn, and also restricts joint and several liability (WSJ, 1986).

Summary and Conclusions

Survival of the profession has and will continue to be measured in terms of the ability of its members to adapt to changes in society. Change should be looked upon as an opportunity, an opportunity to serve, grow and mature.

The application of extending liability of accountants to reasonably foreseeable third parties will probably increase beyond the three states where it is now applied. The profession can meet this challenge by aggressively pursuing:

- A continuing dialogue with users of financial statements as to the role and responsibilities of the external auditor, corporate management, and boards in the financial reporting process.
- Mandatory membership in the AICPA Division for CPA Firms for all firms.
- A reasonable limitation, such as a multiple of the annual audit fee, on the amount of liability extended to CPA defendants and elimination of joint and several liability.

End Notes

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2

An Assertion Based Approach To Auditing

Donald A. Leslie
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1. Some History And Introductory Comments

It is our contention that there is a theory of auditing, that there exist a number of basic assumptions and a body of integrated ideas, the understanding of which will be of direct assistance in the development and practice of the art of auditing. Further, it is our belief, which we attempt to support in the following pages, that an understanding of auditing theory can lead us to reasonable solutions of some of the most vexing problems facing auditors today.

Mautz and Sharaf
The Philosophy of Auditing, p. 1
American Accounting Association, 1961

It is interesting to note that this is the Silver Anniversary of what is probably the most recognized pioneering work on auditing theory. It is a pleasure to have Bob Mautz with us today as a participant in Auditing Symposium VIII.

The earliest reference to the concept of **assertions** that we could locate in the auditing literature can be found in Chapter 5 of Mautz and Sharaf. After publication of ***The Philosophy of Auditing*** by the American Accounting Association in 1961, the concept of assertions appears to have gone into hibernation until 1973 when it made a brief appearance in *A Statement of BASIC AUDITING CONCEPTS* [ASOBAC]. The definition of auditing provided in ASOBAC was:

> Auditing is a systematic process of objectively obtaining and evaluating evidence regarding **assertions** about economic actions and events to ascertain the degree of correspondence between those **assertions** and established criteria and communicating the results to interested users.

In the early 1970s R.J. Anderson recognized the merits of the assertion concept described by Mautz and Sharaf and he organized the assertions by financial statement component[1] [assets, liabilities and income]. Figure 1, taken

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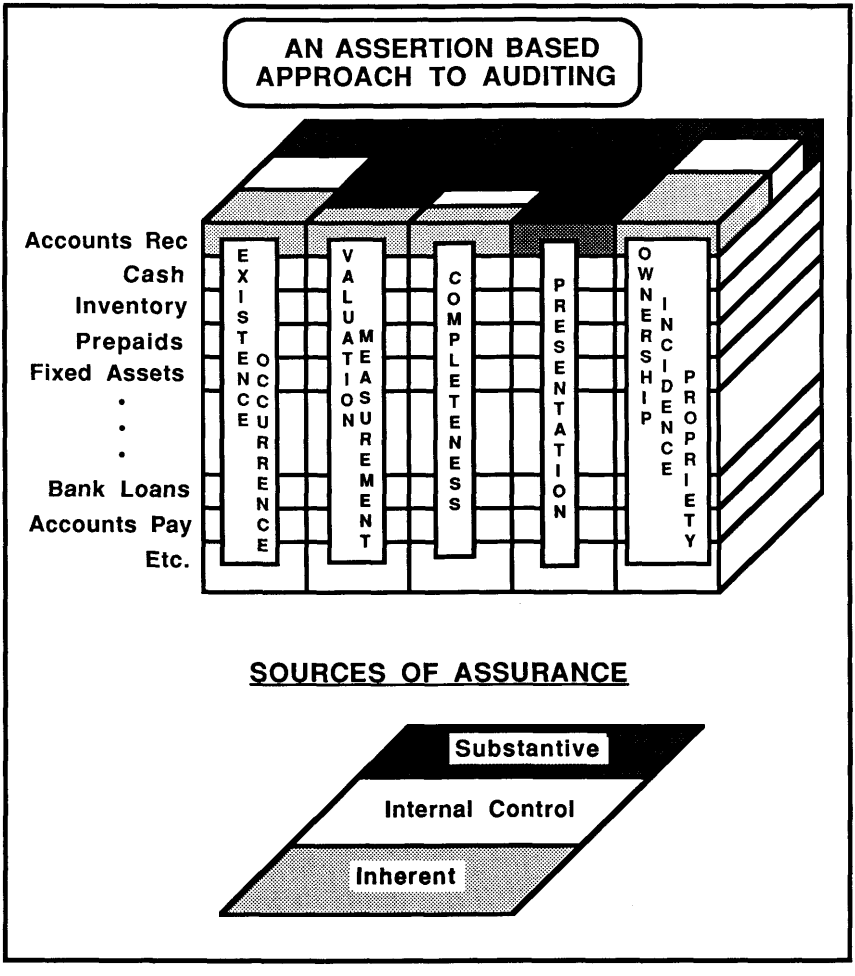

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Carolyn J. Reiter

Figure 1

Components of the Objective of Substantive Verification

Assets	Liabilities	Income Components
To provide reasonable assurance as to whether or not:	To provide reasonable assurance as to whether or not:	To provide reasonable assurance as to whether or not:
1. the reported assets really exist *(existence)*;	the reported liabilities really exist *(existence)*;	the reported transactions really occurred *(occurrence)*;
2. there are not other undisclosed assets *(completeness)*;	there are not other undisclosed liabilities *(completeness)*;	there were not other, undisclosed transactions *(completeness)*;
3. the enterprise really owns and has clear title to the reported assets *(ownership)*;	the reported liabilities really incide on the enterprise and not on some other entity or person instead *(incidence)*;	the enterprise, and not some other entity or person instead, was really a party to the reported transactions *(propriety)*;
4. the assets are valued appropriately and accurately *(valuation)*;	the liabilities are valued appropriately and accurately *(valuation)*;	the income components are measured appropriately and accurately *(measurement)*;
5. the assets are appropriately described and disclosed *(presentation)*.	the liabilities are appropriately described and disclosed *(presentation)*.	the income components are appropriately described and disclosed *(presentation)*.

from *The External Audit* [Anderson, 1977], illustrates this structure. As the first Chairman of the CICA Auditing Standards Committee, Anderson was also instrumental in the CICA's decision to formally recognize the assertion concept in its Handbook [Sections 5300.16-.21]. The commentary in Section 5300.17 immediately following a description of the assertions states:

> The auditor seeks evidence with respect to these **assertions** primarily through the performance of substantive procedures. Obtaining evidence relevant to one **assertion,** for example, existence of inventory, will not compensate for failure to do so for another, for example, its valuation. Some **assertions** will be virtually self-evident to the auditor, for example, the "valuation" of cash, while others, such as the "completeness" of accounts payable, may require extensive procedures.

Section 5300.21 concludes the discussion of assertions with the italicized statement:

> *The auditor should evaluate all the evidence he has obtained and assess its sufficiency and appropriateness. He should consider evidence supporting and evidence refuting an* **assertion** *and should be alert for evidence supporting one* **assertion** *but inconsistent with that supporting another. [Jan. 1978]*

The AICPA addressed financial statement assertions in August 1980 when it issued SAS 31 on Evidential Matter [AU § 326.03 - .13]. Included in this statement is a section on "Use of Assertions in Developing Audit Objectives and Designing Substantive Tests" which includes the following sentence:

> In obtaining evidential matter in support of financial statement **assertions,** the auditor develops specific audit objectives in the light of those **assertions.**

In the concluding paragraph of SAS 31 under the heading "Evaluation of Evidential Matter" the Auditing Standards Board stated:

> In developing his opinion, the auditor should give consideration to relevant evidential matter regardless of whether it appears to corroborate or to contradict the **assertions** in the financial statements. To the extent the auditor remains in substantial doubt about any **assertion** of material significance, he must refrain from forming an opinion until he has obtained sufficient competent evidential matter to remove such substantial doubt, or he must express a qualified opinion or a disclaimer of opinion.

In January 1982, the International Auditing Practices Committee of the International Federation of Accountants issued International Auditing Guideline 8 on Audit Evidence. The content of IAG 8 is entirely consistent with the CICA and AICPA material on assertions.

Although one can safely conclude that the use of an assertion based approach for planning and evaluating an audit is in accordance with GAAS in both Canada and the United States, assertion based methodologies do not pervade either audit practice or audit literature. Most auditing books do little more than make reference to SAS 31. It is not at all clear why the authors of such books appear to be reluctant to adopt the assertion concept. The answer may lie in the fact that auditing firms have also been very slow to integrate the concept into their audit approaches. Thus, academics in particular may be reluctant to produce a publication that is a step ahead of practice for fear that it will be rejected by their peers who would prefer to teach what they believe is the current common methodology. At this time, only two firms in the US have exposed audit methodologies that utilize the assertion concept.[2]

An important characteristic of the assertion based methodology described in this paper [an "optional" rather than "mandatory" role of internal control as a source of assurance] is the subject of the paper to be presented tomorrow morning by Thomas Bintinger. It would also appear that the role of internal control in a GAAS audit may be addressed by the Auditing Standards Board of the AICPA. At its March 1986 meeting, the Board reviewed a significant issues paper on the subject prepared by the staff. The following were among the issues identified:

1. Should there be a separate field work standard for the study and evaluation of internal control? Should the existing standard be incorporated into the other standards of field work?
2. How should controls relevant to a financial statement audit be defined and classified? How does an auditor relate internal controls to audit objectives?
3. What should be the relationship between reliance on internal controls and substantive tests? To what extent can an auditor use internal controls to reduce substantive tests?
4. Should a minimum study and evaluation of internal controls be required in an audit of financial statements? If so, what should the minimum be? Should there be a different minimum study for some (i.e., public) clients than for others?

5. What should be the auditor's reporting responsibility for his study and evaluation of internal control performed incident to his audit of financial statements?

The Board has instructed the staff to proceed to develop the issues into a "concepts" paper that could then be used as a basis for discussion.

Mautz and Sharaf [1961, p. 148] expressed very strong views on the role of internal control and they suggested that "a prudent practitioner will tend to give this phase of the examination a full measure of emphasis." When one considers the ASB issues noted above, it becomes obvious that a consensus does not exist within the profession as to the role of internal control under GAAS. We look forward to the discussion of this critical issue by Symposium participants.

Achieving The Audit Objective Is All That Really Matters

In auditing, like many other aspects of life, achieving the objective is far more improtant than how it is done. In other words, it is the final score that counts, not how the game is played. An analogy will serve to illustrate this point. Suppose that several individuals are in New York and all of them would like to go to Philadelphia [their objective]. One might take a non-stop airplane flight between the two cities while the second travels by train. The third might make the trip by bus and the fourth by automobile. It would also be possible to make the trip by any combination of airplane, train, bus or automobile. In fact, one could even go by boat. For each individual, the most important thing would be reaching the objective—Philadelphia. Each mode of transportation could be judged on the basis of its efficiency, effectiveness and economy in achieving the objective.

An audit [provided that we agree on the objective] is no different. Several practitioners could undertake the same audit and each could conduct the audit in a different way and yet still comply with GAAS. Once again, the important point would be that each achieved the objective [to obtain reasonable assurance that the financial statements "present fairly" (do not contain a material error)]. While the audit fee charged could vary significantly from auditor to auditor, that is not an issue that the profession need concern itself with provided that an agreed objective is being achieved by all participants. Over time, the market place should take care of any significant differences in the "value for money" being provided by practitioners.

Finally, we wish to stress that we recognize that the approach to auditing described below is not the only way to achieve the objective of an audit. We believe that the use of different audit methodologies, strategies, procedures and techniques throughout the profession is a healthy situation. We offer this as one alternative for consideration.

II. The External Audit Objective And The Elements Of An Audit Strategy

Financial data are mainly assertions of intangible facts. Their verification requires application of the techniques and methods of proof. Proof is a part of the field of logic which has been described by some as the "science of

proof." Logic is concerned with how we establish facts, conclusions, and inferences as valid or invalid.

Mautz and Sharaf, p. 15

While some might argue otherwise, the objective of a financial statement audit is to arrive at an opinion as to the fairness (i.e. material correctness) of the client's financial statements. There are probably as many ways of achieving this objective as there are auditors but, by and large, they all tend to have similar characteristics (we all like to confirm accounts receivable, vouch fixed assets, etc.) But what really distinguishes the good auditor is the type of questions he asks. We can all remember those auditors who asked something which, on the surface, seemed so innocuous, but led to a revelation in terms of audit findings when the client or, more likely, a third party responded. Asking good questions is the crux of good auditing.

At the outset, the auditor may address the financial statement audit objective by asking two questions:

1. What types of error can materially affect the financial statements and what must I know to be satisfied that these error types have not occurred?

or

2. What must I know to be able to conclude that the financial statements are materially correct?

Obviously, no auditor approaches audit planning by asking one of the above questions to the exclusion of the other. For example, when an auditor assesses inherent risk he must consider a question similar to the first and when he plans his substantive procedures he often focuses on questions similar to the second. The real issue, therefore, is not whether the auditor asks the first or second question, but which question he emphasizes and at what level in the hierarchy of his planning process he places that emphasis.

In many cases, the audit strategy that follows when emphasis is placed on answering the first question will differ, sometimes quite significantly, from that directed at answering the second question. While answering either of the two questions properly will obviously lead to an adequate audit, there may be opportunities for audit cost savings if one option leads to selecting less costly audit procedures than the other. Our view is that an auditor who emphasizes the second question has a better chance of selecting the most efficient combination of procedures. In this paper we will focus on the audit strategy that follows from that question.

In the next three sections, we examine the three main elements of an audit strategy:

1. The sources of audit assurance (See section III below)
2. The links between each of the financial statement item assertions and the relevant procedures (See section IV below)
3. The interrelationships among the financial statement items (See section V below).

These elements recognize that, in order to conclude as to the material correctness of the financial statements, the auditor must obtain reasonable

assurance with respect to the material correctness of each of the assertions for each financial statement item. Although their application is likely to differ, these elements do not change in any significant way if we were to adopt the first of the above questions as our basic strategy.

III. Audit Sampling, The Audit Risk Model And The Elements Of An Audit Strategy

The auditor requires evidence in order that he may rationally judge the financial statement propositions submitted to him. To the extent that he makes judgments and forms his "opinion" on the basis of adequate evidence, he acts rationally by following a systematic or methodical procedure; to the extent that he fails to gather "sufficient competent evidential matter" and he fails to evaluate it effectively, he acts irrationally and his judgments can have little standing.

Mautz and Sharaf, p. 68

The essential features of the audit risk model, and its relationship to audit sampling, can be found in the auditing literature in the 1930's and 1940's. For example, the principles underlying the second field work standard of generally accepted auditing standards, which permits a reduction in the extent of testing conditional on the quality of internal control, can be found in auditing textbooks written over 40 years ago:

> In this day and age, when a business has a good bookkeeping system and a good system of internal check, a test audit, which efficiently samples the transactions throughout a period, is about as detailed an audit as one would expect to find.[3]

While this quotation was written in the context of comparing what we now call judgmental sampling to a **detailed** or **100 percent** audit, and hence is only partly relevant to today's environment, it nonetheless represents an important trade-off between the two fundamentally different types of audit evidence. It is implicit in the statement that the preferred form of evidence in terms of quality would be the **detailed** audit. However, the additional quality of this form of evidence was (and is) not always worth the additional cost if it was possible to place reliance on internal control and audit a sample. The reduction in quality in making the trade-off was not considered significant and was implicitly recognized in the extent of testing that became customary.[4]

The increased use of statistical sampling methods in auditing[5] has brought with it the need to be more explicit in the related audit planning decisions. Proper planning of statistical audit samples requires an explicit recognition of the desired sampling precision and the sampling risk. While it is not quite so simple, the sampling precision will be determined largely by materiality considerations which leaves sampling risk as the controllable variable.[6] It is the sampling risk that is influenced by the availability of alternative forms of audit evidence.

Over time, auditors have developed formal (and informal) methods of analyzing the effect on sampling risk of the strength of internal control and other audit procedures such as analytical review. This led to the audit risk model.

The audit risk model has taken on a variety of different forms over the past twenty years. The AICPA's SAP 54 model published in 1972 is a discrete joint risk model in which the audit risk is expressed as the product of the internal control risk and the substantive testing risk. Teitlebaum [1973] illustrated the Bayesian approach to the audit risk model and the pre-audit sample concept of defining priors. The SAP 54 model was subsequently extended by Stringer [1975] to explicitly recognize analytical review risk separate from the substantive sampling risk. Anderson [1977] presented audit sampling using an audit risk model which explicitly recognized the role of inherent risk together with the Bayesian interpretation [illustrated by Teitlebaum] in an auditing context. Anderson's approach is further described in Leslie, Teitlebaum and Anderson [1979] and in the CICA's Extent of Audit Testing Research Study [1980].

The logical evolution of the Anderson-CICA model is presented in Leslie [1984, 1985] in which the effect of preventive internal controls is distinguished from the effect of detective internal controls. (The essential Bayesian character of inherent risk assessment is also clarified in Leslie's paper.) The conditional dependency of the existence of preventive internal controls on inherent risk leads to the prior probability of error concept. The audit risk model we shall consider here is an adaptation of Leslie's model.

Our discussion has focused on a risk-based approach directed at determining substantive sampling risk. Anderson [1977, p. 130] introduced the degree of assurance concept as the complement of the combined component risks (i.e. inherent, control, and audit[7]). By recognizing the complement of each of the individual component risks, we introduce the source of assurance concept and the assurance-based approach to auditing.

The shift from a risk-basis to an assurance-basis is, on the surface, not a dramatic step nor is it anything fundamentally new. In fact, some firms have been using the risk-complement approach of recording their risk assessments for years.[8] Our move to this approach was originally made because it was considered easier to use than the risk-based approach. However, the shift has the potential for facilitating a significant shift in philosophical attitudes towards auditing. In the previous section we presented two alternative auditor questions from which an audit strategy could be derived. The first question asked "what can go wrong" and proceeds along a risk-based approach whereas the second question asked "how could the auditor know something was correct" and proceeds using a proof-based thinking process. The risk-complement (source of assurance) approach can be effectively applied under a risk-based philosophy, but its full potential is only realized under an assurance-based philosophy.

Under the risk-based philosophy, the extent of detailed testing is viewed as a focus for the risk analysis and the effect of each risk assessment is either to increase or decrease the testing extent. The approach requires an analysis of the possible causes of error and then an assessment of the chance of each type of error occurring. This necessarily leads the auditor to invest time and effort into reviewing and evaluating the internal control system because the system will be a major factor in the assessed risks. There is no doubt that this risk-based approach is effective and, for the most part, efficient. Indeed, our firm has been using this approach since the 1960's[9] and during the last five years has moved more towards the assurance-based alternative.

The philosophical argument supporting the assurance-basis states that it is generally more persuasive and efficient to establish the general validity of an assertion than it is to enumerate the possible ways the assertion could be incorrect and then check each of these possibilities. Thus, in an assurance-based approach, the material correctness of a particular financial statement item assertion is an implicit hypothesis for which the auditor selects a combination of sources of assurance which may support the hypothesis. The combination is chosen within the constraints of available assurance (e.g. poor internal controls provide no assurance) to achieve the objective in the least costly way.

The audit assurance model we use, therefore, consists of the following principal components:

Inherent nature of the item	• the complement of inherent risk, which is defined in the usual way.
Preventive internal controls	• As explained in Leslie et al.[1979] and in Leslie[1984, 1985], preventive internal controls are related to the level of inherent risk. The greater the inherent risk, the greater the need for preventive controls and conversely. The combined assessment of inherent risk and preventive internal controls is referred to as the **prior probability of error.**
Compliance procedures (applied to preventive controls)	• The assurance from compliance procedures is related to the existence of suitable preventive internal controls and helps support the assessment of prior probability of error.
Detective internal controls	• Detective internal controls are applied subsequent to the processing of data and increase the likelihood of detecting any errors which may have occurred and hence supports the assessment of prior probability of error. (Compliance procedures on detective controls are part of the detective internal control identification process.)
Analytical review	• The degree of assurance from analytical review depends upon whether a judgmental or regression analysis-based analytical review is being conducted. For regression analysis-based analytical review, the assurance level is determined primarily by the

	software whereas in the case of judgmental analytical review the assurance level depends upon the quality of the analytical review as assessed on a judgmental basis.
Other substantive sources	• These sources include substantive sampling together with other non-sampling substantive procedures.

In addition to the above sources of assurance, the approach also permits the explicit recognition of assurance from audit procedures directed at other financial statement assertions as explained below in section V. A practical illustration of the above assurance matrix structure is presented in Figure 2 which shows a Source of Assurance Plan for a particular financial statement assertion. Note the various minima and maxima and the highlighting of the prior probability of error. The risk-complements are recorded using Poisson factors ($-ln\ \beta$) which, for purposes of acceptability by our practitioners, we have called assurance factors.

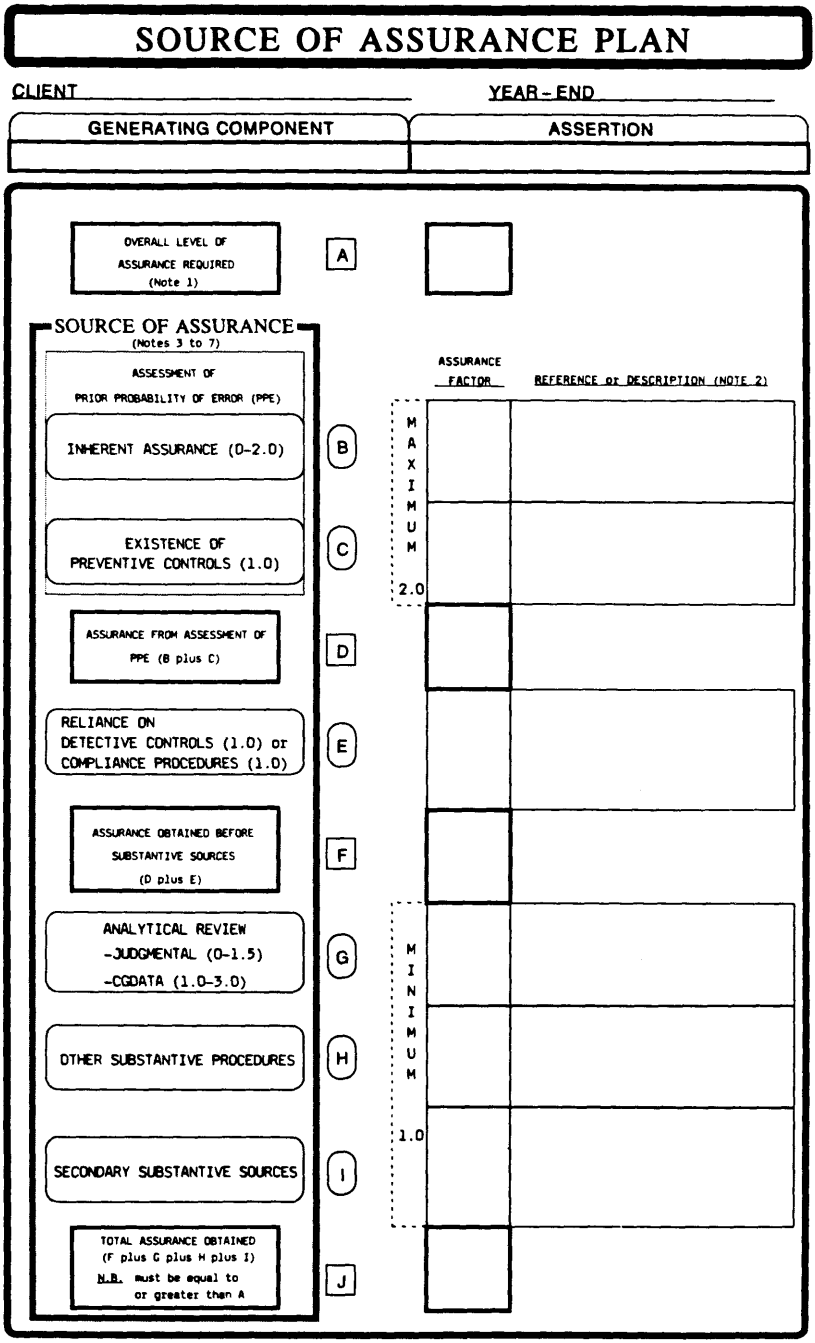
One aspect of the use of the assurance-based approach in contrast to the risk-based approach is the psychological effect of expressing the various assessments using the *positive* rather than *negative* perspective. The positive approach also facilitates discussion of testing extents and related assurance levels with clients who find it easier to understand that a procedure is adding assurance rather than reducing risk.

Technical Interlude: Inherent Risk, Smoke, and Fire

In the above discussion, the role of compliance testing was mentioned only briefly. From the source of assurance plan it is apparent that compliance procedures, which may include sampling, are directed at supporting the assessment of the assurance from preventive internal controls. Our approach to compliance testing has been based upon Dollar-unit sampling and makes an explicit assumption as to the relationship between the frequency of compliance deviations and the occurrence of monetary errors. The approach assumes a three-to-one ratio between *smoke* (i.e. compliance deviations) and *fire* (i.e. monetary error). This assumption has been discussed extensively by Leslie [1985]. In this technical interlude, we introduce a model which indicates that the actual ratio is dependent upon the inherent risk.

Consider a transaction stream of sales invoices totalling $1,000,000 in which all invoices are $1 and are either correct or 100 percent overstated, i.e. the customer should not have been charged at all. Materiality is $30,000 and the invoice pricing process is such that for this audit year, the sales stream has a 20 percent error rate **before** the effect of *preventive* internal controls. Suppose the client has an independent price-check control procedure which is 100 percent effective when it is applied to a particular invoice and the only method of determining whether the checking procedure is applied is to examine the invoice. The issue is to determine the extent of compliance test that is necessary in order to have 80 percent confidence that a material error is not present after the effect of internal control.

Figure 2



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7
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Let **r** be the rate of compliance deviations. Assuming the inherent error is evenly distributed throughout the population and the compliance deviations also occur evenly, the expected net error rate after the application of controls is **.2r.** To meet our audit objective, we must compliance test so that there is only a 20 percent chance that **.2r** > $30,000/1,000,000 where **r** is the upper limit of compliance deviations at an 80 percent confidence level. Using discovery sampling, the Poisson factor for 80 percent is 1.61 and hence the sample size is 1.61/(.03/.2) or 11 items. This compares with a sample size of 1.61 × 1,000,000/(3 × 30,000) or 18 when a 3:1 ratio assumption is used. Obviously, in this example, the actual ratio of compliance deviations to monetary errors is 5:1 (i.e. 1/20 percent). Applying similar reasoning to the general case in which the inherent error rate is **p,** the actual ratio of compliance deviations to monetary errors will be **1/p.** Thus, if the population had a 10 percent inherent error rate, then a 10:1 ratio would be satisfactory whereas a 50 percent inherent error rate would need a 2:1 ratio.

Obviously this example is extremely simplified, not only in the specific audit context but more importantly in the somewhat naive statistical approach taken. A more realistic model might use a Bayesian approach for inherent risk but would certainly need a more probabilistic approach to the distribution of monetary errors and of compliance deviations. Nonetheless, the example serves as an indication that in high inherent risk situations (i.e. when high inherent error rates are more likely) the ratio of compliance deviations to monetary errors will probably be lower than if the inherent risk were less. More research into this issue seems warranted.

IV. Assertions And The Links To Internal Control Procedures And Audit Procedures: Procedure Packages

> *Auditing is concerned with the verification or testing of financial statements and similar data. Such data consists of a series of assertions. . . . The total number of assertions included in a set of financial statements is considerable, but our interest here is in the essential nature of these propositions, not in their number.*
>
> *Mautz and Sharaf, p. 79*

In the previous section we described the source of assurance concept which categorizes audit procedures by the nature of the audit evidence they provide. As was noted, the assurance sources are organized by financial statement assertion which makes the linking of procedures (both internal control procedures performed by the client and audit procedures performed by the auditor) to assertions, a key element of an assertion-oriented audit strategy. This linking deals with the **relevance** aspect of the audit evidence that is obtained.

For example, a numeric continuity internal control procedure on work orders is relevant to the revenue completeness assertion as is the audit procedure of comparing paid service personnel hours with service revenue. Similarly, the internal control procedure of checking invoice pricing is relevant to revenue measurement as is the audit procedure of testing invoice pricing. These are examples of procedures linked to transaction stream assertions [revenue completeness and revenue measurement].

Internal control procedures are generally linked to transaction streams and not balance sheet items, as the latter are usually residuals of the netting of the underlying transaction streams. For example, the accounts receivable balance is the residual of the revenue and cash receipts streams. An exception to this is inventory when the inventory balance is derived from the inventory count and not from the underlying transaction streams, purchases and cost of goods sold. In this case the client may have controls over the count such as a second employee checking the count figures, an example of an internal control procedure directed at a balance sheet item.

Audit procedures may be linked to transaction stream assertions or to balance sheet item assertions. An example of the latter would be inventory pricing tests, an audit procedure relevant to inventory valuation.

The linking of procedures to assertions is usually straightforward. However, there are some twists. For example, a particular procedure may be relevant to more than one financial statement item assertion as is the case with a receivables circularization, an audit procedure which is relevant for both the existence assertion and the valuation assertion (with respect to overstatements and, to a much lesser extent, with respect to understatements).

The above discussion has focused on individual procedures. However, what is normally required is a **package** of procedures which jointly provide evidence relevant to a particular assertion. For example, the receivables circularization must be accompanied by adding the receivables trial balance and reconciling it to the general ledger in order to properly address the existence assertion. Similarly, when looking at internal control procedures to place reliance on internal control, the auditor considers a package of procedures. The package of procedures must be complete in the sense that the appropriate **environmental** controls are present (for example, controls over program maintenance, master file changes, proper segregation of duties) and the package of controls covers all steps in the accounting process, from initiation to the final recording in the general ledger. For example, the package of internal control procedures relevant to revenue measurement would not only include the checking of invoice pricing but also controls over the master price lists and the recording of invoices in the revenue journal.

In principle, the link between assertions and procedures can be followed in either direction, from assertions to procedures or procedures to assertions. The audit strategy described here is **driven** by assertions and thus the link is made from assertions to procedures. Alternative audit methodologies which make the link from procedures to assertions are **procedures-driven.** In these latter methodologies, **assertions are recognized** but are not the driving force behind the audit planning. In our practice we believe the **assertion-driven** methodology has some advantages over the alternative because it asks the question **why** before deciding **how.** It is more flexible since the auditor can plan to select, using a source of assurance plan within the constraints of the situation, the most economical combination of procedures packages that are relevant for each assertion.

One aspect of the above flexibility is the non-mandatory nature of a review and evaluation of internal control. An auditor would still carry out a review of the internal control environment and obtain knowledge of the client's accounting systems (this is consistent with the minimum level of review of internal

control as described in SAS 43) but a review of **internal control procedures packages** would only be carried out for those internal control procedures packages on which the auditor intends to rely.

This approach to internal control is consistent with emphasizing the second question in section II at the strategic planning level. If the first question had been emphasized, the auditor would normally require a review of the specific internal control packages to identify where in the process errors ***could*** occur. Using the assertion-oriented approach at the strategic planning level permits the strategy decision to be made before the auditor applies the "what can go wrong" approach at the detailed level.

Technical Interlude: Internal Control in the Audit Environment

As can be seen from the preceding discussion, internal control is treated as one of a number of sources of assurance for the auditor. There are two implications of looking at internal control in this way. The first is that the auditor should review and evaluate internal controls only when it helps to achieve the audit objective (obtaining sufficient appropriate/competent audit evidence) in the most cost-effective way possible. The second is that the auditor should review and evaluate internal controls when it is necessary in order to achieve the audit objective, i.e., when the only reliable method of obtaining sufficient appropriate audit evidence requires the auditor to look to internal control as a major source of assurance. This latter case arises most frequently when the auditor is concerned about the completeness assertion—for example, completeness of deposits in a deposit taking institution. Looking at internal control in this way flows logically from the question "What must I know to be able to conclude that the financial statements are materially correct?"

Viewing internal control in this way also logically leads to the view that the second examination (field work) standard can be eliminated from generally accepted auditing standards. Auditing is an audit evidence gathering process. The review and evaluation of internal control is one part of this process. It can be subsumed within the existing third examination (field work) standard—the audit evidence standard.

V. Interrelationships Among the Financial Statement Items

> *Part of an auditor's task is to recognize the subsidiary assertions contained within any financial statement propositions. Only if these are identified can evidence be obtained to support or contradict each one. Failure to identify all subsidiary propositions is failure to recognize the full scope of the audit problem. This in turn makes the obtaining of adequate evidence and fully rational judgment most unlikely.*
>
> *Mautz and Sharaf, p. 104*

The third element of the assertion-oriented audit strategy is a structure which takes into account the interrelationships among the financial statement item assertions that arise from the accounting model. The recognition of the interrelationships is crucial in the development of a cost-effective audit strategy. Needless to say, the basic accounting interrelationships here amount

to elementary bookkeeping concepts and can be found, in one form or another, in any practical audit approach.

The starting point for identifying the interrelationships are the accounting cycles (e.g. sales/receivables/receipts, purchases/payables/payments). Looking at the accounting cycle, sales/receivables/receipts, the relationship between the accounting cycle components can be expressed in the form of a simple arithmetic equation:

Receivables (beginning of year) + Revenues (during the year)
− Cash receipts (during the year) = Receivables (end of year)*

* prior to considering bad debt provision and write-offs.

Given the above relationship, it seems obvious that procedures addressing the assertions related to the transaction streams—revenue and cash receipts—should also provide assurance with respect to the assertions related to the receivables and vice versa, procedures addressing receivables' assertions should also provide assurance with respect to the underlying transaction stream assertions.

To account for the assurance from the procedures in an appropriate manner, the auditor needs to link transaction stream assertions to the related balance sheet item assertion. This can be readily accomplished by considering, for each transaction stream assertion, what balance sheet item assertion would be affected if the transaction stream assertion was not supported. For example, consider revenue -occurrence. The impact of a revenue - occurrence error on the balance sheet item accounts receivable would be the recording of a non-existent receivable balance and therefore revenue - occurrence is linked to receivables - existence. Similarly, if all cash receipts were not recorded (i.e. cash receipts - completeness error), then again this would result in non-existent receivables balances. Therefore, cash receipts - completeness is linked to receivables - existence. Links between all transaction stream assertions and related balance sheet item assertions can be established in a similar manner. The following simple rules may be used as a shortcut to correctly identify the links.

Balance Sheet Item Assertion	**Related Transaction Stream Assertions**
1. Valuation	Measurement.
2. Existence	Occurrence if transaction **increases** balance sheet account.
	Completeness if transaction **decreases** balance sheet account.
3. Completeness	Completeness if transaction **increases** balance sheet account.
	Occurrence if transaction **decreases** balance sheet account.

An auditor would consider the interrelationships among the financial statement item/transaction stream assertions in developing an audit strategy

which produces a cost-effective combination of **procedure packages.** For some assertions, the greater part of the assurance required may be obtained from procedure packages linked to the balance sheet item assertion whereas, for other assertions, the greater part of the assurance required may be obtained from procedure packages linked to the transaction stream assertions. For example, in many situations the greater part of the assurance required with respect to receivables - existence is obtained from the receivables circularization whereas the greater part of the assurance required with respect to receivables - completeness is obtained from audit procedures, and control procedures, directed at revenue - completeness and cash receipts - occurrence.

An important consequence of these accounting interrelationships is their effect on the audit assurance that is applicable to a particular financial statement assertion. For example, the audit assurance on accounts receivable - existence will depend, in part, upon the assurance on revenue - occurrence and on cash receipts - completeness. However, since an existence error in accounts receivable could arise from either the revenue stream or the cash receipts stream, the combined assurance from sources directly connected with the related streams that is applicable to accounts receivable - existence cannot exceed the minimum assurance from either of the two related streams. This particular consequence is the main result of recognizing the effect of accounting interrelationships. In our experience, its effect has been somewhat less than explicit in many existing audit strategies. [See Appendix A for A BAYESIAN MODEL FOR COMBINING INFORMATION.]

VI. Audit Evaluation As The Start Of The Planning Process

Because the auditor determines the type of audit evidence pertinent to his needs, then collects that evidence, and finally uses it in arriving at judgments, it behooves him to take special precautions in reviewing it for pertinence, credibility, and usefulness.

Mautz and Sharaf, p. 106

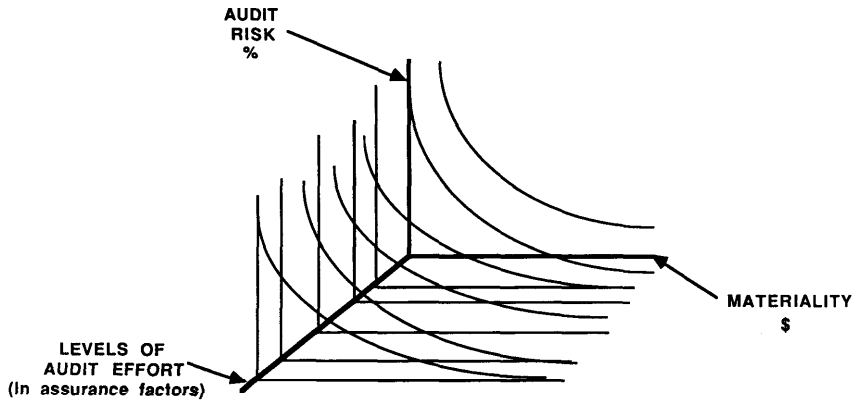
Planning an audit is like planning anything else. If you do not have a reasonably clear notion of where you are going, then you should not be surprised at where you end up. But to know where you end up, you have to be able to determine where you are at a point in time. Audit evaluation is how the auditor determines the state of his opinion on the client's financial statements, i.e., where he is at a point in time.

Audit evaluation is multi-dimensional. On the one hand, the auditor deals with the concept of materiality and its relationship to the errors (or departures from generally accepted accounting principles) in the financial statements while on the other hand the auditor must deal with the degree of assurance he has in his audit opinion. This multi-dimensional viewpoint is illustrated in Figure 3.

Thus, an audit evaluation consists of an estimate or projection of the error in the client's financial statements together with some perception or measure of the degree of assurance that the auditor has with respect to the estimate. The former depends primarily on the actual error in the client's financial statements whereas the latter depends primarily on the intensity of the audit work.

Figure 3

MATERIALITY AND AUDIT RISK GRAPHS FOR DIFFERENT LEVELS OF AUDIT EFFORT



Our approach for summarizing the errors on an audit focuses on their effect on pre-tax income but also recognizes their effect on the rest of the financial statements. The achieved[10] degree of assurance is summarized on the various source of assurance plans. The combined effect of these two evaluations is the maximum possible error in pre-tax income which includes the SAS 47 concept of an allowance for further undetected error in addition to the most likely error. Given this approach to audit evaluation, the planning process involves important judgments as to a reasonable materiality level and an indication of the desired overall degree of assurance for the auditors' opinion. We have not introduced anything new in this section because the approach we use for dealing with audit evaluation is already described in existing literature.[11]

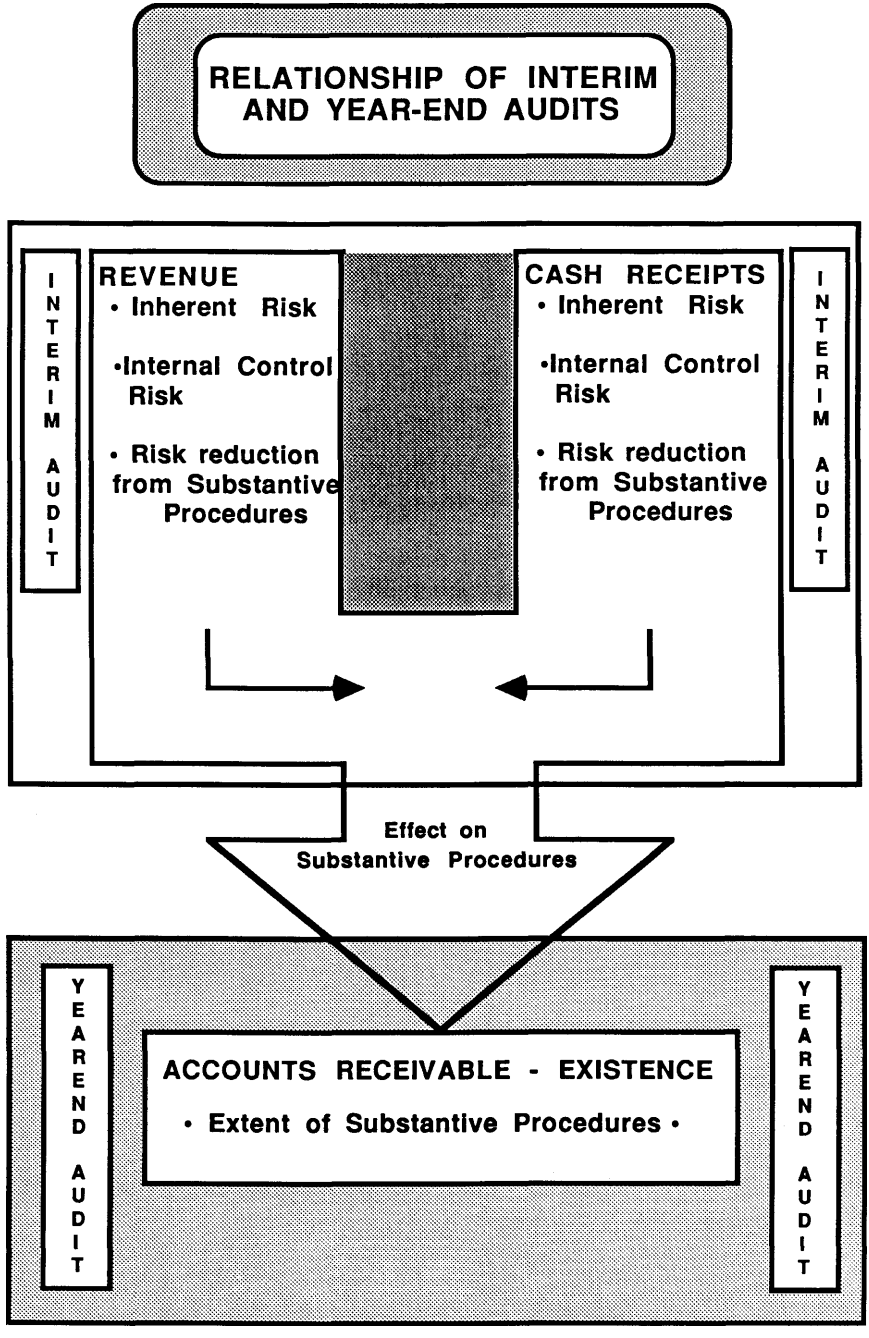
VII. Operationalizing The Elementary Concepts In A Practical Audit Methodology

Audit evidence is obtained through the application of the basic audit techniques in the form of procedures designed to fit the specific situation.
Mautz and Sharaf, p. 100

The various audit methodology components we have discussed in the last four sections can be found in the structure of any practical and effective audit strategy. They do not represent a fundamentally new discovery, but they do represent a way of thinking about the audit process that has the potential for changing the perspective some auditors take in their work.

For example, an auditor who follows a risk-based strategy would view the audit of accounts receivable-existence along the lines shown in Figure 4. The two transaction streams, sales and cash receipts, would be audited during the current or interim audit, either by transaction testing or internal control work,

Figure 4


RELATIONSHIP OF INTERIM AND YEAR-END AUDITS
INTERIM AUDIT
REVENUE
• Inherent Risk
•Internal Control Risk
• Risk reduction from Substantive Procedures
CASH RECEIPTS
• Inherent Risk
•Internal Control Risk
• Risk reduction from Substantive Procedures
INTERIM AUDIT
Effect on Substantive Procedures
YEAREND AUDIT
ACCOUNTS RECEIVABLE - EXISTENCE
• Extent of Substantive Procedures •
YEAREND AUDIT

and the accounts receivable-existence assertion would have been audited during the balance sheet or financial statement audit. This customary division of the audit process into two stages separates the often complex internal control system components from the comparatively simpler balance sheet accounts.

The perspective we have described in the previous sections attaches assertions to the transaction streams in the diagram (i.e. sales-occurrence and cash receipts-completeness) and then organizes the various sources of assurance (or risk elements, if the risk-based approach is preferred) according to their relevance to the particular assertions. Instead of burying the complexity of the client's business in an interim audit file, in which the links to the financial statement assertions may be difficult to identify, even when reviewed by the audit partner, the essential structural complexity of the client's business operation is brought forward and highlighted as an integral part of the audit process. This is illustrated in Figure 5.

The shift we are making is therefore not merely to introduce some new terminology or to call risk by another name. We are shifting our audit thinking to a more comprehensive level that deals with each of the sources of assurance in a consistent manner. In order to make practical use of this audit methodology, we need to deal with the now more visible complexity.

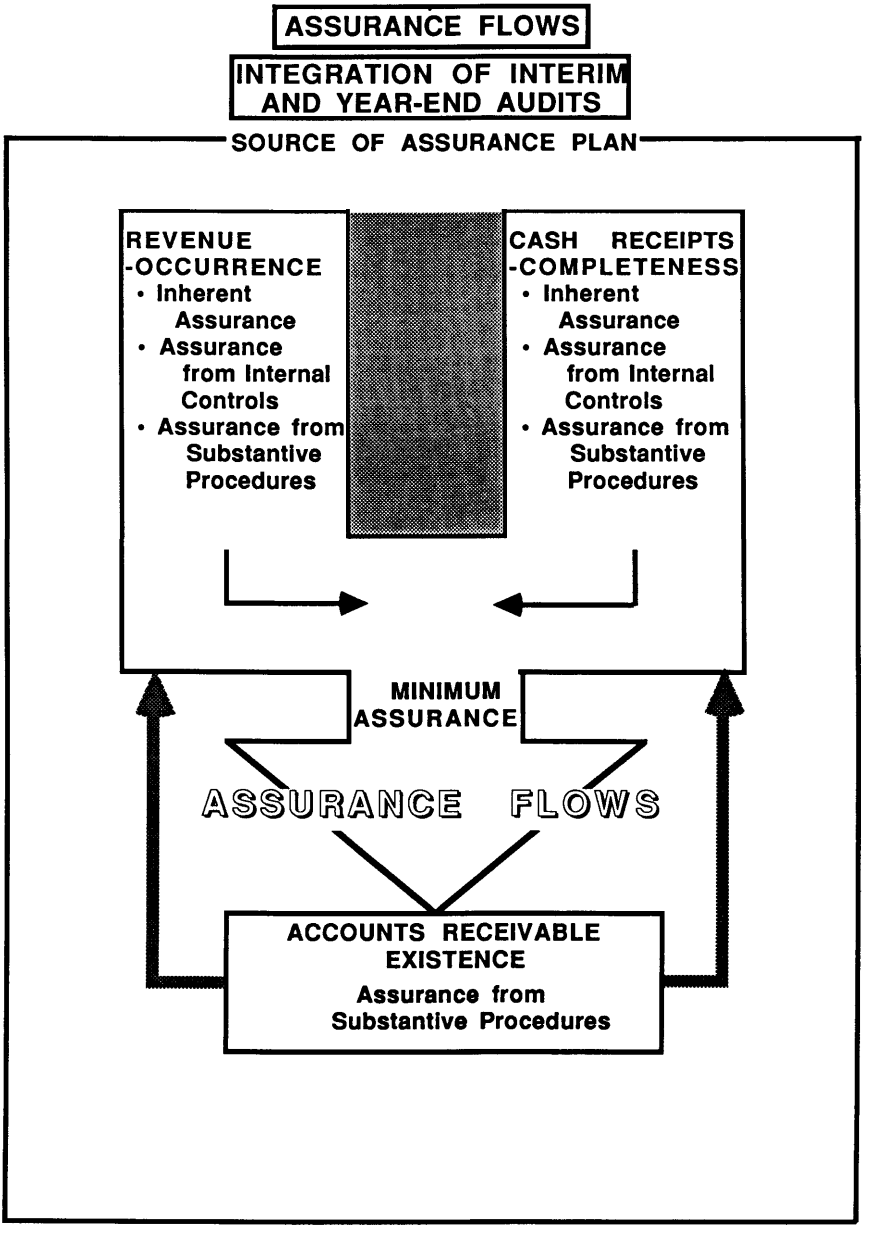
A large portion of the complexity in the planning process is due to the effect of the interrelationships among the financial statement items' assertions (see section V). This aspect can be simplified (and ultimately automated) through an audit strategy structure which permits the use of some simple rules based on accounting cycles.

The first simplification is to achieve some parsimony in the planning process. This can be accomplished if the audit strategy is organized so that each accounting cycle is included once and only once. The auditor would start out by listing the **derived components.** The derived component[12] of an accounting cycle is the component for which the value is derived from the netting of the related components. In other words, the derived component is an image of the net results of its related components at a point in time (e.g. receivables usually represents the netting of revenue less cash receipts at a point in time).

Balance sheet items will usually fall under this definition, whereas income statement items and other transaction streams such as cash receipts will not.[13] Double-entry accounting ensures that an accounting cycle will always include one and only one derived component and therefore organizing the audit strategy by the derived components ensures that each accounting cycle is included once and only once.

The prior probability of error and the effect of internal control on the audit assurance is relevant only to the **generating components** of the accounting cycle, i.e. those components which are **not** derived. The generating components determine the value of the derived component. Because of its residual balance nature, the sources of assurance for a derived component do not directly include the prior probability of error or the assurance provided by internal controls. Typically, generating components involve transaction streams such as sales and cash receipts. For controls such as safeguarding inventory, it will often be necessary to attach the controls to a related transaction stream

Figure 5


ASSURANCE FLOWS
INTEGRATION OF INTERIM AND YEAR-END AUDITS
SOURCE OF ASSURANCE PLAN
REVENUE -OCCURRENCE
• Inherent Assurance
• Assurance from Internal Controls
• Assurance from Substantive Procedures
CASH RECEIPTS -COMPLETENESS
• Inherent Assurance
• Assurance from Internal Controls
• Assurance from Substantive Procedures
MINIMUM ASSURANCE
ASSURANCE FLOWS
ACCOUNTS RECEIVABLE EXISTENCE
Assurance from Substantive Procedures

assertion. This arises when planning for an inventory roll-forward situation since the inventory balance is derived and cost of goods sold is generating.

The audit planning process can then focus on an accounting cycle's derived component for a detailed analysis of the assurance sources in the components of the accounting cycle which affect the derived component. To perform this analysis the auditor would, for each derived component assertion, identify the related generating component assertions along the lines given in section V. For example, for the sales/receivables/receipts cycle the following relationships would be identified:

Derived Component Assertions	**Related Generating Component Assertions**
Receivables - Existence/Ownership	Revenue - Occurrence Cash receipts - Completeness
Receivables - Completeness	Revenue - Completeness Cash receipts - Occurrence
Receivables - Valuation[14]	Revenue - Measurement Cash receipts - Measurement

As explained in section V, assurance may be obtained from a combination of procedure packages addressing transaction stream assertions (usually generating component assertions) and balance sheet item assertions (usually derived component assertions.) In principle, the auditor could directly plan to obtain the required overall level of assurance on each of the derived component assertions for the entire audit. However, from our discussions of accounting interrelationships, this would clearly involve a considerable amount of duplication and would be unduly complicated. In some cases overauditing may occur whereas in others there may be some underauditing. The solution is to employ the following **direction of assurance** rules in the development of the audit strategy.

If the derived component assertion is:

1. asset → existence/ownership
2. liability → completeness
3. expense → occurrence

   or

4. revenue → completeness

a **Source of Assurance Plan** [SAP] will be set up whereby the assurance required from procedure packages directed at the derived component assertion will be reduced by the minimum of the assurance from sources directed at the related generating component assertions.

If the derived component assertion is other than one of the four listed above, no procedures directed at the derived component assertion will be planned. Instead, all the required assurance will be obtained from audit plans providing overall assurance with respect to each of the related generating component assertions. If the related generating component is already included on another audit plan then no further planning is required for that related generating component assertion.

By following these direction of assurance rules **throughout** the entire audit plan, it can be shown that:

1. The assurance required from procedures directed at a derived component assertion is reduced by the minimum assurance obtained from procedures directed at the related generating component assertions.
2. The assurance obtained from procedures directed at the derived component assertion also provides the same level of assurance with respect to each of the related generating component assertions.

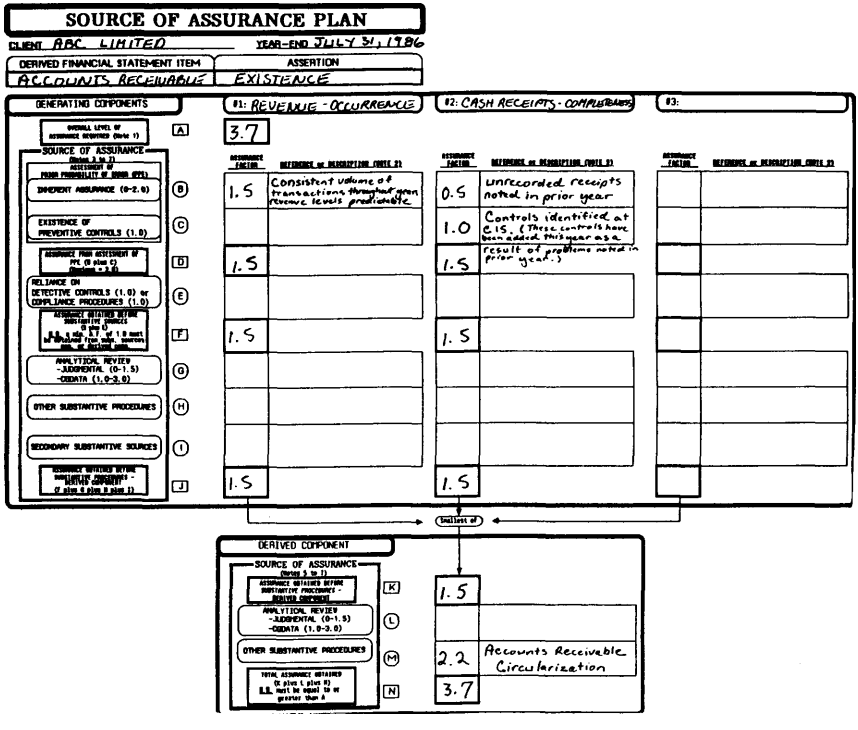
   [See Appendix B for a proof of this **DIRECTION OF ASSURANCE THEOREM**]

Continuing with the example of receivables and following the direction of assurance the following plans would be required:

1. receivables → existence
2. revenue → completeness
3. revenue → measurement

Cash receipts - occurrence and measurement would be addressed by the cash plans. An example of a receivables-existence SAP is shown in Figure 6. Note

Figure 6



how the generating components play an explicit role here when the plan is directed at a derived component. (The SAP in Figure 2 is for generating components only.)

Obviously, if the above approach was followed for all accounting cycles in a client's business, the number of components and plans would likely be unmanageable. To simplify the process, we categorize accounting cycles as major (i.e., with a material amount and a large number of transactions) and as minor. The above process is applied to the major accounting cycles. For the minor accounting cycles such as prepaids and long-term debt (in some cases), the auditor usually employs a package of substantive procedures directed at the derived component assertions without performing a detailed analysis by source of assurance.

VIII. Automation

Since micro-computers did not even exist in 1961, Mautz and Sharaf can be forgiven for not addressing their eventual role in automation of the audit.

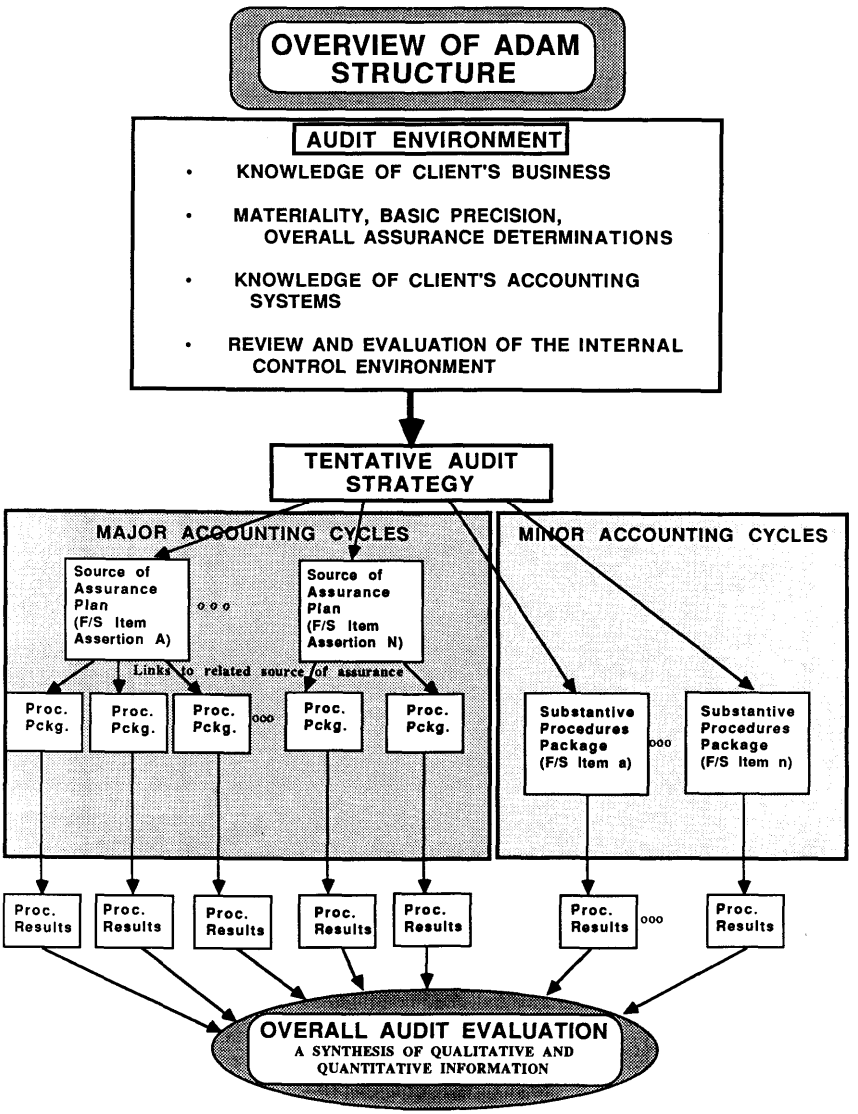
L, A, C & R

With the dramatic increase in the use, and usefulness, of microcomputers in accounting firms, it should not come as a surprise that the audit methodology we have described in this paper has been automated for use on microcomputers. The software, which we have called **ADAM**[15] [audit decision assistance modules], runs on IBM-XT's and compatible computers and has been under development since 1982. During the development period, progressive versions of the software have evolved in a series of prototypes, paralleling the evolution of the audit methodology during this period. The current version of the software has been in limited field use since mid-1985 and we anticipate increasing use throughout our practice.

In the previous section, we commented on the inherent complexity of the audit planning process when the role of the client's internal control system is highlighted at the planning stage. Although we use simplifications in the methodology to deal with this complexity, there remain a number of areas where automation can be of assistance.

Figure 7 is a functional schematic of ADAM which shows some of the logical links between the various functions. Staff using ADAM begin by entering some overall planning information, including decisions on planning materiality and the overall level of assurance for the audit, and then summarize their knowledge of the client's accounting system by setting up the financial statement components and the principal journal entries. Staff then identify the major and minor accounting cycles and use ADAM's tentative audit strategy (TAS) modules which automatically develops a customized TAS, setting up the linkage structure from the TAS to the source of assurance plans, procedure packages and results that is appropriate for the particular client. The ADAM SAP's are essentially the same as those presented in Figures 2 and 6 but they are automated and integrated with the underlying procedure packages. The procedure packages include standard audit questionnaires together with automated planning for representative compliance and substantive sampling

Figure 7



applications. The latter are integrated with the overall planning decisions, representative sample selection, sample evaluation and overall audit evaluation.

Needless to say, we believe ADAM represents the automation of a substantial portion of the technical audit planning and evaluation task and feel that it is a major step towards an automated audit file.

IX. Prospectus

In the past, auditing has been conceived only as a practical subject with little need for or possibility of any underlying theory. Thus attention has been given to its practical applications to the almost complete exclusion of theoretical considerations. We hope we have indicated the close connection between the theory and practice of auditing, for we are convinced that the only sure solution to practical problems is through the development and use of theory. Auditing stands at the threshold of service opportunities we can as yet scarcely foresee, even in dim outline. With a well-developed theory it will not only be prepared to take advantage of such opportunities but will be able to escape confusion and misplaced effort in its desire for real service.

Mautz and Sharaf, p. 248

Auditing is a pragmatic art. In order for it to continue to be of economic value to society, auditing must continue to address society's needs which are not static but ever changing, ever evolving. The demands placed upon auditors should be expected to evolve over time, albeit at a gradual pace. As new economic entities, transactions and activities are created, as some increase in importance and others decline in importance, it will be impossible for the auditing profession to stand still. There is no such thing as a status quo when faced with the inexorable march of time.

Audit methodology deals primarily with the **how** of auditing and to a large degree it is reactive to the audit requirements imposed by society. These requirements are, by far, the most significant factor in the evolution of audit methodology. But to some extent, audit methodology is proactive since new audit techniques may permit the auditor to broaden the scope of his responsibilities and address issues that were previously impossible or uneconomic to deal with. Obviously, future audit methodologies will result from the interplay of these two factors.

Current professional developments, such as the introduction of attestation standards and standards for reporting on forecasts and projections, are responses to the needs of society. These expanded requirements will probably lead to some changes in existing audit methodologies as our present strategies are extended to provide the service. The extension of the SAS 47 risk model to the broader range of assertions contemplated in the attestation standards is one example of this evolution.[16]

One area to which a great deal of attention is being directed at present is the possible extension of the auditor's reporting responsibility to include reporting on internal control. Although the U.S. profession is the first to deal with this possibility at an official level, there is no doubt it will be given consideration in other countries, including Canada. It is therefore instructive to consider the implications of such an extension on audit methodology, particularly in light of the audit methodology we have described in this paper.

Perhaps the most important thing to recognize is that, generally, auditors have **never** looked at a client's internal control system in the broad sense that the client's management typically applies:

> Canadian managers seemed to have little difficulty in defining internal control as a broad concept. From this perspective, internal control was

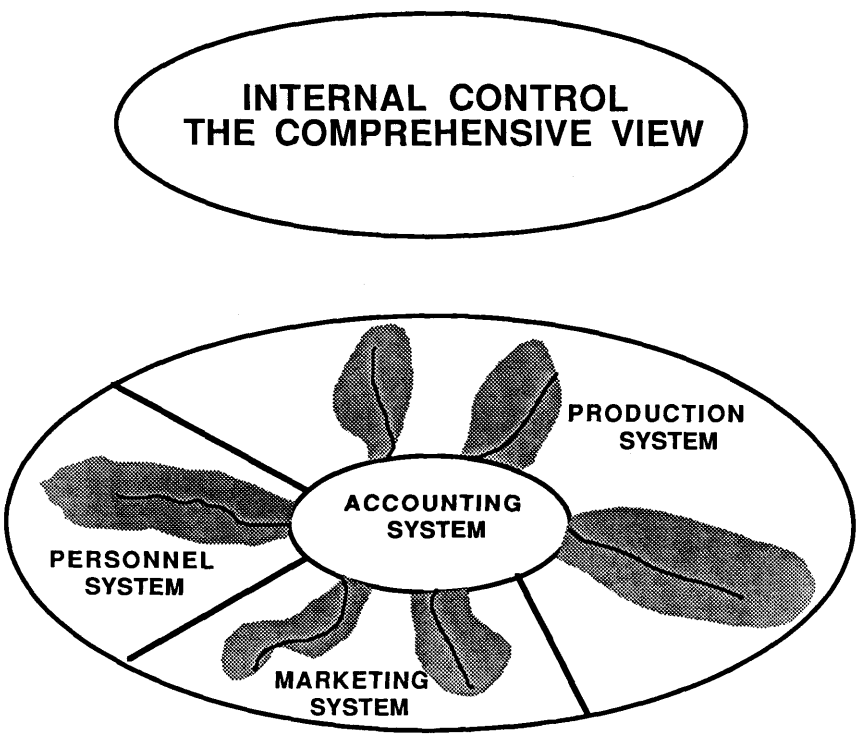
found to encompass accounting, management and operational controls, including such factors as organizational structure, quality of personnel and management, delegation of responsibility commensurate with authority, and effective and efficient management.[17]

This is illustrated in Figure 8 which shows a broadly defined internal control concept with the various systems. The accounting system is shown at the center for our purposes here and its **tentacles** or **nerves** stretch into each of the various systems.

Auditors who follow an internal control oriented audit approach will, for the most part, focus attention on aspects of the various systems which are directly related to the extensions of the accounting system (shaded regions in the diagrams). In the assertion-oriented audit methodology we have described in this paper, attention is directed first at the accounting system and then along the various tentacles as considered necessary given the strategic audit plan. However, in this context neither approach can be considered comprehensive in the way it addresses internal control. Hence, any extension of auditor's responsibilities towards reporting on internal control will require either a careful limitation on the scope of the responsibility or a possibly radical change in the nature of the audit methodology that is employed.[18]

Developments from within audit methodology have also had an influence on its evolution. The increased importance of statistical sampling and its effect on the audit risk model has been described above. The development and more

Figure 8



widespread use of techniques such as regression analysis in analytical review is another example of how audit techniques can affect the overall methodology. One technological development that should have a considerable effect on audit methodology is the microcomputer. In time, these remarkably powerful machines will become as prevalent as the hand held calculator, if they are not already. Their considerable computational power will permit the development of a computerized audit file in which expert systems and comprehensive decision support capabilities can play a major role. Technologically these are, no doubt, exciting times.

Epilogue

In this paper we have described an assertion-based approach to auditing. We have focused at the strategic level and explained the consequences of our strategic emphasis in terms of its effect on the elements of the audit strategy. Our description has included an outline of a practical approach for applying the methodology together with its automation on a microcomputer. But in the final analysis, have we introduced anything that is fundamentally new? Perhaps we have. For example, we have refined the approach for reviewing and evaluating internal controls conditioned on our inherent risk assessment and we have directed the auditor to a more comprehensive view of the financial statements in which the role of transaction streams and their assertions is placed on an equal footing to the remainder of the financial statements. But surely, these are not new discoveries.

We believe our contribution is the bringing together of all of these known and familiar concepts and, using financial statement item assertions as the organizing principle, integrating the various elements into a cohesive, consistent framework that provides a practical and effective audit methodology for our professional environment.

End Notes

1. First exposed at the *Frontiers of Auditing Research* conference at the University of Texas at Austin in 1976 [published in 1977].
2. Peat, Marwick, Mitchell & Co., "Unique Audit Methods: Peat Marwick International," by Robert K. Elliott, *Auditing: A Journal of Practice & Theory*, Spring 1983. Arthur Young at the University of Southern California Symposium on Expert Systems and Audit Judgment, 1986.
3. See Hanson [1942] p. 6.
4. Some would argue that there was no reduction in quality when sampling was employed because of the more intensive and effective effort that could be directed at a sample.
5. See Stringer [1975], Elliott and Rogers [1972], Anderson and Teitlebaum [1973] and Kinney [1983].
6. The oversimplification is due to not recognizing the interplay between statistical precision and the α and β risks. For example, in dollar-unit sampling α risks can be contolled by adjusting from planning materiality to a basic precision which allows a margin for expected error. See Leslie, Teitlebaum and Anderson [1979].
7. This refers to substantive procedures including testing.
8. See Holstrum and Kirtland [1982] for one example.
9. See Skinner and Anderson [1966] and Anderson [1977].
10. To say achieved is an overstatement. The auditor can only believe he has achieved the desired degree of assurance.
11. See for example, Leslie, Teitlebaum and Anderson [1979] and Leslie [1985].

12. We would like to acknowledge the contribution of Jean Pare [formerly with our National Office and now with Arthur Young in London, England] for suggesting the concept of derived and generating components.

13. An exception is inventory at the count date. In this situation, inventory is not derived from purchases and cost of goods sold. Instead, cost of goods sold is derived from inventory and purchases.

14. Valuation refers to pricing. A separate audit plan would be designed to address net realizable value.

15. We wish to acknowledge the contribution of David Pollard, leader of the ADAM development project.

16. See Stilwell and Elliott for an explanation of this approach.

17. See Etherington and Gordon, p. 2.

18. One might consider re-orientation of the audit objectives to the non-accounting systems on which the effect of audit procedures directed at components of the accounting system could be recognized. For example, responses to accounts receivable confirmations could give some information relevant to operations such as customer service and perhaps marketing.

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Teitlebaum, A.D., "Dollar-Unit Sampling in Auditing," a paper presented at the National Meeting of The American Statistical Association (1973) Appendix III, pp. 34–40.

Appendix A

Technical Interlude: A Bayesian Model for Combining Information

We introduce an example in which explicit Bayesian priors are assessed for revenue-occurrence and for cash receipts-completeness and then combined to give a prior for accounts receivable-existence. In this example, the subjective probabilities are attached to specific financial statement and transaction stream assertions and their combination is the result of the interrelationship between the components of the sales/receivables/receipts accounting cycle.

In our example, we use the following assumptions:

Sales:	$1,400,000
Cash Receipts:	$1,200,000
Accounts Receivable:	$350,000
Materiality:	$20,000

Tables 1(a) and 1(b) show the posterior probability calculations for sales and cash receipts separately. The sample sizes represent either representative substantive samples (assuming such testing is an appropriate procedure) or an equivalent pre-audit sample size.

Table 2(a) shows the combined error rates that arise from combining the error rates from the two streams. Thus, the error rate of .09143 for a sales-cash receipts error rate pair of (.01, .015) is computed as $[(.01 \times 1{,}400{,}000) + (.15 \times 1{,}200{,}000)]/350{,}000$ which reflects the fact that a sales-occurrence error and a cash receipts-completeness error will be additive in accounts receivable.

Table 2(b) shows the combined (posterior) probabilities of each of the sales-cash receipts error rate pairs in the corresponding positions to Table 2(a). These probabilities are simple products of the posterior probabilities from Tables 1(a) and 1(b). Table 2(c) shows the probability of obtaining zero (100% tainted) existence errors in a sample of the indicated size drawn from the accounts receivable population for each of the error rates in Table 2(a) [again, in corresponding positions]. Table 2(d) is the element by element product of Tables 2(b) and 2(c) and Table 2(e) contains the relative frequencies of each of the probabilities in Table 2(d). The Table 2(e) entries are the posterior probabilities for each of the error rates in Table 2(a).

Given the posterior probabilities in Table 2(e), it is possible to compute the total of the posterior probabilities for these error rates in Table 2(a) which exceed materiality. For the example used in Tables 1 and 2, the posterior probability of a material error, i.e. one exceeding $20,000, is .12628.

In the above example, the prior probabilities and pre-audit sample sizes resulted in a fairly low risk of error before the effect of the sample from accounts receivable. It is instructive to consider some alternative combinations of the various factors. Table 3 shows posterior probabilities of error greater than $20,000 under a variety of situations. Case A shows the posterior risk in accounts receivables-existence when no errors are possible in cash receipts and the only sample is in the sales stream. As would be expected, the .05431 probability agrees with the probability of an error rate greater than .015 in the

sales stream alone as shown in Table 1(a). A similar effect occurs when the (pre-audit) sample size in cash receipts is made very large (e.g. 1,000,000 or more).

In Case B, less optimistic prior probabilities are assumed and the result of the limited (pre-audit) samples is a very high posterior probability of a material error. Case C illustrates the effect of sampling in accounts receivable (e.g. a circularization of accounts) in reducing the case B posterior risk to a more acceptable level. Cases D and E illustrate the effect of concentrating the audit effort on the streams and then on the residual balance. This is a very graphic example of the necessary extent of reliance an auditor must place on the transaction stream assurance sources in comparison with that needed on the balance sheet account. The differences in overall sample size are mainly due to the relative magnitudes of the streams ($2,600,000) in comparison with the balance sheet amount ($350,000).

Although the above combining model has some appeal, it does possess some technical weaknesses. Foremost among these is the assumption that the posterior probabilities for sales-occurrence and cash receipts-completeness are independent. We know this is not the case. For example, if the client has a good credit department that actively follows up old unpaid accounts, it is unlikely there will be a large amount of sales-occurrence or cash receipts-completeness errors. This one detective control is common to the two streams and therefore its effect on the posterior probabilities from each stream is dependent. Nonetheless, this weakness should not undermine the example as an illustrative theoretical model, but it should be kept in mind when interpreting the results.

An extension of this Bayesian combining model directed at pre-tax income could possibly serve as an approach for combining results for the audit as a whole. Although the practical utility of such a model would have to be questioned (it would be **many** dimensional), it would certainly have some theoretical value. One of the main theoretical conclusions implied by such a model can be seen in our example here. Even if the individual prior probabilities and pre-audit samples are independent, the combination of the effect of these probabilities, which is determined by the nature of the accounting model, leads to an overall model in which there are significant dependencies. An auditor wishing to draw some conclusions at the end of the audit cannot set his prior probabilities on each of the individual transaction streams (etc.) independently. They are related by the overall evaluation model and their reasonability must be assessed at both the individual level and at the overall level. This is entirely consistent with the overall audit evaluation approach outlined in SAS 47 and Leslie [1985].

Appendix B

Technical Interlude: A Direction of Assurance Theorem

One of the major assumptions made in developing audit strategies is that by focusing attention on achieving the desired overall assurance on a subset of the

financial statement assertions the auditor will obtain the desired level on all of the financial statement assertions. This permits the use of simplifications in the planning process and ensures the audit has complete coverage of the financial statement assertions. In order to apply this approach, it is necessary to introduce a method of identifying the subset. The direction of assurance rule provides the identification method and the direction of assurance theorem, which we will outline below, states that the rule leads to **minimal sufficient** audit plans, within the context of the problem framework set out below.

We consider a simplified situation with three accounting cycles:

1. Cash, Cash disbursements, Cash receipts
2. Accounts receivable, Cash receipts, Revenues
3. Accounts payable, Cash disbursements, Expenses

The results derived in this analysis would extend to more complex situations. From these cycle elements, the corresponding accounting cycle equations can be written, using the obvious notational abbreviations, as:

$$\begin{aligned} \text{Cash}(t) &= \text{Cash}(t-1) + \text{REC}(t) - \text{DIS}(t) \\ \text{A/R}(t) &= \text{A/R}(t-1) + \text{REV}(t) - \text{REC}(t) \\ \text{PAY}(t) &= \text{PAY}(t-1) + \text{EXP}(t) - \text{DIS}(t) \end{aligned}$$

We will call these the **normal form** of the cycle equations.

The **accounting cycle assurance formula** for a given accounting cycle equation can be derived by writing the accounting cycle equation in the form desired and then writing the accounting cycle assurance formula that corresponds beneath it. For example:

$$\begin{array}{ccccccc} \text{REV}(t) & = & \text{A/R}(t) & + & \text{REC}(t) & - & \text{A/R}(t\text{-}1) \\ \Downarrow & & \Downarrow & & \Downarrow & & \Downarrow \\ \text{REV}^{\text{O/S}}_{\text{U/S}} & & \Leftarrow \text{AR}(t)^{\text{O/S}}_{\text{U/S}} & \wedge & \text{REC}(t)^{\text{O/S}}_{\text{U/S}} & & \text{audited in prior years} \end{array}$$

This assurance formula shows how audit assurance (measured discretely in terms of Poisson factors) on A/RO/S and RECO/S provides assurance on REVO/S. The "$\wedge$" symbol in the formula indicates that only the minimum assurance can be carried over.

In the remainder of this discussion, the assurance formulas will be written out explicitly using the following symbols for the **direct** assurance obtained with respect to each component error exposure (we focus here on error exposures rather than assertions since the main results arise from interrelationships between various accounting cycle components of an arithmetic nature. The extension to assertions is straight forward.): CashO, CashU, RECO, RECU, DISO, DISU, A/RO, A/RU, REVO, REVU, PAYO, PAYU, EXPO and EXPU. Thus, REVO represents the assurance level, expressed as a Poisson factor, obtained from audit procedures **directed** at the revenue account and effective at detecting overstatements. Since it is an **assurance level,** it can be derived only from inherent assurance, internal control assurance (preventive or detective), analytical review assurance or substantive procedures such as testing of the revenue transaction stream. In any particular situation, some of the sources may not be available ... e.g. direct inherent

assurance (and internal control assurance) on A/RO is negligible although this type of assurance can be found in the related component exposures REVO and RECU. Similarly, there is little direct assurance possible on A/RU.

The total assurance on any particular component exposure will be expressed as $v_x(^*)$ where * represents the component exposure and x represents/indicates the accounting cycle (x is one of either cash (C), receivables (R) or payables (P) cycles). Thus,

$$v_R\ (REVO) = REVO + \min\ \{A/RO,\ v_c(RECO)\}$$

is the explicit formula for the accounting cycle assurance formula: REVO/S $\Leftarrow$ A/RO/S$\wedge$ RECO/S introduced above. The fact that REC is an element of both the receivables (R) and cash (C) cycles requires the use of $v_c(RECO)$ when it appears in a formula for an R-component exposure.

The formula says that the total assurance on revenue overstatements obtained from the revenue cycle is equal to the sum of the direct assurance on REVO/S plus the minimum of the direct assurance on A/RO/S and the total assurance on receipts overstatements obtained from the cash cycle.

Using this notation, it is possible to develop audit programs that ensure a **sufficient** level of audit assurance is obtained on each financial statement component exposure. Stated in terms of the v_x operator, if the required overall level of assurance is 3.0, then a **sufficient** audit plan must have:

I. $v_C(CashO) \geqslant 3.0$	II. $v_C(CashU) \geqslant 3.0$
III. $v_R(A/RO) \geqslant 3.0$	IV. $v_R(A/RU) \geqslant 3.0$
V. $v_P(PAYO) \geqslant 3.0$	VI. $v_P(PAYU) \geqslant 3.0$
VII. $v_R(REVO) \geqslant 3.0$	VIII. $v_R(REVU) \geqslant 3.0$
IX. $v_P(EXPO) \geqslant 3.0$	X. $v_P(EXPU) \geqslant 3.0$

For convenience, each of the v_x formulas will be referred to as source of assurance plans, i.e. SAPs.

Obviously, an auditor could develop a sufficient audit plan by entering factors so that each of the above ten inequalities was satisfied, but this would be inefficient since it would not recognize the structural relationships between the various component exposures. Thus, for efficiency, the auditor is interested in finding the minimum number of SAPs which when "satisfied," i.e., indicate the required overall level of assurance, imply that all the other SAPs are satisfied. The following theorem answers this question for the three-cycle situation.

Direction of Assurance Theorem

In the three-cycle situation, a minimal sufficient audit plan must have at least five SAPs. The following SAPs constitute a minimal sufficient audit plan:

I. $v_C(CashO) \geqslant 3.0$
III. $v_R(A/RO) \geqslant 3.0$
VI. $v_P(PAYU) \geqslant 3.0$
VIII. $v_R(REVU) \geqslant 3.0$
IX. $v_P(EXPO) \geqslant 3.0$

Proof

To prove the theorem, it is necessary to show that a minimum of five SAPs is required and that the five SAPs listed provide a sufficient plan since they imply that the remaining five SAPs are also satisfied. We begin by expressing each of the SAPs in terms of the basic assurance elements (e.g. EXPO, CashU, etc.) and writing out the equivalent inequalities. These are as follows:

I. $v_C(\text{CashO}) \geq 3$ is equivalent to
1. CashO + RECO + REVO ≥ 3
2. CashO + RECO + A/RU ≥ 3
3. CashO + DISU + PAYO ≥ 3
4. CashO + DISU + EXPU ≥ 3

II. $v_C(\text{CashU}) \geq 3$ is equivalent to
1. CashU + RECU + REVU ≥ 3
2. CashU + RECU + A/RO ≥ 3
3. CashU + DISO + PAYU ≥ 3
4. CashU + DISO + EXPO ≥ 3

III. $v_R(\text{A/RO}) \geq 3$ is equivalent to
1. A/RO + REVO ≥ 3
2. A/RO + RECU + CashU ≥ 3
3. A/RO + RECU + DISU + PAYO ≥ 3
4. A/RO + RECU + DISU + EXPU ≥ 3

IV. $v_R(\text{A/RU}) \geq 3$ is equivalent to
1. A/RU + REVU ≥ 3
2. A/RU + RECO + CashO ≥ 3
3. A/RU + RECO + DISO + PAYU ≥ 3
4. A/RU + RECO + DISO + EXPO ≥ 3

V. $v_P(\text{PAYO}) \geq 3$ is equivalent to
1. PAYO + EXPO ≥ 3
2. PAYO + DISU + CashO ≥ 3
3. PAYO + DISU + RECU + REVU ≥ 3
4. PAYO + DISU + RECU + A/RO ≥ 3

VI. $v_P(\text{PAYU}) \geq 3$ is equivalent to
1. PAYU + EXPU ≥ 3
2. PAYU + DISO + CashU ≥ 3
3. PAYU + DISO + RECO + REVO ≥ 3
4. PAYU + DISO + RECO + A/RU ≥ 3

VII. $v_R(\text{REVO}) \geq 3$ is equivalent to
1. REVO + A/RO ≥ 3
2. REVO + RECO + CashO ≥ 3
3. REVO + RECO + DISO + PAYU ≥ 3
4. REVO + RECO + DISO + EXPO ≥ 3

VIII. $v_R(\text{REVU}) \geq 3$ is equivalent to
1. REVU + A/RU ≥ 3
2. REVU + RECU + CashU ≥ 3
3. REVU + RECU + DISU + PAYO ≥ 3
4. REVU + RECU + DISU + EXPU ≥ 3

IX. $v_P(\text{EXPO}) \geq 3$ is equivalent to
1. EXPO + PAYO ≥ 3
2. EXPO + DISO + CashU ≥ 3
3. EXPO + DISO + RECO + REVO ≥ 3
4. EXPO + DISO + RECO + A/RU ≥ 3

X. $v_P(\text{EXPU}) \geq 3$ is equivalent to
1. EXPU + PAYU ≥ 3
2. EXPU + DISU + CashO ≥ 3
3. EXPU + DISU + RECU + REVU ≥ 3
4. EXPU + DISU + RECU + A/RO ≥ 3

Thus, in the above analysis, each of the ten SAPs has been analyzed into its equivalent set of four inequalities that must be satisfied by the basic assurance elements. There are 40 such inequalities but they are not all distinct as a cursory review of the table would show.

The distinct inequalities in the above list can be grouped into 2-term, 3-term and 4-term subgroups as follows:

Distinct inequalities

2-Term
(a) A/RO + REVO ≥ 3
(b) A/RU + REVU ≥ 3
(c) PAYO + EXPO ≥ 3
(d) PAYU + EXPU ≥ 3

3-Term
(a) CashO + RECO + REVO ≥ 3
(b) CashO + RECO + A/RU ≥ 3
(c) CashO + DISU + PAYO ≥ 3
(d) CashO + DISU + EXPU ≥ 3
(e) CashU + RECU + REVU ≥ 3
(f) CashU + RECO + A/RO ≥ 3
(g) CashU + DISO + PAYU ≥ 3
(h) CashU + DISO + EXPO ≥ 3

4-Term
(a) A/RO + RECU + DISU + PAYO ≥ 3
(b) A/RO + RECU + DISU + EXPU ≥ 3
(e) A/RU + RECO + DISO + PAYU ≥ 3
(f) A/RU + RECO + DISO + EXPO ≥ 3

(c) PAYO + RECU + DISU + REVU $\geqslant 3$ (g) PAYU + RECO + DISO + REVO $\geqslant 3$
(d) EXPO + DISO + RECO + REVO $\geqslant 3$ (h) EXPU + DISU + RECU + REVU $\geqslant 3$

There are 20 distinct inequalities here. Since each of the ten SAPs is equivalent to only four inequalities, it is therefore obvious that at least five are required in order to form a sufficient audit plan. This proves the first part of the theorem. To prove that SAPs I, III, VI, VIII and IX are sufficient, it is only necessary to show that each of the above 20 inequalities are included in the set of inequalities implied by these SAPs.

Thus,

I. is equivalent to 3 – T(a), 3 – T(b), 3 – T(c), 3 – T(d)
III. is equivalent to 2 – T(a), 3 – T(f), 4 – T(a), 4 – T(b)
VI. is equivalent to 2 – T(d), 3 – T(g), 4 – T(e), 4 – T(g)
VIII. is equivalent to 2 – T(b), 3 – T(e), 4 – T(c), 4 – T(h)
IX. is equivalent to 2 – T(c), 3 – T(h), 4 – T(d), 4 – T(f)

Simple inspection shows that the above are indeed distinct and therefore equivalent to the distinct inequalities listed above. This proves the theorem.

Corollary

By reflection (i.e. o/s→u/s, u/s→o/s), the SAPs II, IV, V, VII and X are a minimal sufficient audit plan.

Thus, as one would expect, minimal sufficient audit plans are not unique.

Corollary: Direction of Test Concept

In the three-cycle situation, the audit strategy of testing debit account overstatement exposures directly, credit account understatement exposures directly and then relying on the accounting model to provide assurance in all other areas leads to a sufficient audit plan.

Proof: The sufficient audit plan of the Theorem is an example of this strategy. If sufficient direct procedures are applied to CashO, A/RO, PAYU, REVU and EXPO, the required SAPs listed in the theorem are obviously satisfied.

Discussant's Response to "An Assertion-Based Approach to Auditing"

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Critiquing an assertion-based approach to auditing is a bit like criticizing motherhood and apple pie, given its reliance on Mautz and Sharaf and an existing SAS, but my role here today is not to toss bouquets. My discussion of this paper will begin with a number of general issues where I think the paper misses its target or I have doubts about its content. I will conclude my discussion with a few points of lesser significance. These comments are intended to stimulate discussion.

Some Basic Issues

The authors of this paper present a wide-ranging analysis of their views on an assertion-based approach with some interesting insights into Clarkson Gordon's use of this method in their development of microcomputer technology for audit practice. While very interesting and appealing ideas are presented, there are some major omissions that are critical to a careful evaluation of the ideas in this paper.

Beyond the author's assertions, there is no convincing argument in this paper as to why an academic or practitioner ought to view an assertion-based approach as either more effective or more efficient than some particular alternative or as a dominant strategy with respect to all available alternatives. An example of this lack of convincing argument is included in the last paragraph on the first page where it appears the authors suggest that since an assertion-based approach to auditing is in accordance with generally accepted auditing standards, that it *should* be used by practitioners and authors of auditing books. This is clearly an inadequate criteria. Our choices of both general audit philosophy as well as specific audit policies should be based on perceptions of improved efficiency and/or effectiveness. Ideally such perceptions would be based on some analysis or empirical data. Such evidence or other supporting analysis seems to have been omitted from the paper. If the authors or Clarkson Gordon have such data or analysis, it would be very worthwhile to present that information.

An assertion-based approach could be viewed as a planning framework to organize thinking about or planning for the types of errors that: 1) are possible or likely; 2) for which internal accounting controls may be considered; and 3) for which effective substantive tests (analytical review or substantive tests of details) need to be considered. Although the authors do not address the differences specifically, a useful focus for our following discussions might have been to identify key differences between the risk-oriented error-discovery

audit that the authors seem to be referring to as a foil and an assertions-based approach. By considering the specific differences between the two methods, possibly in the context of a specific illustration, we could have discussed how the assertions-based approach differed in terms of our own criteria. Such a discussion will be difficult today because we lack those specifics.

The questions stated in Section II are instructive. The authors' categorization of an error-based (negative) approach and an assertions-based (positive) approach is questionable. I prefer their following observation that both questions are probably considered jointly in many audit-planning approaches. Also, both questions can be stated either positively or negatively. However, since the authors appear to favor the second question in its positive form, it is worth reminding the group of the evidence from the philosophy and psychology of decision making. A number of authors have noted that the search for evidence to support a belief is suspect behavior on philosophic grounds (see for example *On Scientific Thinking*)[1]; and empirical evidence in psychology suggests that human decision makers are overly inclined to recognize evidence that supports their views and ignore contrary evidence (see for example Waller and Felix).[2] Both of these observations suggest that there is considerable risk in pushing auditors to look for supporting evidence alone as suggested in the second question. However, the use of research from supporting disciplines uncritically is very questionable. Research on the issues implicit in an auditor searching for evidence to refute an assertion (negative approach) as opposed to searching for evidence to support an assertion (a positive approach) is needed.

In view of the comments above, I also found the eighth paragraph in Section III difficult to follow. An assurance as opposed to a risk approach does not differ as to "a proof-based thinking approach" per se. As the approaches are being used by the authors, they do differ in the direction of the implicit hypotheses about errors, but the concepts of evidence and the support of beliefs of which I am aware say very little about proving anything in an absolute sense.

In reading Section 4 of the paper, I must have missed something. The title suggests that "Assertions And The Links To Internal Control Procedures And Audit Procedures . . ." will be analyzed. Instead, the discussion seems to focus on procedure packages (also included in the title) without linking assertions and internal controls. To be fair, careful study of Figure 2 will supply some insights into the authors' implicit views. An explicit discussion of their views would still be preferable.

The authors sketch very briefly a Source of Assurance Plan (SAP). I suspect that this SAP is central to their planned microcomputer decision support package, but as described, it includes some unstated efficiency and/or effectiveness tradeoffs which are important to facilitate understanding. At a minimum, a brief comment as to how these tradeoffs were made would be very informative.

Some Other Comments

I disagree strongly with the description in Section III of the degree of assurance available from analytical review. The authors describe the degree of assurance as depending upon the type of procedure used to organize analytical review evidence. As is true of all audit evidence, the degree of assurance an

auditor obtains should depend on the quantity and the quality of the evidence. Not, as is described in this case, the choice between judgmental or statistical methods.

I agree with the author's position that internal control may be viewed as one alternative source of evidence, at least in a conceptual sense. However, this position is not unique to the assertions-based approach. It also raises the possibility that the approach may push auditors too far. Even in an assertions-based audit, internal control may be critical to adequate evidence in a client of larger size. In developing new approaches and new philosophies about carrying out the auditor's opinion formulation process, the central role of internal controls, particularly at the point of capture of transactions in large clients, may need special emphasis in order to avoid understating their significance.

In Section VI and also in Figure 3 a multidimensional evaluation concept is "asserted." It is not clear how this evaluation concept operates or relates to the notion of aggregating achieved levels of assurance and materiality across assertions and across balances. If there is some other role to this multidimensional evaluation concept, this discussion needs to be expanded significantly. Otherwise, Figure 3 adds little and should be omitted.

The notions of derived components and generating components were difficult to follow. Are they just complicated ways of labeling transaction flows into balances or are there more insights intended? Knowing Don Leslie I suspect there is more intended but it did not come through in my reading.

As always, a Leslie or a Leslie and others paper is stimulating reading. Our progress as both efficient and effective auditors requires that we continually question and reevaluate all that we do. This paper is an important contribution to that progress.

End Notes

1. Tweney, R.D., M.E. Doherty and C.R. Mynatt, *On Scientific Thinking,* Columbia University Press (1981), p. 458.

2. Waller, W.S. and W.L. Felix, Jr., "The Auditor and Learning from Experience: Some Conjectures," *Accounting, Organizations and Society,* Vol. 9, No. 3/4 (1984).

3

On the Economics of Product Differentiation in Auditing*

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I. Introduction

Corporate financial statement audits have traditionally been viewed as homogeneous across auditors. For example, the Commission on Auditors' Responsibilities ("Cohen Commission") in its Report [1978, p. 111] stated that:

> 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* (emphasis added), that is, management of the corporation.

In support of this view, it is usual to assert that the identity of the firm which performs an audit is irrelevant since every examination must conform to generally accepted auditing standards (GAAS) and all firm partners must be fully professionally qualified. Thus users of financial statements have no reason (nor basis) to distinguish among auditing firms.

At the same time, however, it has also been recognized that a company which may have a perfectly satisfactory relationship with a local accounting firm will often change auditors to a well-known national firm when that company first sells securities to the public. It is usually alleged that such "displacement" occurs as a result of pressure from underwriters (see, for example, *Wall Street Journal*, July 18, 1983, "Small CPA Concern Sues an Underwriter Over Loss of Client") or because of other unwarranted "biases." For example, Arnett and Danos [1979] use the term "perceptual barriers to viability" to describe these "biases." Under the assumption that the services of auditing firms are homogeneous, it follows that professional accounting

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bodies, such as the AICPA or CICA, should strive to eliminate "biases," perhaps by "educating" managers, underwriters, and other financial statement users. However, if we drop the homogeneity assumption, then auditor displacement at the time of an initial public offering of securities (to the extent such displacement actually occurs) may simply be evidence of rational economic behavior.

1.1 The Product Differentiation Hypothesis

Recently, several researchers [Simunic, 1980; De Angelo, 1981(a) and 1981(b); Dopuch and Simunic, 1980 and 1982] have suggested that audit services, like most products, are likely to be differentiated.

De Angelo [1981(a)] argues for the existence of audit quality differentiation, in the sense of systematic differences in auditor independence, essentially as follows. First, she assumes that the production of audit services for a specific client over time is subject to a learning curve. Given this condition, if, whenever a client changes auditors, there is competitive bidding among potential suppliers, then the first year's audit fee will be less than the avoidable cost in that year. This is referred to as "low balling." In other words, the auditor is "forced" (through the competitive bidding process) to invest in the client by passing through into his initial fee bid the discounted future cost savings due to learning. The investment will be recovered (along with at least a normal return) through fees in subsequent years which exceed avoidable costs, and these "excess fees" constitute client-specific quasi-rents.

With respect to auditor independence, the important feature of this argument is that the quasi-rents can be lost (and the auditor earn less than a normal return) should a client *unexpectedly* change auditors. Thus, other things being equal, the existence of client-specific quasi-rents gives a client more bargaining power vis-a-vis the incumbent auditor, potentially impairing that auditor's independence. However, De Angelo argues, other things are *not* equal in that an incumbent auditor who is tempted to "cheat" in order to please one client must also consider the possible loss of his *other* clients, should his malfeasance subsequently be discovered. Hence a large audit firm with many audits and earning large aggregate client-specific quasi-rents faces a higher potential opportunity loss from "cheating" to retain a client than would a small audit firm with few clients. The aggregate quasi-rents are said to constitute a "collateral bond" against auditor "cheating." As a result, auditor independence will be positively correlated with audit firm size.

Note that De Angelo's argument is essentially mechanistic, being driven by an assumed audit learning curve and competition in the bidding process. Many objections can be raised against the reasonableness of this scenario, including the fact that the existence of a significant learning curve in auditing has not been empirically demonstrated.[1] In addition, De Angelo ignores the *demand* for differentiated audit services, except in the narrow sense that a client is not willing to pay the cost of an independent audit to an auditor who, in fact, is not perceived as supplying such audits (i.e., a "cheater").

In a second paper, De Angelo [1981(b)] broadens her notion of audit quality into "the market assessed joint probability that a given auditor will *both* (a)

discover a breach in the client's accounting system and (b) report the breach" [p. 186]. Differences in quality supplied are still motivated by differences in auditor collateral bonds; that is, audit quality is correlated with audit firm size. In addition, De Angelo conjectures that the demand for differences in audit quality arises from differences in agency costs across clients. Several of the linkages (particularly the connection between the size of the collateral bond and the probability of *discovering* a breach) in that paper are very vague. However, some of the arguments (discussed later) are consistent with the present work.

At about the same time, Dopuch and Simunic [1980; 1982] proposed a demand based model of product differentiation wherein audit services possessed two characteristics valued by a company's top management: a contribution to organization control and credibility with external financial statement users. They argue that credibility is simply associated with an auditor's reputation or brand name. The demand for credibility is assumed to arise when there is an asymmetry of information between top management and investors about the honesty of top management. In this situation, a costly audit by a credible auditor can either signal management's honesty to investors or reduce agency costs by restricting top management's ability to conceal, through misrepresentation in the financial statements, the consequence of actions taken which were in the best interests of top management ("self-serving behavior") but not shareholders. Dopuch and Simunic argue further that top managements' utility functions and opportunity sets for "self-serving behavior" likely vary across companies. Hence, "the market is not likely to be characterized by a single value of credibility demanded and supplied" [1982, p. 413]. Note that an important element of any market characterized by information asymmetry is the question of observability. Thus, Dopuch and Simunic argue further that auditor credibility must be associated with an observable characteristic, such as the name of the auditor, rather than the undisclosed details of the audit examination.

These arguments are silent as to the specific rank ordering(s) of auditors on a credibility dimension and the theory is sufficiently general to allow different orderings of audit firms in different circumstances. For example, auditors may possess different local, regional, or client industry-specific reputations. However, from the observed dominance of the Big Eight firms in the market for audits of publicly held companies, Dopuch and Simunic *infer* that audits of such companies by Big Eight firms are more credible than audits by smaller firms.

1.2 Previous Tests for Product Differentiation

Several researchers have attempted to empirically test this "product differentiation hypothesis," generally in the simplified two-class form wherein audits by Big Eight firms are hypothesized to be of higher quality than audits by non-Big Eight firms.

Nichols and Smith [1983] examined the stock market reaction to auditor changes between auditor classes during the years 1973-79 by 51 companies whose common shares were listed on either the New York or American Stock Exchanges. In a series of tests, they found that while abnormal returns were in the directions predicted by the product differentiation hypothesis (i.e., negative residuals were associated with Big Eight to non-Big Eight changes while

positive residuals were associated with non-Big Eight to Big Eight changes), the mean differences were not statistically significant. They concluded that the magnitude of any market revaluation of the firm arising from a change in auditor class may not be detectable using conventional methods, particularly for large, listed companies.

Shockley and Holt [1983] used multidimensional scaling to examine how a sample of bank chief financial officers rated the Big Eight CPA firms. The basic issue tested was whether or not purchasers of audit services could systematically differentiate among the Big Eight firms (i.e., whether there was product differentiation *within* the Big Eight). Shockley and Holt found that bankers tended to differentiate among these audit firms largely on the basis of market shares within the banking industry. They therefore suggested that industry expertise may be a source of audit quality differentiation.

Healy and Lys [1983] used the product differentiation hypothesis to explain the acquisition by Big Eight firms of smaller audit firms. They conjectured that auditor mergers may be the least costly method for the clients of the acquired firm to change the quality of their auditing. However, not all clients of the acquired firm are likely to demand a change in audit quality at the time of the merger. Hence, any systematic differences between those clients which stay with the acquiring Big Eight firm and those which revert to a smaller auditor would represent factors associated with the demand for audit quality. Their test consisted of an examination of switching vs. non-switching clients of J.K. Lasser & Co., following its merger into Touche Ross, and the clients of S.D. Leidesdorf & Co., following that firm's acquisition by Ernst & Whinney. The results were weakly consistent with the product differentiation hypothesis in that switching vs. non-switching clients differed on certain plausible dimensions, including size and leverage. However, other plausible explanatory variables, including changes in client capital structure, were found to be insignificantly different between the two groups.

Palmrose [1984] investigated the association between agency cost variables and the use of different classes of auditors. She hypothesized that the higher the expected level of agency costs arising from a certain ownership-management structure in a company, the higher the level of audit quality which will be demanded. The test consisted of a series of logistic regressions of auditor choice (Big Eight vs. non-Big Eight) on a set of potential explanatory variables which measured expected agency costs (i.e., client size, degree of separation between ownership and management, leverage, and the existence of management compensation plans tied to accounting numbers). The sample consisted of a cross-section of 276 companies classified by industry. The results were inconclusive and somewhat anomalous in that client size was the only consistently significant explanatory variable (i.e., the clients of the Big Eight firms tended to be larger). In addition, leverage was the only other variable which was sometimes significant, but in the wrong direction. That is, the clients of Big Eight firms tended to have lower leverage (lower expected agency costs), which was contrary to the hypothesis.

One direct implication of product differentiation in auditing is that there should be related systematic differences in audit prices. As pointed out by Simunic [1980], the market for audits is a hedonic market wherein differentiated products are not observable directly, but rather are revealed by differ-

ences in prices associated with differences in observed product characteristics. Thus, if Big Eight firms deliver a higher quality of service than non-Big Eight firms then, other things held constant, audit prices should likewise vary between the two groups.

The existing evidence on this point is mixed. Simunic [1980] found that prices charged by the Big Eight firms in the United States were, on average, not significantly different and perhaps somewhat lower than non-Big Eight firm prices, across all sizes of clients. Note that his sample consisted of a cross section of 397 audits of companies ranging in size from $500,000 in assets (and sales) to about $10 billion in assets (and sales). Using a pooled cross section of 136 Australian companies, Francis [1984], on the other hand, found that prices charged by Big Eight firms *were* significantly higher than prices charged by non-Big Eight firms. This is consistent with the results reported by Taffler and Ramalinggam [1982] using data from the United Kingdom. However, in addition to the institutional differences between countries, the companies in Francis' sample were significantly smaller (by about a factor of 10) than those in Simunic's U.S. sample. In a subsequent paper, Francis and Stokes [1985] report that the positive difference between Big Eight and non-Big Eight firm prices seems to be largely confined to the very smallest companies in their sample (mean assets of $1.8 million Australian dollars). This leads the authors to speculate that scale economies to Big Eight firms and consequent lower production costs may "swamp" the price effects of product differentiation, except for audits of very small companies where "scale economies are less likely to exist" [p. 12].

The conflicting nature of this evidence may, at least partially, be due to the difficulties of inferring audit *prices* from audit *fee* data. An audit fee, which alone is directly observable, can be thought of as the product of price times audit quantity purchased by the client company. Hence in a cross section (and time series) of fees, sources of extraneous differences in audit quantities must be carefully controlled before inferences about prices can be made. While there is now considerable evidence about the *major* determinants of audit fees [e.g., Simunic, 1980; Palmrose, 1983; Maher, Broman, Colson and Tiessen, 1985], the specifications of existing models are no doubt imperfect and omitted variables may bias regression coefficients. In addition, many audit fee determinants are correlated with company size, the relation between fees and size is nonlinear, and, because of the dominance of the Big Eight firms in the audits of large companies, it is very difficult to obtain a sample of audits wherein the clients of Big Eight and non-Big Eight firms are well matched on a size dimension. Hence, a failure to properly control the nonlinear client size effect on fees can easily lead to a biased coefficient on an auditor identity variable. Add to these econometric difficulties the possible confounding effects of scale economies to large auditors, and it is not surprising that no clear evidence on product differentiation has yet emerged using audit fee data.

In summary, the empirical tests of the product differentiation hypothesis have, to date, been suggestive but inconclusive. But, this is not surprising given the early stage of the research on this topic, as well as the economics of auditing in general.

1.3 Plan of this Paper

The economic foundations for the product differentiation hypothesis in auditing are only roughly and incompletely sketched out in the existing literature. Our objective in this paper is to develop these foundations, which serve as a basis for a theory of auditor choice by top management of a company. Note that the auditor choice decision is non-trivial only under the hypothesis that auditor services are somehow differentiated. The assumption of homogeneous audit services implies that the assignment of auditors to clients is random or simply a function of auditor cost conditions. For example, if only the largest auditing firms are fully able to exploit available economies of scale due to input indivisibilities, then there is no meaningful auditor choice and these largest firms will eventually (in a world of transaction costs) "sweep" the market for audits.

In Section II, using Lancaster's [1966] "characteristics" framework, we begin by analyzing the attributes of the audit service which may be valued by top management. In doing so, we consider the distinction between audit quality and quantity and their relation to audit service inputs. We then analyze the "product location" decision of auditors, and develop the argument that the credibility of an audit is communicated to external financial statement users (e.g., prospective shareholders and creditors) through an audit firm's brand name. Thus it is the brand name which has *ex ante* value to top management when seeking to influence the decisions of users. We conclude this section with a discussion of some welfare implications of product differentiation.

In Section III, we associate auditor credibility with the power of an auditor's tests (in a statistical sense), and analyze the sources of demand for *different* levels of credibility. We argue that an auditor's brand name induces a Bayesian revision of users' prior probability distributions that financial statements contain material error. In a world of rational users who can "price protect" themselves when transacting with management, cross sectional differences in the prior probability of error and the wealth effects of error will cause top managers of different companies to demand different credibility levels. We examine the role of future rents and quasi-rents in "enforcing" the delivery of a particular expected power of test, and consider the implication of our analysis for rates of litigation ("hit rates") which can be expected to occur across audit firms whose credibility varies. Finally, we compare our analysis to that of De Angelo and present some examples to illustrate the main ideas. The paper closes with some concluding observations and comments.

II. Economics of Product Differentiation

2.1 Basic Concepts

Consistent with the traditional view of financial statement audits, the standard assumption in microeconomic analysis has been that the products produced by firms in a particular industry or market are homogeneous. That is, within an industry, consumers cannot distinguish the product produced by firm i from that produced by firm j. More formally, this assumption is expressed by the condition that the cross price elasticity of demand for the product of the i^{th} firm in an industry with respect to the price of product of the j^{th} firm in the

industry is infinite, or the products are perfect substitutes.[2] An implication of this assumption is that a single price must prevail within the market.

Chamberlain [1933] was the first economist to suggest that no two firms are likely to make precisely the same product, even though they operate in the same industry. He coined the term "monopolistic competition" to describe a market where there are *many* sellers, each one producing a somewhat differentiated product. If, on the other hand, there are only a few firms in the industry, the market can be described as a differentiated products oligopoly. Note that differentiated products are assumed to be *strong* substitutes, but not *perfect* substitutes for each other. That is, their cross price elasticities are finite and relatively large. If the products are very weak substitutes in demand (cross price elasticities approach zero), then the products are no longer simply differentiated, but the firms can be thought of as operating in different industries. In fact, a criticism of Chamberlain's work has been that the notion of differentiated products is really nothing new, but simply causes us to think more deeply about which group of firms ought to be considered an industry [e.g., Stigler, 1968]!

Following Chamberlain, and the essentially concurrent work by Hotelling [1929] on spacial duopoly, there were few contributions to the economics of product differentiation until the work of Lancaster [1966; 1971] on the nature of product characteristics. In considering exactly how products may be differentiated, Lancaster proposed the notion that a commodity is not desired in and of itself, but rather for the bundle of utility bearing characteristics it contains. For example, a specific brand and model of automobile provides not only the obvious characteristic *transportation,* but also some amount of the characteristics *safety, social prestige, driving entertainment, pleasant appearance,* etc. Each of these characteristics commands an implicit price in a market, and the observed market price of the commodity (e.g., automobile) will be a linear combination of the measured quantities of each of the component characteristics. Since quantities of characteristics vary across products, observed prices will also vary. Hence in order to compare product prices, construct price indices over time, or test hypotheses about market behavior using price data, it is necessary to control for differences in product characteristics. A way to do this is to estimate the coefficients of a hedonic regression function where product price is the dependent variable and quantities of characteristics are the independent variables. This is essentially the theoretical rationale underlying the studies of audit fees discussed in Section 1.[3]

The notion of characteristics suggests that there are two basic ways in which products can be differentiated. In the simplest case, the industry's product contains only *one* characteristic, but products of various firms differ in the amount of the characteristic each contains. This situation can be described as vertical product differentiation and it implies that products can be ordered on a single dimension, which can be labeled *product quality.* The more general case, where the product possesses many characteristics and producers differ in the amount of each characteristic their product contains, can be called horizontal product differentiation. Note that in this case, the description of each firm's product is a k component vector of quantities (where k is the number of characteristics or dimensions) and, in general, the products of various suppliers cannot be ordered.

2.2 Demand for Audit Service Characteristics

Before proceeding further, it is useful to relate these concepts to the audit services market. First, it is important to recognize that audit services are not a consumption good, but rather a factor of production. That is, neither audit services nor their component characteristics are direct objects of utility to any ultimate consumer, and the demand for audit services is not the outcome of a standard constrained utility maximization problem. Thus, the demand for *differentiated* audit services cannot arise from a simple assumption that consumers vary in their tastes, preferences, and incomes.

As a factor of production or intermediate good, the demand for audit services is derived from the objective function of the top management of the audited company. We assume that this objective is to maximize own expected utility.[4] Some insight into the characteristics of the audit service which may be valued by (or increase the wealth of) top management can be derived by considering various possible relationships between top management, shareholders, and creditors.

Top managers are also owners and there are no creditors

These assumptions describe a smaller closely-held company with no debt. Will audit services be demanded at all in this situation? The answer would seem to depend crucially on the size and complexity of the company and the resulting degree to which top managers can personally monitor the various activities of their subordinates. The less their personal control over the organization, the more likely an outside audit would be valuable to top management. The audit service would be part of the control system over the information produced within the organization, and hence the company's financial statements. This demand, which arises from the internal agency problems of an organization, may be termed a *control* demand. Therefore, a plausible audit service characteristic along which auditors can be differentiated is the contribution of the audit to the organization's internal control system.

Top managers are separate from owners and there are no creditors

These assumptions describe a publicly held company with an all-equity capital structure (ignoring government regulations and any mandatory audit requirement). There is now an agency relationship between top management and outside shareholders.[5] Given the existence of this agency relationship, there is likely to be a demand for an independent attestation (audit) as to the truthfulness of the information reported by top management to the outside shareholders, and, in general, both parties (groups) might benefit from such an audit [Beaver, 1981]. The key attribute of the audit service is likely to be its *credibility* as perceived by the shareholders. Hence, this is a second characteristic or dimension along which audit services can be differentiated.

Effects of the introduction of debt into the capital structure

The issuance of debt by a closely held company creates an agency relationship between the debtholder(s) as principal and an owner-manager as

agent. After the issuance of debt, the owner-manager is motivated to take actions which increase the value of the equity, but decrease the value of the debt. A major potential source of such agency costs is adoption of an investment policy in which projects with a high variance but low expected net present value are substituted for lower variance but higher net present value projects [Jensen and Meckling, 1976].[6] Note that the owner-manager will exclusively earn the possible high returns from high variance projects, but shares the risk of possible low returns or losses with the debtholders. This agency relationship is likely to give rise to the use of restrictive covenants in debt agreements [see Smith and Warner, 1979] as well as a demand for independent attestation to verify both the compliance with these agreements and the truthfulness of general financial information reported by the owner-manager to the debtholders. As with public shareholders, *credibility* or reputation is thus likely to be an important audit service attribute. Of course, both the manager-shareholder and manager-debtholder agency relationships will exist simultaneously if debt is issued by a publicly held company, reinforcing the demand for audit service credibility.

In summary, two major audit service characteristics arise from a consideration of the possible organization structure of the audited company:

1) the contribution of the audit to organization *control,* and
2) the *credibility* of the audit as perceived by shareholders and creditors.

The importance of these two characteristics was confirmed in a recent study of 881 small, closely held U.S. companies by O'Keefe and Barefield [1985]. Of the companies who *voluntarily* purchased audits in this sample (132 companies or 15 percent), 57 percent listed "enhances credibility (of financial statements) with outside users" as the most important reason for the purchase, while 46 percent listed "augments internal control" as the second most important reason.[7] Moreover, other reasons for the purchase were mentioned only infrequently (e.g., 12/17 percent listed "limits liability" as a primary/secondary reason).

A third possible characteristic which top management may value is the scope of the *product line* offered by an audit firm, in particular the availability of various management consulting type services from the audit supplier. Such product availability reduces management's search costs when seeking to acquire consulting services. In addition, it is often claimed that production of auditing creates a knowledge externality or spillover which reduces the costs of consulting services when the services are produced jointly. This issue was analyzed and tested by Simunic [1984] who found that the pricing of audit services *is* consistent with the hypothesis that knowledge spills over from auditing to consulting. Thus, managers in certain circumstances may be better off by purchasing the audit service from a supplier with a wide product line. However, this need not be true in all situations. For example, in the data set on publicly held companies underlying Simunic [1980; 1984], 235 of 381 companies or 62 percent purchased *no* consulting service from their auditor over a three-year period.[8] Further, of the 277 companies audited by a Big Eight firm, 163 or 59 percent purchased *no* consulting service from their audit firm during the period. Hence, the value of wide service scope to managers can be assumed to

vary, creating a third characteristic along which audit firms can be differentiated.

2.3 Distinctions Between Characteristic Quantities, Quality of Service, and the Quantity of Inputs and Output

Based on this analysis, a description of the audit service purchased by a particular client[9] from a particular audit firm requires, in principle, the specification of a vector of quantities of three service characteristics:

$$\{\text{control, credibility, product line}\} \text{ or } \{c_1, c_2, c_3\}.$$

A unit of each characteristic is assumed to be costly to produce. For example, the offering of a line of consulting services which may or may not be demanded by a particular client is costly to the audit firm. Or the development of a certain credibility[10] level with outside shareholders and creditors is also costly. Therefore, each service characteristic commands a positive implicit price—say λ_1, λ_2 and λ_3 — in the market.

With differentiated audit services, *quality* of service comparisons can be made using any dimension of interest if the quantities of the suppressed characteristics are at least equal. For example, an audit service described by the vector {2, 8, 5} is of higher quality than the service {2, 5, 5}, of lower quality than the service {2, 9, 5} and not comparable in quality to the service {1, 10, 5}.

In addition to the quantities of service characteristics from which quality of service rankings can sometimes be made, auditing also has a *pure quantity* dimension. This is so because audit service contexts differ radically across companies. We have argued that some differences in client contexts are the basis for a demand for differentiated audit services. However, other contextual differences lead to supplier choice and the delivery of a certain quantity of service on the basis of supplier efficiency considerations *in a context* taken alone. To make this distinction meaningful, it is necessary to clearly specify a base level or standard service. All client context differences which affect the resources expended by a supplier in providing the base level service are sources of pure audit quantity differences. Conversely, any context differences which lead to different choices of service vectors, $\{c_1, c_2, c_3\}$, are sources of product differentiation among auditors.

The base level service is defined by the simple purchase of an audit opinion.[11] If management only values an audit opinion *per se* (perhaps because an audit is mandated by law), then management would simply choose the least-cost producer in the circumstances. This characterization of the problem is the basis for the traditional view that all auditors deliver the same homogeneous product—an appropriate audit opinion. Empirically, it motivates a search for auditor scale economies [e.g., Danos and Eichenseher, 1982]. The hypothesis of product differentiation motivates a search *beyond* the opinion to distinguishing service characteristics. Of course, management still demands an efficient producer of a particular characteristic vector, but auditor choice is no longer a cost minimization problem. Rather, it requires explicit recognition of a benefit function to top management.

If the pure quantity of auditing is measured by q, then an audit service fee can be denoted as

$$F = (\lambda_1 c_1 + \lambda_2 c_2 + \lambda_3 c_3)q.$$

While audit fee data are not examined in this paper, some examples of fee determination are useful to illustrate the ideas. Suppose that a client wishes to purchase a base level service—an audit opinion. Management deems the audit valueless in controlling the organization and has no use for consulting services. Since some auditor must sign the opinion, credibility or c_2 can arbitrarily be assigned a minimum value of 1. Hence the characteristic vector demanded would be the base level {0,1,0} and the fee would be

$$\hat{F} = \lambda_2 \hat{q}$$

where $\hat{q}$ depends on company size, complexity, etc. Consider now an identical company, except that management values the auditor's ability to perform certain consulting services as needed. Say the desired characteristic vector is {0, 1, 1}. Note that this is a higher quality service. The service fee would be

$$\hat{\hat{F}} = (\lambda_2 + \lambda_3)\hat{q} \text{ where } \hat{\hat{F}} > \hat{F}.$$

The fee now reflects the presence of both attributes and is scaled by $\hat{q}$. Finally, suppose there exists another identical company in terms of size, complexity, etc. whose top management chooses an audit service which improves organization control, has a higher credibility with outsiders than the base level, and is obtained from a supplier who is capable of rendering certain consulting services as needed. Say the vector {2, 3, 1} characterizes this service. The fee for this service, which is of higher quality than in the previous case, would be

$$F' = (2\lambda_2 + 3\lambda_3 + \lambda_3)\hat{q} \text{ where } F' > \hat{\hat{F}} > \hat{F}.$$

What is the role of service inputs in this fee model?[12] The outputs of the audit service are the quantities $\{c_1, c_2, c_3\}$ and q. These outputs are related to inputs through a production function, but the relationship need not be simple. For example, it seems likely that control and credibility are largely joint products, thus restricting the values c_1 and c_2 can assume. On the other hand, the breadth of the available product line is not a function of variable audit service inputs but requires the incurrence of a fixed cost by the auditing firm. Higher levels of available services presumably are associated with higher fixed costs. Thus, distinguishing between inputs and output is important in conceptualizing the audit service; but detail specification of the input/output relationship is not possible, nor usually necessary.

2.4 Product Location in Characteristics Space

If audit services are differentiated, then the question arises as to what service designs will be offered for sale in the market? Also, can a given audit firm be expected to supply a single type of service (i.e., a vector with specific characteristics $\{\hat{c}_1, \hat{c}_2, \hat{c}_3\}$) or simultaneously supply a variety of characteristic vectors? These are important issues from the point of view of both purchasers and producers. Audit firms presumably want to design services so as to maximize economic rents; conversely, the services (and prices) which emerge

in market equilibrium affect the welfare of purchasers. In the economics literature, these issues are described as "product location" decisions since the insights are frequently derived by analogy from formal models of spatial competition.

Consider first the question of whether a producer will offer a single or multiple characteristic vectors. For typical goods, it is common to observe a company which produces and markets a variety of product types. For example, in a study of product characteristics of the U.K. fertilizer industry, Shaw [1982] found that 69 different compound fertilizers were available in 1978 from three major producers. These products largely differed only in composition with respect to the three plant nutrients—nitrogen, phosphorus, and potash. In this setting, labeling presumably allows the consumer to choose the most suitable product for a particular situation, and the identity of the selling firm may well be irrelevant.

As product characteristics become more subtle and thus more difficult to enumerate and measure, a company will use separate brand names to identify products with specific sets of characteristics. For example, automobile manufacturers sell a variety of models which presumably differ as to the amounts of the characteristics—transportation, safety, prestige, etc.—each provides. In the limit, if a company is (somehow) precluded from developing a multiplicity of brands, the relevant brand will be the name of the company itself. In that situation, where the nature of the product precludes direct communication of component characteristics and the firm name is the brand, each supplier will produce a product with a single set of characteristic quantities.

Turning to the location decision, rent seeking suppliers can be expected to locate (i.e., choose a vector) in response to demand and the location choices of other suppliers. Unfortunately, the economics literature offers few general results on equilibrium location choices, as solutions are very sensitive to alternative plausible assumptions about the behavior of competitors, the nature of the space in which competition occurs, and the distribution of customers [Eaton and Lipsey, 1975]. However, some insights can be obtained by considering the basic factors which affect the location decision [see Waterson, 1984].

Three cost elements enter into economic models of location:

a. a transportation cost per unit of distance,
b. production costs which can consist of a fixed and/or variable component, and
c. relocation costs.

The existence of fixed costs is crucial to the solution. If there are no fixed costs of production, then firms will simply produce at all points at which there are customers. That is, demand will be perfectly satisfied without the incurrence of transportation costs. The assumption of fixed costs implies that the number of suppliers must be limited to maintain profitability; hence customers will vary in distance from the nearest supplier. A second key assumption concerns the possibility of relocation. That is, once a supplier chooses a location, are there costs of relocation? In general, if relocation is costless but there are fixed production costs, there is no unique equilibrium solution [Eaton and Lipsey,

1975]. Conversely, if initial location choice is irreversible and suppliers enter a market sequentially, then the equilibrium location pattern will be symmetrical for a uniform distribution of customers. For example, if buyers are uniformly scattered along a line segment of fixed length, sellers will anticipate that unusually large "gaps" in the market will be filled by competitors and hence will array themselves at equally spaced intervals [Waterson, 1984]. However, if customers are located in clusters, a closer packing of suppliers will occur in areas of high demand density with the "gaps" increasing in width in areas of low demand density [Shaw, 1982].

Let us now relate these ideas to the audit service. If different quantities of control, credibility, and product line scope can be readily observed and measured by top management (i.e., these attributes are like nitrogen, phosphorus, and potash!), it would seem that each audit firm can produce a multiplicity of characteristic vectors to meet (perhaps imperfectly if there are fixed costs) client demand. However, even if top management possesses such complete information, the situation is complicated by the fact that *credibility is purchased solely to influence the decisions of shareholders and creditors*. These outside parties, who may be numerous and geographically scattered, are very unlikely to possess complete information. We therefore conclude that, for them, the audit firm's brand name or reputation is the relevant measure of credibility. However, brand name will be less important for the other two characteristics where the outputs (and inputs) can be more easily observed by top management, who directly value these characteristics. An implication is that each audit firm will be identified with a single level of credibility at any moment in time, but may offer a multiplicity of control levels and, perhaps, product scope levels.[13] In the next section, we analyze the auditor choice decision given this information asymmetry and develop more precisely our notions of credibility, brand name, and reputation.

With respect to the product location decision of auditors, the first step is to identify the analogues of transportation, production, and relocation costs. Note that transportation costs are incurred whenever suppliers and customers are physically separated. Thus, in a characteristic space, an analogous cost arises if, given the equilibrium distribution of characteristic vectors of suppliers, top management incurs an opportunity loss of wealth or utility. For example, suppose managers rationally want to purchase an audit of near zero credibility, but no such service is available on the market. Acquiring a credible audit implies an opportunity loss or transportation cost.[14] Or suppose management wants an audit of certain credibility from a supplier who also specializes in a certain type of consulting service, but no such supplier exists. Again, an opportunity loss is incurred. From the previous discussion, note that such opportunity losses will arise only if there are fixed costs of producing at certain locations, that is, particular characteristic vectors.

Since very little is known about the production functions of public accounting firms, we can only speculate about the importance of fixed costs in producing a level of control, credibility, and product scope. However, it seems likely that there are significant fixed costs associated with a firm's capital commitments. The most important of these will be the technology adopted and the human capital (expertise) of professional staff. For example, Kinney [1985] has argued that auditing firms can be categorized on an audit technology

dimension into "unstructured" vs. "structured" firms. The first group tends to minimize the constraints imposed on professional judgment whereas the second uses statistical methods, decision aids, etc. to constrain and "improve" judgment. It seems plausible that fixed costs increase as "structure" increases. Fixed costs are also likely to increase as the professional staff becomes more specialized (narrow). For example, the offering of a specialized consulting service to clients, such as industrial engineering for plant design and cost control, no doubt adds to an audit firm's fixed costs.

Two conclusions follow from this discussion. First, auditing firms probably vary in the level of fixed costs they incur. Second, the higher the fixed cost commitment, the less flexible the firm will be in producing a variety of characteristic vectors. This seems to be the basis for the often heard claim that small audit firms are more flexible in meeting a client's demands, although large firms may be more efficient in performing specific, complex tasks. With respect to the three audit service characteristics, fixed costs can be important in all cases. As a result, all possible combinations of control, credibility, and product scope are not likely to be available in the market.

Finally, consider the costs incurred by an audit firm when attempting to move from one characteristic vector to another vector. Typically, relocation costs are those fixed production costs which are "sunk" at a specific location. These costs may be particularly high when information about characteristics is conveyed by the brand name. Schmalensee [1978] points out that, for consumer goods, the "repositioning" of brands can be so costly that it is frequently cheaper to simply abandon an established brand whose sales have fallen to low levels and introduce a new brand. Again, while there is no empirical evidence on the point, such costs are likely to exist in auditing. For example, if an audit firm invests in structured technologies which facilitate the production of high levels of control and credibility but are unnecessary for producing low levels of these characteristics, an attempted move from the high level will be costly. Or, if a firm enters into an employment contract with a specialized consultant, firing the consultant will be costly. Perhaps most important, as with consumer goods, it may be very costly for a firm to change the credibility level associated with its brand name. In fact, high costs of directly relocating a brand may be an important motivation for mergers between CPA firms.

If costs of relocation are substantial (therefore locations more or less fixed), the characteristic vectors of audit firms will tend to be separated. For example, there will be an array of credibility levels associated with firm brands. Thus any grouping of suppliers into broad classes such as Big Eight vs. non-Big Eight is necessarily arbitrary and should be tested for within-group homogeneity. Note, however, that audit firm product vectors *will* tend to be clustered in response to concentrations of client demand.

2.5 Welfare Implications of Product Differentiation

When dealing with differentiated products, a social welfare question which can be asked is this: given a location equilibrium, will the variety of characteristic vectors offered for sale in the market be optimal?[15] This evaluation involves a trade-off. On the one hand, the greater the variety of characteristic vectors,

the better the market caters to diverse consumer tastes and preferences. On the other hand, the assumption of differentiated products (imperfect substitutes) implies that the demand curves faced by suppliers are downward sloping and equilibrium must occur where average production costs are still falling. Thus differentiated products imply a loss of efficiency. Unfortunately, the welfare properties of the free market solution depend on the specific values of parameters. That is, in general too many or too few product varieties may be produced and sold [Friedman, 1983]. Hence beyond these general statements the economic literature offers no conclusion about the welfare implications of product differentiation in auditing from the usual perspective.

However, a somewhat different question appears to be more relevant here; namely, is it socially desirable for auditors to offer differentiated services *at all* to their clients? Since the demand for auditing is not a consumption demand but rather is derived from top management's objective function which is assumed to be maximization of *own* wealth or utility, are demand differences, in some sense, socially legitimate? There is no special problem if top management's objective is consistent with the objectives of shareholders and creditors. Such mutuality of interests would occur with respect to the characteristics *control* and *product line scope.* That is, all three parties are presumably interested in efficient monitoring of organization subordinates and efficient acquisition and utilization of consulting services. However, the credibility characteristic is clearly different in that the purpose of auditor credibility is to ameliorate an agency problem between top management and the other two groups. Thus, the legitimacy of product differentiation on this dimension is likely to be a controversial, but interesting question. To answer the question, we must analyze the nature, role, and demand for credibility in more detail.

III. Auditor Credibility and Auditor Choice

3.1 Nature of Audit Service Credibility

Dopuch and Simunic [1982] describe auditor credibility as follows (p. 407):

> An auditor's attestation to the authenticity of financial statements adds credibility to these top management assertions. Credibility is judged by users. More credible reporting simply means a report is more likely to be truthful or lack intentional misrepresentation. . . . Shareholders will rationally expect that attestation by a credible auditor reduces the probability that management is able to successfully conceal 'self-serving behavior.'

This is consistent with both Watts and Zimmerman [1980] and De Angelo [1981(b)] who argue that the *ex ante* value of an audit to shareholders and creditors depends on these individuals' (or "the market's") perception of the joint probability that a given auditor will discover errors and irregularities in a set of financial statements and report those findings truthfully (without omission or bias).[16] Recall that this is also De Angelo's definition of audit quality.

The concept can be made more precise by considering a simplified Bayesian model of an auditor's decision problem. Assume an auditor faces a two-action, two-state reporting decision where the states of nature are: (s_1) — the financial

statements are correct, and (s_2) — the financial statements are materially incorrect. The available actions are: (a_1) — give an unqualified opinion, or (a_2) — give an appropriately qualified or adverse opinion. Assume the auditor has performed all the usual audit tests at a certain intensity level, measured by n, which yield possible signals, t. Further, the test results, $\hat{t}$, indicate the presence of only immaterial errors. Then the posterior probability of s_2 will be:

$$p''(s_2|\hat{t},n) = \frac{1(\hat{t}|n,s_2)p'(s_2)}{1(\hat{t}|n,s_2)p'(s_2) + 1(\hat{t}|n,s_1)(1-p'(s_2))}$$

where

p'' = a posterior distribution on the states

p' = a prior distribution on the states

l = a likelihood function

This expression can be simplified if it is assumed that the auditor cannot commit a Type I error. That is, if the auditor receives a signal, $\hat{t}$, which indicates material errors are present, he will keep sampling. If the state of nature is s_1, additional evidence should lead to the discovery that sampling error is responsible for the faulty signal. Thus, $1(\hat{t}|n,s_1) = 1$ and[17]

$$p''(s_2|\hat{t},n) = \frac{1(\hat{t}|n,s_2)p'(s_2)}{1(\hat{t}|n,s_2)p'(s_2) + (1-p'(s_2))}$$

Assume that, given $p''(s_2)$, the auditor will take action a_1.

A measure of the credibility of the *financial statements* (the "package") reflecting all available information about management, the auditor, and organizational and environmental factors would be $1-p''(s_2)$. On the other hand, a measure of the credibility of the *auditor,* or audit service, is $1-1(\hat{t}|n,s_2)$, which is the power of the auditor's tests (the complement of the probability of a Type II error).

3.2 Demand for Credibility

It is generally agreed that a major purpose of financial statements is to provide information which is useful in assessing a company's future cash flows [e.g., Beaver, 1981]. It is also reasonable to assume that when top management has agency relationships with creditors and shareholders, errors in financial statements (both historical statements and those to be delivered in the future) will not be merely random or capricious. Rather, such errors will tend to reflect top management's own expected utility maximizing motives, which will typically be to induce financial statement users to *overestimate* these flows.[18] The probability that such errors are detected *ex ante* (before users assess the firm's cash flows) increases with the credibility of the audit.

The cash flows of the firm are important because the wealth of users will be a function of such flows and any errors in their assessment. For example, unrecorded liabilities may cause a banker to assess a downward biased probability of the borrower's bankruptcy and hence, charge too low an interest

rate. Or, overstated historical revenues may cause a purchaser of common stock to pay an inflated price relative to the true value of shares. Of course, if the error is subsequently discovered, an injured user will seek to recover his losses from any person who, through negligence or fraud, created the error or failed to detect and report it. But such *ex post* compensation is not likely to be complete. As a result, users will value a credible audit *ex ante* and, ignoring the costs of auditing, prefer more credibility to less.

In order to transform the *ex ante* value of credibility to users into an effective demand for credibility by top management, it is necessary to identify a mechanism through which costs to users from possible financial statement errors are imposed (at least partially) *ex ante* on top management. A reasonable assumption is that users of financial statements are rational and "price protect" themselves in transactions with management. That is, they anticipate the costs that top management, acting in its own self-interest, can impose upon them, and adjust the terms of contracts accordingly. An extreme form of "price protection" is refusal to transact. For example, a bank may demand a high rate of interest on a commercial loan where the application is supported by unaudited financial statements, or may simply refuse to make such a loan. Or a prospective shareholder will submit a low bid for stock if the company's financial statements have not been verified by a credible auditor, or may refuse to buy such shares. Thus, under the rational user assumption, top managers will demand credible auditing *in their own interests.*

The auditor's decision problem from the previous section can be extended to provide insights into the demand for credibility. Assume a particular user assesses the present value of a company's future cash flows, given all the available information, including a set(s) of *unaudited* financial statements, as the value, ϕ.[19] However, if these statements contain a material error(s), actual cash flows will yield a lower present value of $\phi - w$. The user's wealth is some increasing function, g, of the firm's cash flows. Thus, the user's expected wealth is

$$[1 - p'(s_2)]g(\phi) + p'(s_2)g(\phi - w) \qquad \{3.1\}$$

where p' is his assessed prior distribution on the states.

Note that a credible but costless audit can benefit the user in two ways:

1) The audit can induce a Bayesian revision of p' to a posterior distribution, p''. If $p''(s_2) < p'(s_2)$, the user's expected wealth is increased.
2) If the user is risk averse, the auditor may function as an insurer against the risk of loss of w, thus increasing the user's expected utility. However, after assuming the risk, the auditor will himself be motivated to minimize the insurance premium by performing an audit examination. This will lead to a Bayesian revision of the *auditor's* prior, p', to a posterior distribution, p''.

In both cases, if audit credibility were costless, a perfect audit, which reduced $p''(s_2)$ to zero, would be demanded.[20]

3.3 Determinants of the Level of Credibility Demanded

However, credibility is not a free good and its cost is normally borne by the audited company. Given the other audit service attributes, the auditor's fee for credibility is $\lambda_2 c_2 q$ and for a specific company (fixed q), an increase in c_2 requires an increase in audit intensity, n. Thus, choice of credibility can be conceptually reduced to choice of n.

The ideal way to proceed at this point would be to specify a model of the determination of audit intensity in a multiple person setting, obtain an optimum solution, and perform comparative static analysis to identify demand determinants. However, this approach is not possible as no such model exists.

A more restrictive but useful approach is to consider the choice of n by a representative risk neutral user in a single-person decision setting. That is, the user either performs the audit himself or delegates its performance to an auditor whose interests are perfectly aligned with his own. Assume there is an audit technology and an associated cost function, $\gamma(n)$. Given p', $g(w)$, and a loss from Type I error,[21] all assessed by the user, an optimum audit intensity, n^*, can be calculated by performing a Bayesian preposterior analysis. It is well known (e.g., see Kinney, 1975) that, in this setting, n^* is an increasing function of two key parameters of the problem, the loss from Type II error, $g(w)$, and the value of $p'(s_2)$. Assume the "auditor" performs this optimum examination, receives the signal $\hat{t}$, which indicates no material errors exist, and issues an unqualified opinion. Then the representative user's expected wealth after the audit is

$$[1 - p''(s_2|\hat{t},n^*)]g(\varnothing - \gamma(n^*)) + p''(s_2|\hat{t},n^*)g[\varnothing - w - \gamma(n^*)] \qquad \{3.2\}$$

where $\gamma(n^*)$ is also the auditor's fee, $\lambda_2 c_2 q$. The net gain from auditing, and receiving an unqualified opinion, to the risk neutral user is {3.2} minus {3.1}. This must be positive, since n^* was computed optimally by equalizing the marginal value of information to marginal audit cost.

This analysis suggests that users' demand for credibility will depend on two factors:

1) the larger the loss from material financial statement error, the higher the level of audit service credibility demanded, and
2) the higher the prior probability users assess that the financial statements will be materially in error, the higher the level of credibility demanded.

If users can price protect themselves in transactions with management, these factors can also be expected to drive top management's demand for audit credibility.

Before proceeding further, it is useful to consider the exact sources of the benefits from credibility implicit in our analysis of the problem. Expression {3.1} states that user wealth is lower in state s_2 than in s_1. It is the avoidance of this loss which drives the demand for credibility. In some cases, by detecting material errors when they exist, an audit can simply *shift a cost* from users to top management. However, in the majority of cases, when no material errors are detected (or detected errors are corrected), an audit can *overcome an information asymmetry* between management and users about the presence of material errors in the financial statements. This is valuable to managers whose

statements (unknown to users) are, in fact, "fairly presented." Finally, the knowledge that an audit will be performed can have a direct *productive effect,* resolving a "moral hazard" problem [e.g., Baiman, 1982] thus reducing agency costs in the relationship between top management and users. This will occur if managers anticipate that a credible audit will reduce their ability to conceal actions (e.g., shirking) that are not in the best interests of users.

In addition to these effects an audit may also have some insurance value to risk averse users. But such a role is dubious, since auditors are not strictly liable for losses to users; even under the most severe liability statutes, an auditor can invoke a "due diligence" defense. However, recent court decisions [e.g., Collins, 1985] suggest that this insurance role of auditors may be increasing in importance.

3.4 Effect of Information Asymmetry About Audit Service Production

If one assumes that users can observe the production function of the auditor, hence the power of the auditor's tests and the level of credibility delivered, *any* auditor could supply *any* level of credibility demanded by top management.[22] But this is clearly *not* the case. The auditor has complete information about his production process, and top management may be able to observe audit production imperfectly. However, users are precluded from directly observing the performance of the audit. As stated in the last section, this information asymmetry will cause users to rely upon the auditor's brand name or reputation as a surrogate measure of audit service credibility. We now develop this argument.

A possible method which could be suggested to overcome the information asymmetry would be simple disclosure of the details of the auditor's examination. In fact, one could even argue that the current stylized claim to audit performance "in accordance with generally accepted auditing standards" is sufficient, since the reader is informed that the auditor "did what he should have done" in the circumstances. However, the auditor is an economic agent who can be expected to pursue his *own* self-interest, and such disclosures and claims are in themselves meaningless. This is so because the information asymmetry is associated with a moral hazard problem between the auditor and users. In the absence of observation, the user has no reason to believe that the auditor has performed the examination he claims to have performed.

Note that users (as principals) can attempt to resolve this moral hazard problem by contracting with the auditor on mutually observable information of some sort. This approach is taken in two agent analyses of the auditing problem, such as in Antle [1982]. However, these models are of little empirical relevance because, in the real world, such contracting simply does not occur. Moreover, even the terms of any contract between the top management and the auditor are not observable to users.

Hence, because an auditor cannot directly communicate, in a meaningful way, variations in the power of his tests and users value different levels of credibility in different circumstances, *auditors must specialize* in the delivery of credibility levels. That is, while an auditor's credibility may change over time, it must be fixed at a moment in time across engagements. Returning to the

fertilizer example, an auditor cannot combine different proportions of nitrogen, phosphorus, and potash as required by users and sell these different products in uniform, unlabeled bags!

As a result, each auditor's brand name or reputation will imply delivery of a certain level of credibility and, at any moment, there is a fixed rank ordering of auditors based on perceived credibility. Top management's choice among different credibility levels thus requires a choice among auditors.

3.5 Reputation Investments, Audit Failure, and Auditor Liability

An auditor can acquire a reputation to perform audits of a certain level of credibility through various means. For example, it is likely that he must invest in technology, physical facilities, personnel and their knowledge, organization control systems, etc. to efficiently produce a credibility level. Moreover, it is reasonable to assume that efficient production of more powerful audit tests requires a higher level of such investments. Thus users could infer the auditor's credibility level by observing these investments directly, through advertising, or through informal communication of various sorts. Note that auditor specialization imposes a far lower information burden upon users than would a need to infer varying credibility *for each auditor for each audit!* Note also that the higher the level of fixed investments which are specialized to production of a certain credibility level, the higher the relocation costs and the more stable the auditor's brand name over time.

A potentially useful source of information about brand name is the rate of audit failure for which an auditor is held to be liable. However, the connection is not a direct or simple one. Consider the following descriptions of four possible engagements:

	Case 1	**Case 2**	**Case 3**	**Case 4**
$p'(s_2)$	.2	.5	.5	.5
g(w)	\$1	\$1	\$2	\$2
n	n_1	n_2 $(n_2 > n_1)$	n_3 $(n_3 > n_2 > n_1)$	n_1
$1-\beta$	.90	.95	.99	.90
Auditor	X	Y	Z	Z
$p''(s_2)$	.02	.05	.01	.09

In Case #1, the user's assessment of the prior probability of material error and the loss from such an error leads to a demand for audit credibility of $1-\beta$ (where β is the conditional probability of a Type II error) of .90. The user believes this power of a test will be delivered by auditor X and, after observing an unqualified opinion signed by auditor X, will assess a posterior probability of undetected material error, of .02. Note that $1-p''(s_2)$ or .98 is the user assessed credibility of the financial statement package. In Case #2, since the user assesses a higher prior probability of material error, he demands a higher power test which, he believes, is supplied by auditor Y. Case #3, with a higher assessed error cost, motivates a demand for a still higher level of credibility, which the user believes is supplied by auditor Z.

An audit failure occurs when there is actual *ex post* discovery of a material error in a set of audited financial statements. Note that, when auditing is costly, a rational user anticipates this possibility whenever $p''(s_2) > 0$. However, if an error is actually discovered, a user who relied on the auditor's brand name is motivated to seek recovery of losses suffered on account of the error and may file suit against the auditor (and top management). The auditor, on the other hand, will raise a due diligence defense and maintain that he was not negligent in the performance of the audit.[23] If the auditor complied with generally accepted auditing standards and obtained evidence deemed by the court to be sufficient and appropriate *in the circumstances,* he will not be liable to the user.

If the user, the auditor, and the court all have homogeneous assessments of $p'(s_2)$ and $g(w)$, then auditors X, Y and Z should *not* be liable in Cases #1 to 3. In each instance, the auditor promised to deliver a certain level of credibility through his brand name and did so. However, in Case #4, auditor Z is expected to deliver a test whose power is .99 but fails to perform such a test. The user believes the posterior probability of loss is .01, but faces an actual probability of loss of .09. If an audit failure occurs, a lawsuit is filed, and the court agrees with the user's parameter assessments (i.e., that a .99 audit was appropriate in the circumstances), the auditor should be found negligent and liable to the user for losses.[24]

Given this process, what rates of successful litigation can users expect to observe with respect to auditors and what is the information conveyed by these rates? Because of the inherent uncertainties surrounding the audit and litigation process, the auditor's credibility level which is assessed as delivered *ex post* can be viewed as a drawing from a probability distribution, whose mean is the current credibility level associated with a brand name. Under these circumstances, *the normal rate of successful litigation across all credibility levels should be approximately uniform.* Any auditor can be found negligent in supplying a service, no matter what the exact specification of that service. Thus auditor "hit rates" provide no information about the absolute or relative (across auditors) powers of auditors' tests as such. However, if an auditor experiences an unusually high "hit rate" during a period, this may be evidence that he is reducing his delivered credibility level to a lower value. That is, the rate provides information about deterioration (intentional or unintentional) of the auditor's reputation. Conversely, if the auditor experiences an unusually low rate, this may be evidence that he has increased the power of his tests beyond expected levels and is repositioning his brand name by investing in reputation.

3.6 Implications of the Analysis for Auditor Behavior

An auditor's brand name or reputation is the basis on which users predict the level of credibility he will deliver. A wealth maximizing auditor can be expected to position his brand in the market seeking to maximize his monopoly rents. That is, he will seek a niche where there is high demand and few competitors. In addition, if there are sunk costs associated with a particular credibility level, his return on these immovable investments is a quasi-rent [Klein, Crawford and Alchian, 1978]. To protect his rents an auditor is motivated to maintain intertemporal stability in his delivered credibility level. Other things being equal, the higher the rents, the greater the motivation to

maintain the level of service [Klein and Leffler, 1981]. However, note that rents can exist at *any* credibility level in the market.

It is useful to contrast this result with De Angelo's claim, discussed in Section 1, that larger audit firms will report more truthfully than smaller firms for fear of losing their larger aggregate quasi-rents. Note that De Angelo focuses on the second aspect of credibility, that an auditor will *report* his findings honestly, rather than the probability of *discovery* of errors in audit testing which is the focus of our analysis. This is an important difference because an auditor who fails to report a known material error commits a fraudulent act, not mere negligence. Penalties for fraud, if discovered, tend to be severe no matter what the circumstances. In particular, potential penalties an auditor faces *personally,* such as a jail sentence and loss of certification and license to practice, probably override any concerns with rents. Thus, one can reasonably argue that the probability of deliberate misrepresentation by auditors is constant, regardless of the auditor's brand name. However, a reporting issue may well arise when the criteria determining what constitutes an error and/or materiality are ambiguous. These situations require the exercise of professional judgment and the ability to make decisions deemed to be "correct" *ex post* can vary among auditors. Such abilities can readily be encompassed in the concept of power of test and hence auditor brand name.

Returning to De Angelo, our analysis then differs from hers in two basic ways. First, her focus on the probability of misrepresentation as the element of credibility on which audit firms differ casts an unnecessarily pejorative tone on product differentiation. Second, she makes an extreme assumption about relocation alternatives—namely, if an auditor is caught cheating, he will lose his other clients. Thus her quasi-rents from multi-period pricing motivate stability of location, but the auditor's choice is simply the current location (which is a mechanistic function of audit firm size) and being out of the market! By contrast, in our analysis, the prospect of earning monopoly rents motivates an auditor's brand name location while the desire to maintain monopoly rents and quasi-rents from any immovable resources motivates an auditor to remain in that location over time.

To summarize and illustrate these ideas, consider how auditors are expected to match-up with a set of available clients. Assume three companies where users value low, medium, and high levels of auditor credibility, respectively, and three auditors (X, Y and Z) exist. Assume the auditors agree with user assessment of $p'(s_2)$ and $g(w)$ and hence with the power of tests appropriate in each situation. Also, the auditors have homogeneous production functions and can produce the three levels of auditing for \$100, \$200, and \$300, respectively. The possible auditor-company pairings are shown below:

	Credibility Demanded		
Auditor	**Low**	**Medium**	**High**
X	\$100	\$200	\$300
Y	\$100	\$200	\$300
Z	\$100	\$200	\$300

Assume audit services are differentiated but an auditor can "tailor" an examination to the demands of users through explicit contracting. Now if the audits were put up for bid, each auditor's bid would at least cover his costs for each client and, in a competitive setting, auditor choice would be indeterminate.

Now assume auditors have brand names in the eyes of users where X → low, Y → medium, Z → high. The bids on the main diagonal are clearly acceptable to users. However, the upper right hand off-diagonal bids are not acceptable because the production process is not observable. Moreover, even if auditors are liable for negligence, these bids are still not acceptable so long as users value credibility *ex ante* because litigation is not a perfect substitute for loss prevention (i.e., users do not expect full loss recovery from the auditor).

The off-diagonal bids at the lower left are somewhat more problematic. Given the brand names, the bids are acceptable to users, who would appear to be receiving a free good from auditors Y and Z. Moreover, since auditors agree with users as to the power of tests appropriate in the circumstances, there is no expected auditor liability problem! The difficulty here arises from the assumption that production functions are homogeneous. If, in fact, there are fixed costs of producing a particular credibility level and higher credibility production is associated with higher fixed costs, then these off-diagonal bids would tend to be higher, for a given company, than those on the main diagonal. Thus auditor choice would be determined consistent with the perceived brand name.

Finally, note that in this example since there is only one auditor appropriate for each company, auditors will earn monopoly rents. However, in general, there can be many auditors at a particular location in the limit driving monopoly rents to zero [see Rosen, 1974].

3.7 An Alternative View: Credibility As a Posterior Probability

In previous subsections, auditor credibility has been identified with the power of the auditor's tests. An alternative possibility is to associate it with the posterior probability of financial statement error, or $1 - p''(s_2)$. Note that this corresponds with what has previously been labeled the credibility of the financial statement package. This alternative view is attractive because it assumes that users care about the possibility of financial statement errors and their consequences, but not about the separate contributions of the auditor and top management. Consistent with this assumption, auditors may be liable for all undetected material financial statement errors, but users still value credibility *ex ante* because expected loss recovery is not complete. In this setting, an auditor's brand name would imply a level of $1 - p''(s_2)$. That is, different auditors would be associated with a different posterior probability that the financial statements were erroneous. However, the Bayesian revision would be performed only by the auditor; users would be concerned only with $p''(s_2)$. In effect, the user delegates to the auditor the responsibility for performing tests consistent with various prior probabilities of error.

The demand for different levels of $1 - p''(s_2)$ can be derived from the different dollar (or utility) consequences users face in different circumstances. That is, the greater is g(w), the higher the level of credibility demanded. Since auditor tests and $p''(s_2)$ are not observable directly, users must still rely upon

the auditor's brand name which must be assessed from various sources of information, including advertising, levels of fixed investment, etc. However, the rate of successful litigation against an auditor can now be associated more directly with a brand name.

As before, an auditor is motivated to deliver $1 - p''(s_2)$ consistent with his brand name to preserve rents at that location. However, since auditors are liable for all undetected errors, the "hit rate" observed will be a proxy for $p''(s_2)$. Note that each auditor expects to incur a particular "hit rate" and such rates are expected to vary. But since auditing is costly, so long as there are variations in dollar consequences, variations in auditor credibility and "hit rates" are desirable from an economic point of view. Again, being a low credibility auditor does not have pejorative implications! If auditors in this situation were allowed to invoke a negligence defense, then the above implications would still go through, so long as the success of such defenses were randomly distributed across auditors and engagements.

While this alternative view of auditor credibility seems to capture certain aspects of reality (e.g., the delegation for responsibility to the auditor) better than when credibility is identified with the power of the auditor's tests, both scenarios have essentially the same implications for auditor choice.

3.8 Auditor Choice by Top Management

In the previous section we identified three audit service characteristics, control (c_1), credibility (c_2), and product line (c_3), which top management may value. Levels of control and product line will be demanded through management's desire to maximize corporate profits or firm value as a determinant of management's own compensation. Since there is no conflict between users and management with respect to these two characteristics, the choice can be expected to be optimal from both groups' point of view.

There *is* a conflict between users and management with respect to auditor credibility, and management can be expected to make an optimal choice, given its own interests. However, if users are rational and price protect themselves when transacting with management, this choice can be expected to at least directionally reflect users' demand determinants.

Formally, top management's problems of choosing an optimum set of audit service characteristics for a period can be described as follows:

$$\begin{aligned} &\underset{(c_1c_2c_3)}{\text{Max}} && \theta[\phi(c_1,c_2,c_3) - wp''(s_2|c_2) - F(c_1,c_2,c_3)] \\ &\text{s.t.} && c_1 - k(c_2) = 0 \end{aligned} \qquad \{3.3\}$$

where θ is some benefit function to top management and F is the audit fee function. Note that the audit service determines an expected present value of net cash flows to the firm as perceived by financial statement users. If users are "price protected" then top management expects to gain from the purchase of credibility. Also, a constraint is included to recognize that control and credibility are likely to be joint products in production and hence not independent in the audit fee function.

Management's solution to this problem determines an optimum characteristics vector, (c_1^*, c_2^*, c_3^*). However, there is no guarantee that this vector of characteristics will be available in the market since, we have argued, production of all three characteristics likely involves fixed costs. Thus, the final step will be a choice of the specific auditor who minimizes opportunity cost (i.e., the "transportation cost") associated with the suboptimal choice.

3.9 Illustrative Example

To illustrate some of the ideas concerning auditor choice developed in this section, consider the simple case of a company with no debt solely owned by a 100 percent owner and manager who wishes to sell 50 percent of his common shares to an outsider or "user" who will assume an active role in future management. (That is, no external agency relationship is created. The situation when a new agency relationship arises is examined subsequently.) Assume the company has been in business for one year and the owner has prepared a set of unaudited financial statements which show a net operating cash flow of $10,000 for the year. The user is risk neutral and has an opportunity rate of return on investment of 10 percent. Assume that the user believes the company's cash flows will follow a random walk in perpetuity. Thus, the best point estimate of future cash flows is simply the level earned last year.

If the user knows the financial statements to be accurate, the assessed value of the firm will be $100,000 and the user should be willing to pay up to $50,000 for a 50 percent interest. However, this is not likely to be the case. Rather, the user will recognize that the owner-manager has an incentive to overstate the reported cash flows of the firm, but not all owner-managers will necessarily do so. If the financial statements are in fact erroneous (assume the true cash flows were only $8,000 last year), the true value of the firm is $80,000.

Suppose the user assesses a prior probability of .3 that the financial statements are in error. Since the user can price protect himself through his offering price for the shares, it would appear that he would be willing to pay no more than 50 percent of the expected value, or $47,000. Since the manager who prepared the financial statements knows their true state, he knows that this price is too high. Thus, he would gladly accept the offer of $47,000 if the statements were erroneous, but would reject it if the statements were correct and auditor credibility was available to convince the user of their truthfulness.

Assume, for the moment, that the statements do *not* contain material errors. Suppose an optimum audit, which maximizes {3.3}, costs $3,000 and induces a Bayesian revision of probabilities by the user from $p'(s_2) = .3$ to $p''(s_2) = .1$. Such an optimum audit implies an optimum level of credibility, or c_2^*, purchased by the manager or (suppressing c_1 and c_3)

$$\max \quad .5[\$100{,}000 - \$20{,}000\, p''(s_i|c_2) - F(c_2)] =$$
$$.5[\$100{,}000 - \$20{,}000\,(.1) - \$3{,}000] = \$95{,}000.$$

Note that $\theta = .5$ in this case is the fraction of equity being sold to the user. Thus, if the financial statements are correct and the auditor cannot commit a type I error, he will issue an unqualified opinion. Having seen this opinion and the identity of the auditor, the user is willing to pay up to $47,500 for the

shares. Since the user is price protected both with or without the audit, it is the *manager* who gains from the purchase of credibility.

Returning to the question of the appropriate offering price if there is no audit, consider the transaction in a market context. Suppose, for example, that ten investment opportunities of identical characteristics are available to the user. Furthermore, his prior probability of error is correct in the sense that three managers have overstated their reported cash flows while seven have not done so. If the user, without seeing an audit, offers to purchase a 50 percent interest in some firm at $47,000, he can be *certain* that only a manager who misrepresented his cash flows will accept! Thus, he would not, in fact, offer $47,000, but only $40,000. At this price he will be fully protected against loss and managers whose financial statements are correct will be motivated to purchase auditor credibility, as described above. Thus, in a market context, where there are many similar potential users, there will be a distribution of auditor - client pairings, with perhaps some managers, who misrepresented their cash flows, purchasing no auditor credibility.

This example illustrates only one possible situation in which auditor credibility is valued by managers. The case is referred to in the literature as an "adverse selection problem" [e.g., Baiman, 1982] and credibility here serves as a signal of a manager's honesty, which itself is exogeneously given. However, since the user is fully price protected against manager misrepresentation, auditor credibility may also *change* the reporting behavior of a manager. For example, since the manager whose statements are unfair has fooled no one in this illustration, he may be motivated to correct existing errors and submit to a credible audit to increase the selling price of the shares.

Now consider the same situation, except that the user does not intend to assume an active role in the management of the firm, but will retain the former owner as the manager. Thus an agency relationship, and an attendant moral hazard problem arises. To forecast future cash flows as simply a continuation of the historical flow (either $10,000 or $8,000) would be naive, since the future agency costs which can be expected to result from the manager's reduced ownership interest in the firm are being ignored. Given the manager's known future trade-off between firm value and perquisite consumption, assume the user forecasts maximum agency costs to be $1,000 per year.

In the absence of the agency relationship, the user would have assessed a prior probability of error of $p'(s_2) = .3$. However, knowing that the agency relationship will be created, we argue that the user is likely to assess a *higher* prior probability that the financial statements are erroneous. This is so because it is in the manager's interest to try to induce the user to bear some or all of the future agency costs through an initial overvaluation of the firm. Moreover, the *larger* the expected future agency costs, the *larger* the difference between the true and reported cash flows is likely to be. Returning to the example, if the manager still reports $10,000 and the user believes cash flows could have been $8,000 with a probability of $p'(s_2) = .4$, he will offer $\frac{1}{2}$ [($8,000 − $1,000) ÷ .1] = $35,000. Again, managers who have not misrepresented their cash flows are motivated to hire auditors of appropriate (and relative to the previous case, higher) credibility. Conversely, given the user's complete price protection, managers who have initially misrepresented their cash flows may be motivated to change their reporting and purchase a credible audit.

Finally, in this case, if the user views a credible audit *now* as a commitment that such audits will continue to be obtained in the future, he may reduce the amount of his forecasted future agency costs below $1,000. This is so because a credible audit prevents (imperfectly) managers from concealing the effects of such behavior (e.g., shirking, consuming excess perquisites, etc.) by overstating the cash flows reported in future financial statements. Depending upon the manager's utility trade-off between firm value now and the present value of future perquisite consumption, it may be optimal for the manager to commit to such future audits, thereby increasing the selling price of the shares.

IV. Concluding Comments

In this paper, we have analyzed the nature of differentiated audit services and the determinants of auditor choice. The perspective on the audit services market developed here differs significantly from the typical textbook view of auditing where any auditor can do anything, and also, we believe, from the conventional thinking of auditing practitioners and academics. Two conclusions in particular should be emphasized: First, we have argued that differentiation on an auditor credibility dimension arises from differences in demand which are themselves a function of differences in company characteristics. Thus, a ranking of audit firms on a credibility dimension has no pejorative implications. Second, given such differences in demand and auditor location, we expect to observe a relatively stable distribution of auditor-client pairs which reflects the optimum decisions of top management under existing circumstances. As we have seen, both the relationship between top management, the auditor, and financial statement users, and the characteristics of the audit service are quite complex. Our objective has been to develop a logical structure for this complex reality as a basis for understanding different auditor choices by top managements of different companies.

End Notes

1. Note that in his study of Australian audit fees, Francis [1984] found no evidence of low-balling. Also, while De Angelo demonstrates that "low balling" in first period bids is an equilibrium strategy in a world of certainty, it is not obvious that this bidding strategy is necessarily an equilibrium under uncertainty. However, even if low-balling does occur, the "strength" of the collateral bond will decrease over time as the initial fee discount is recovered through quasi-rents. Since auditor-client pairings tend to be long-lived (about 20 years on average), the motivational impact of the residual collateral bonds that will exist at any moment in time is not obvious.

2. Let q_i denote the quantity of product of the i^{th} firm and p_j denote the price of the product of the j^{th} firm, then the cross elasticity coefficient is

$$\eta_{ij} = (\partial q_i/q_i)/(\partial p_j/p_j)$$

where $q_i = f_i(p)$ is the demand function faced by firm i and $p = (p_1 \ldots p_m)$ is the vector of prices for the products of the m firms in the industry.

3. However, as noted earlier, there is a further complicating factor in such studies in that an audit *fee* is *not* a simple *price*, but rather the product of price times quantity of service purchased.

4. The standard assumption is that managers' utility functions include both wealth and effort as arguments. Managers are assumed to derive utility from wealth and disutility from effort. However, auditors and their services do *not* enter directly into the utility function.

5. The agency relationship has a long history as a form of social interaction. Ross [1973] characterizes the agency relationship as arising "between two (or more) parties when one, designated as the agent, acts for, on behalf of, or as representative for the other, designated the

principal, in a particular domain of decision problems." Because the agent is himself an expected utility maximizing individual, it is unrealistic to assume that he will always necessarily act so as to maximize the expected utility of the principal. However, the principal can limit the divergence of interests by establishing incentives for the agent and by incurring monitoring costs. Likewise the agent may incur bonding costs to guarantee to the principal that he will not take certain actions. But these mechanisms are unlikely to perfectly align the divergent interests of the principal and agent(s)—it is, in fact, unlikely to be optimal to try to do so—with the result that there will still be some residual loss. Note, however, that the expanded opportunity set which the agency relationship allows must yield a net benefit to the principal (and perhaps the agent), else the relationship would simply not arise [see Jensen and Meckling, 1976].

6. In addition to this potential "asset substitution" problem, Smith and Warner [1979] list three other sources of conflict between an owner-manager and debtholders:

1) dividend payment—increasing dividend payout after the debt issuance (in the extreme, paying a liquidating dividend to shareholders, leaving the debtholders with a worthless claim).

2) claim dilution—unexpectedly issuing additional debt of equal or higher priority after the current debt issuance.

3) underinvestment—refusing to invest in positive net present value projects whose primary benefit accrues to the bondholders.

7. While only 15 percent of the companies voluntarily purchased a full audit, another 69 percent purchased either a review or compilation service, which are lower cost partial substitutes for the audit service. Moreover, as with the audit, the primary and secondary reasons given (with essentially the same frequencies) for the purchase of these audit substitutes were "control" and "credibility."

8. In this data set, consulting services were defined to include any non-audit service *except* corporate tax work (i.e., return preparation, planning, etc.).

9. Throughout this monograph, the term "client" refers to the top management of a company.

10. A complete discussion of the exact nature of audit credibility is deferred until Section 3.

11. More precisely, it is the purchase of the best form of audit opinion (i.e., unqualified, qualified, or adverse) which management can expect given the characteristics of the financial statements being audited.

12. A related question is—how does the model compare to the way audit fees are ostensibly determined in practice? Audit services not performed under a fixed fee arrangement are normally billed using a set of hourly rates for the various grades of professional labor utilized. Even with a fixed fee, the amount bid can be conceived as a function of expected labor usage and the billing rate structure. But this process only defines a "standard fee" or upper bound on the amount collected. The standard fee may be discounted for a variety of reasons including perceived inefficiencies in labor usage, because the job utilizes resources which would otherwise be idle or underemployed, or under the pressure of competition. In addition, of course, the process through which standard billing rates are set is not known, hence the (billing rate x time) model is not a particularly useful way to view the process of audit fee determination.

13. Product scope would be measured by the expertise of the firm in supplying various types of consulting services. At a moment in time, the total level of such firm expertise is fixed. Note that it is the fixed costs associated with maintaining an expertise level for sale as needed which will cause the implicit price of scope (λ_3) to be positive. However, only certain subsets of the total service package may be relevant and therefore priced to certain subsets of clients. For example, the ability to design and install computerized hospital accounting systems will be relevant to some clients but irrelevant to others. Hence, an audit firm may simultaneously offer different levels of c_3 to different types of companies.

14. The offering of "near audit services," such as reviews and compilations, by public accounting firms represents an attempt to reduce client opportunity losses in this situation.

15. The criterion of optimality normally used is whether the sum of consumer's surplus plus producers' excess profits is maximized [Schmalensee, 1978]. In an auditing context, consumer surplus can be interpreted in the normal way except that the demand curve is derived from top management's objective function.

16. Auditors frequently distinguish between "errors," which are mechanistically caused by deficiencies in financial reporting systems, and "irregularities," which are the result of intentional attempts to bias, conceal, or otherwise misrepresent financial information. We make no distinction between these situations. However, it has been suggested that optimum audit program design,

given the possible presence of "irregularities," must recognize the gaming nature of the situation [Fellingham and Newman, 1985].

17. This is essentially the audit risk model proposed by the Canadian Institute of Chartered Accountants [CICA, 1980].

18. Auditors have long recognized that the greatest risk with respect to the financial statements of publicly held companies (and companies with significant debt) is that assets, and hence net income, are overstated. The reasonableness of this concern was confirmed by St. Pierre and Anderson's [1984] study of 129 lawsuits filed against auditors in the U.S. during the 1960's and 1970's. Of the 334 alleged errors in these suits "*none*. . .concerned errors in *under*valuing assets, recognizing *inadequate* amounts of revenue, or recognizing *excessive* expenses" (p. 242).

19. To focus on the essential auditing aspects of the problem, assume a world of certainty, except for the state of the financial statements.

20. This statement assumes that the audit evidence indicates that no material errors exist. Presumably, if top management knew that a perfect audit would be performed, they would not attempt to deceive users. However, if this were not the case, the perfect audit still would resolve all uncertainty. Knowing that $p''(s_2) = 1$, users could behave accordingly.

21. If the user falsely rejects the null hypothesis that the financial statements do *not* contain material errors, he may choose not to transact with top management or may request contract terms which will not be acceptable to management. In either case, the user loses whatever net benefits were available to him in the "trade."

22. Assuming the auditor was technically capable of performing an audit of the company—given its size, complexity, geographic dispersion of operations, etc.; that is, he can deliver the required q, efficiently. Also, efficient production of higher levels of credibility may require higher fixed costs. This is discussed in Section 3.5.

23. This is, in fact, his "worst case" defense under statutes such as the Securities Act of 1933. Under the Securities Exchange Act of 1934, and probably under common law appealing to the Ultramares decision, the auditor can claim a mere absence of gross negligence or fraud as his defense.

24. For what amount of damages should the auditor be liable? In principal, since the auditor increased the user expected loss by $.16 through his negligence, this should be the amount of damages assessed *each time the auditor is negligent*. However, not all instances of negligence are likely to be discovered *ex post*. While negligence by the auditor increases the *probability* of undetected material error (e.g., from .01 to .09 in case #4), negligence need not result in an actual audit failure. For example, assume auditor Z performs 100 audits in a given year (such as case #4) where users expect .99 credibility but only .90 is delivered. Users expect three audit failures and losses of $6. However, suppose nine audit failures occur causing losses of $18. Users will presumably seek damages of $18 but only $12 should be awarded, else the auditor is being implicitly held to a perfect audit standard. Conversely, if users are only awarded the increase in expected loss *in each case filed* or $.16 \times 9 = $1.44, they are grossly undercompensated. How much would actually be awarded is, of course, an open question but there is no apparent mechanism which would motivate a court to award the correct amount of $12.

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Discussant's Response to "On the Economics of Product Differentiation in Auditing"

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Good afternoon ladies and gentlemen. First let me express my appreciation to the Symposium organizers for inviting me to start the discussion of such a difficult topic as product differentiation in auditing. I also want to express my appreciation to Dan and his coauthor for making this such a challenging opportunity. It has been a long time since I have thought of differentiation in auditing in terms of formulas like they use. While I have used some advanced mathematical techniques such as regression analysis to determine the reasonableness of inventory levels for a chain of 400 drugstores, it has been many years since I have had to deal with sentences like "Given P′, and a loss from Type I error, all assessed by the user, an optimum audit intensity, N*, can be calculated by performing a Bayesian preposterior analysis."

Many of you are familiar with the television program Star Trek. I want to tell you that after reading the paper several times I could finally sympathize with Dr. McCoy of the Starship Enterprise every time he had to try to treat an injury to Mr. Spock. Dr. McCoy was a very talented physician, but Mr. Spock was a rather unusual character. While, other than his famous ears, he looked human, we know his blood was green and his heart was where your liver might be. His various other physical differences from a normal human being made him quite a challenge to the doctor. I almost feel like I am playing Dr. McCoy to the paper's Mr. Spock.

In spite of these deficiencies in my upbringing, I am going to try to give you what I believe is a practitioner's view on product differentiation in auditing, with particular emphasis on the definition of the product itself. Unfortunately, time did not permit me to discuss the contents of the paper with Dan prior to this meeting. If I had, some of my comments and questions might be unnecessary. But, since our purpose here is to generate a discussion of the paper and its applicability to the world of auditing, I guess we will still be able to meet our objectives.

We should recognize that the academician and the practitioner tend to come at any problem from different perspectives. To paraphrase what they say about the English and the Americans, academics and practitioners are two professions separated by a common interest. I have personally found trying to read and understand most academic papers to be an extremely frustrating experience, especially when the topic seems to have applicability to what I am interested in, but the content leaves me absolutely dumbfounded. I have been heading our firm's audit research and development efforts for the last three

years, and have found very few academics that I can discuss audit methodology with who speak a language that I am capable of understanding or applying to our practice. Maybe that is a deficiency on my part, but perhaps it is just symptomatic of the different backgrounds and perspectives of the academician and the practitioner. I do wish there was a more coordinated effort between the academic and practice sides of our common interests that could make much of the research more valuable to the practitioner.

Let me start the discussion of the paper by presenting what I call the Auditor's Dilemma of Interests. The auditor, as we are all painfully aware, really has at least two parties interested in the nature of his services. One of these parties is the client, or client management, that engages the auditor to report on financial statements or render other services as may be required. The other is the public that looks to the auditor as a "guardian of the public interest." Our discussion earlier this morning on the legal liability of accountants touched heavily on this matter.

One of my concerns about the paper is that I believe it tends to deal unrealistically with the public's attitude toward the auditor and the auditor's responsibilities and thus glosses over a major problem of our time. That problem is that the public does not assess *ex ante* and *ex post* probabilities in determining whether, when there has been a business failure, they should try to sue the auditor. Let us be realistic about it. When a business fails, investors have very few sources to look to for recovery of their funds. A legal system such as we have in the United States tends to make it easy for an investor to look for someone associated with the company who has funds to become a target of litigation to recover the lost investment. I do not want to discuss the U.S. legal system, but I believe it is unrealistic to say that, in the real world, only mismatches between the public's expectation of an auditor and the auditor's actual performance on the engagement will result in "hits" as they are called in the paper. I believe that, in spite of what the profession would like, the public does perceive the auditor as an insurer of its investment and someone who has the responsibility to signal when that investment might be turning sour.

I believe this has serious implications to the differentiation model when you balance it against the clients who engage the auditor. These clients have interests, too. The paper implies that the client (meaning top management of the client) will always take the position on issues that will most favorably reflect management's wishes as to the outcome of the issue. It almost, but not directly, implies that management will always select a course of action that is opposite the interest of the public when it comes to reporting bad news. While I am sure that such cases do exist, I do not believe it is always the case. Management is not stupid and it does not like to have the auditors waving red flags in front of the bull. Neither management nor the auditor would like to see an auditor's disclosure become a self-fulfilling prophesy. Therefore, it is up to the auditor and the client together to agree that the public interest has been served without destroying the whole economic system because of incomplete and imperfect information.

Thus the auditor's dilemma . . . how does he serve the interests of the client and the public at the same time while serving the other interest which thus far has not been mentioned, that is, the self-interest of the auditor in

practice? I believe this is where the issue of differentiation comes into play. It also means it is time that I focused on a definition of the product that the auditor produces.

I believe that the product differs depending upon your point of view. For the public, the product is the auditor's report, and I agree with most of the material in the paper that tends to indicate that the public's only means of assessing the quality of that report is by the reputation, or at least the public's perception of the reputation, of the auditor involved, versus the reputation of auditors as a whole. Of course, the public is working with imperfect information, because even two audit reports signed by the same firm do not necessarily carry the same amount of real quality with them. Auditing firms consist of people, and people do not always react the same way in the face of similar information. So while the general marketing of a firm's name in the public eye is important, I believe it is only important from that standpoint, that is, a marketing standpoint.

The real key to differentiation is to understand that the product the auditor delivers to the client and client management is not the auditor's report. It is the whole relationship of the auditor with the client. It is the auditor understanding what the client expects of him and what is important to that client, and then delivering against those measured objectives.

Differentiation takes on another aspect also. It's a different perspective that the potential client or client has on an auditing firm depending upon whether they are an incumbent firm or whether the company is involved in investigating the engagement of new or different auditors. It is much easier for a firm to differentiate itself in the mind of its client when it has been the firm's auditor for a few years. The incumbent auditing firm knows the client, its strengths and weaknesses, and has hopefully identified any "hot points." The rest of the auditing firms represent a vague world to the client. I think that we have found that the only real way to begin to tickle a potential client's fancy for selecting you as their auditors is to have developed a personal relationship, through outside activities or otherwise, with top management of the potential client. This is why accounting firms devote so much time, effort and expense to the outside activities of their partners. An accounting firm cannot differentiate itself through its audit process nor through anything else that another firm can duplicate. What those other firms cannot duplicate are its individual people and the impressions those people leave in the minds of the clients they serve and the potential clients they contact.

Unfortunately, there is not sufficient time today to provide a detailed discussion of client values, but let me conclude this section of my discussion with a comment: the auditor that does not respond to the client's values, and indeed respond to the client's highest value, will be unsuccessful in attempting to differentiate himself through any of the tools that he uses on the audit. I would propose that the client does not know nor does the client care about the audit process. He does not care if the auditor uses a microcomputer, has a pyramid of six to one or ten to one, or uses yellow or green paper. What he does care about is that he has a good working relationship with an audit partner who really understands his company. That understanding can be demonstrated by being responsive to the company's needs, understanding the company's

operations, organization, terminology and management style, and delivering the audit in an efficient manner.

Let me make one more point about responding to client values and differentiation. Good performance in a client value area by the practitioner is usually not sufficient to satisfactorily transfer the differentiation impression to the client's mind. The auditor's exemplary performance in meeting the client's values must be adequately *communicated* so the client is fully aware of the auditor's accomplishments and his efforts to satisfy the client's needs. Remember that attempts at differentiation amongst auditing firms is irrelevant if buyers of the firms' services cannot distinguish the differentiating factors. The auditing firm must transfer the differentiation knowledge to the client and be sure the client acknowledges and is aware of the factors involved. Again, this is much easier for the incumbent firm to do than for a potential auditing firm. In a proposal situation, the client must look to criteria that are indicative of future performance, such as reputation, industry experience and apparent business sense. This is the best alternative available since the client has no actual experience working with the firms being evaluated, except for the limited exposure obtained during the proposal process and any prior personal relationship with the firm's personnel.

In the short time I have, it is not possible to discuss all aspects of the paper, but let me talk about some points that are of the most concern to me. On page 100, the authors conclude that "the higher the fixed cost commitment, the less flexible the firm will be in producing a variety of characteristic vectors." It implies that a firm is less flexible in meeting the real needs of its client and its public if it has more structure to its audit process than another firm. I do not believe this is necessarily true. I believe it depends on the nature of the structure imposed into the process. If those things that are required to be done on every audit, regardless of the shape or size of the company, can somehow be put into a structure so they can be dealt with more efficiently, I believe this gives the structured firm the advantage over one with less structure. Structure does not always have to be viewed in a negative sense. In fact, if the firm can put positive structure into the process, it could actually spend more time doing a better job responding to the client's real values and not have to spend significant amounts of time dealing with constant elements. If the auditor can spend less time on the audit process, of which his client and the public care very little, more time is available for responding to that client's real values which will differentiate the auditor in the client's eyes.

Let me come to the item in the paper that has given me the most trouble. A conclusion in the paper states: "A ranking of audit firms on a credibility dimension has no pejorative implications." Now, to tell you the truth, the first thing I had to do with that conclusion was look up the meaning of "pejorative" in the dictionary. And *Webster's* tells me that means "having negative connotations." What that conclusion says to me is that, if an auditor has a name which is associated with a low credibility level as far as the public is concerned, that does not have any significant implications to that auditor. I may have interpreted the meaning of that conclusion wrong, but if I have not, I find it very difficult to understand. I cannot understand how you can have a negative reputation in the business community as to the quality of the intrinsic value of your report versus someone else's report and it not have implications for your practice or your

relationship with your client. During our discussion period, perhaps we can explore whether I have interpreted the conclusion properly and what the implications are for actions that an accounting firm might take in establishing its reputation.

Finally, let me summarize my comments by putting differentiation in what I think is its proper context in the entire auditing process. The auditing firm which does the best job of balancing the three factors that must be considered when providing service to clients—management of risk, efficient conduct and reporting of the audit, and delivering values that are held in the highest regard by that client—is the auditing firm that, in the long run, will be able to differentiate itself from its competition. This differentiation involves hiring the right people and training those people in both the art of auditing and effective communication.

4

Unresolved Issues in Classical Audit Sample Evaluations

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Classical variables techniques can be usefully employed in certain audit situations. They may be useful, for example, when auditing high error rate populations or accounts with numerous negative balances or when the auditor is concerned about both over and under-statement errors. Classical variables techniques may also be useful when the auditor is concerned with assessing the reasonableness of proposed adjustments in light of statistical test results. This paper reviews several issues associated with the evaluation of classical statistical hypothesis testing results in auditing. Though presented in terms relevant to classical statistical testing, some of the issues reviewed may be germane to other statistical or non-statistical approaches to audit sampling as well.

Some of these issues have been isolated and examined in greater detail by other studies. This paper mainly deals with the comparison and reconciliation of certain alternative evaluation strategies which can be employed when achieved allowances for sampling risk differ from planned levels. This situation can occur when the apparent achieved efficiency of a sample estimator is different from the level on which the auditor based the audit sampling plan.

Comparative Evaluation Strategies

Several strategies are available for use in evaluating the results of a classical variables hypothesis test. Conclusions drawn from the evaluation of sample results may vary depending upon which strategy is employed. Three of these strategies are explained and compared in this paper.

No one of the three strategies is uniformly dominant or necessarily superior to the others in all situations. However, they can lead to different conclusions. Therefore, it is important to understand how they differ. In this respect, the selection of an appropriate evaluation strategy is similar to the dilemma

encountered in selecting an appropriate error bound in probability-proportional-to-size sampling applications (see Felix, Leslie & Neter, 1982).

We shall identify the three strategies as: the acceptance risk control strategy, the rejection risk control strategy, and the balancing strategy. Figure 1 depicts and compares the decision sequences associated with the first two strategies. The decision sequence for the balancing strategy is presented separately in Figure 2. Where possible the symbols and terminology used will conform to the AICPA audit sampling literature (e.g. Roberts, 1978; SAS 39; and Accounting and Audit Guide—*Audit Sampling*, 1983).

Both approaches described in Figure 1 are relatively well-known strategies for evaluating the results of classical statistical samples. Evaluation strategies based on both approaches appear in the AICPA's publication *Audit Sampling* as well as auditing literature and firm procedure manuals.

The acceptance risk control strategy for evaluation of the results of classical variable hypothesis tests appears in the AICPA publication, *Statistical Auditing* [Roberts, 1978]. This approach is also referred to, but not described in detail, by the AICPA's guide on audit sampling which supports Statement on Auditing Standards #39 (SAS 39) [Auditing Standards Board, 1981]. Sample evaluation approaches based on this strategy can be found in the auditing literature, e.g. Guy and Carmichael [1986].

The rejection risk control strategy is described in detail in the AICPA publication *Audit Sampling* and the audit and accounting guide prepared by the Statistical Sampling Subcommittee to support SAS 39. Sample evaluation approaches based on this approach can be found in the accounting literature, e.g. Arens and Loebbecke [1981] and Bailey [1981].[1]

The balancing strategy which is depicted in Figure 2 was explored by Thompson [1982] and is rooted in the work on the utility of various schemes for reporting or summarizing hypothesis testing results done by Leamer [1978]. Using this balancing strategy, the auditor would employ an epistemic loss minimizing criterion. It could be used as an alternative to the two better known traditional strategies.

In order to set the stage for the sample evaluation strategies portrayed in Figures 1 and 2, it may be useful to briefly consider the sample planning process. In most descriptions of audit sampling, in the planning stage, sample sizes are determined which will control the risk of incorrect acceptance (TD) and the risk of incorrect rejection (α) to levels that are acceptable to the auditor given *ex ante* (before sampling) information about the population and planned statistical estimator. In this regard, the estimated standard error is important.

The *ex ante* (planned) allowance for sampling risk associated with the amount A can be compiled based on an estimate of the standard deviation of the population under examination or the related population of auxiliary values (differences or ratios between audited and book values, etc.) and on auditor decisions about appropriate levels for the risks of incorrect acceptance and incorrect rejection and about the amount of tolerable error for the account or balance, TE. Discussions of this process and factors affecting it can be found in the audit sampling literature, especially Guy and Carmichael [1986], Arens and Loebbecke [1981], Roberts [1978], SAS 39 and the associated AICPA audit guide. The auditor will plan a sample such that if $B \in \hat{X} \pm A$, the reported amount will be accepted as fairly presented, whereas if B is not in the interval $\hat{X}$

$\pm$ A, the reported amount will not be accepted as fairly presented. In each instance, B is the book value of the account or balance and $\hat{X}$ is the audit sampling estimator of the correct value. The sampling plan will be established such that the risk of incorrect acceptance and the risk of incorrect rejection of the decision interval, $\hat{X} \pm A$, in relation to TE will be at levels planned by and acceptable to the auditor.

As shown in Figures 1 and 2, if the *ex post* (after sampling) information agrees with the *ex ante* estimates ($A' = A$), then the auditor faces no special evaluation problem, and the three evaluation schemes are the same. That is, the decision rule is to accept the book value if $B \epsilon \hat{X} \pm A'$. Since this is equivalent to $B \epsilon \hat{X} \pm A$, the associated risks of incorrect acceptance and rejection should be the same as the planned levels. A' is the monetary amount which equates the risk of incorrect rejection associated with this decision rule with the planned level for α.

Usually, however, after the sample has been selected and audited, the *ex post* assessment of the standard error will be different from the *ex ante* assessment, i.e., $A' \neq A$. When this is the case, no decision strategy discussed in the auditing literature reviewed here will retain the risk of incorrect acceptance and the risk of incorrect rejection at the planned levels. For any given sample result, there is a trade-off between the two risks. In fact, there are infinitely many α and TD risk level pairs that could be established for the sample evaluation. In this circumstance, the issue to resolve is how to devise an evaluation strategy which will contain risk levels which are preferable or acceptable to the auditor. The three strategies discussed here handle the balancing of these risks in different ways. By understanding the approach and the results of these strategies, the auditor may select one (or devise another strategy) that is consistent with his or her preferences.

The essential differences among all the strategies reviewed in Figures 1 and 2 can be traced to different philosophies about risk control. In our discussion we shall highlight the manner in which each strategy deals with this dilemma and attempt to explain what the various options imply about the relative utility of incorrect rejection and incorrect acceptance.

Acceptance Risk Control

The acceptance risk control strategy, as detailed by Roberts [1978], will be reviewed first. Like each of the other strategic options discussed, the principal purpose is to provide a framework for rational evaluation of a classical statistical sample. The objective is to accept or reject the amount being tested, given the *ex ante* specification of the risk of incorrect acceptance, TD, and risk of incorrect rejection, α, and the achieved sampling test results.[2]

If the estimated standard deviation used in planning and the sampling estimator of standard deviation are identical, then the potential for variability in sampling results can be properly controlled by relying on the critical limits associated with the *ex ante* allowance for sampling risk. In such instances, $A' = A$, and an appropriate decision rule is to accept the amount being tested B, if $B \epsilon \hat{X} \pm A'$. Otherwise it is appropriate to reject the amount being tested. In this situation, the planned risks of incorrect rejection and incorrect acceptance are also the levels achieved.

In most instances *ex post* estimates of the standard error of the estimator will vary from planned levels, i.e., $A' \neq A$. In pursuing the "acceptance risk control" option as shown in Figure 1, the auditor confronted with a difference between *ex ante* and *ex post* estimates of variability will establish an *ex post* allowance for sampling risk by relying on an initial decision rule which calls for acceptance of the amount under examination if that amount exists in the region $\hat{X} \pm A''$. In this case, A" is the monetary amount which necessarily equates the risk of incorrect acceptance associated with the new decision rule (TD') with the planned level for TD. In other words, the risk of incorrect acceptance associated with the decision interval $\hat{X} \pm A''$ is equivalent to the level originally planned by the auditor. The acceptance risk control approach does not explicitly control the risk of incorrect rejection. At this point, the risk of incorrect rejection may be higher or lower than the planned level, α. In other words, TD is fixed at the planned level and α varies, either higher or lower than the planned level.

The strategy as described so far can only lead to an acceptance decision where $B \epsilon \hat{X} \pm A''$. The preeminence of TD is justified because at this point the initial decision rule allows only for acceptance of the reported amount. If acceptance is not possible, then rejection based on statistical evaluation alone cannot take place without considering the level of control over the risk of incorrect rejection.

In fact, if the auditor is unable to accept based on the test involving A", then this strategy as described by Roberts (1978) calls for reassessment of both risks. The reassessed values of these risks are reflected in Figure 1 as TD_R and α_R.

Presumably, the failure to accept based on the analysis of evidence to this point would not lead to an increase in the acceptable level of either risk when this reassessment takes place; however, decreases in either may occur. A reduction of the risk of incorrect acceptance might be appropriate if, in the auditor's judgment, the sample evidence casts doubt on the appropriateness of the level of reliance on internal control used when initially assessing TD. Similar reassessments of that risk might be made because of changes in the perception of inherent risk, or the risk associated with other audit test results as compared to those used in the initial assessment of TD. The appropriate level for a revised risk of incorrect rejection might be lower than initially planned because a significantly larger than expected number of errors have been observed. The likelihood of encountering circumstances requiring adjustments may indicate that a reduction in the risk of incorrect rejection is warranted.

After reassessment of the two risks, this strategy, as described by Roberts, calls for a test of conclusiveness. The objective of such a test is to determine whether the sample evidence is sufficient to control both risks to their reassessed levels.[3] If the sample evidence is conclusive, an audit conclusion to reject the amount under examination is justified. Otherwise, the auditor will conclude that the sample evidence alone is insufficient for a final decision and some fallback option must be pursued. Generally these options may include: 1) expansion of the sample, where feasible; 2) performance of additional substantive procedures to provide additional evidence useful in

fulfilling the audit objectives for which the statistical sample is germane; or 3) requesting that the client adjust or reconstruct the amount being examined.

Rejection Risk Control Strategy

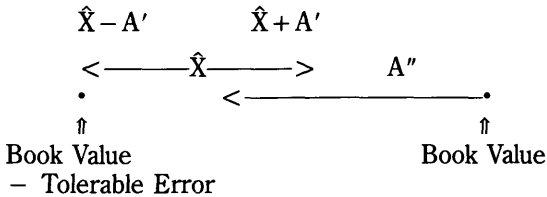
In contrast to the audit planning and evaluation strategy described above, statistical testing in many contexts other than auditing are based on direct control of the risk of incorrect rejection with the risk of incorrect acceptance not explicitly considered. As a result much nonauditing-statistical sampling literature is based on direct control of the risk of incorrect rejection. Therefore, many computer programs that may be useful for sample evaluation provide output based on control of the risk of incorrect rejection. The AICPA audit and accounting guide, *Audit Sampling,* considers sample determination and evaluation in this situation. In addition, sample evaluation strategies conceptually based on direct control of the risk of incorrect rejection and indirect control of the risk of incorrect acceptance can be found in the auditing literature [e.g. Arens and Loebbecke, 1981 and Bailey, 1981].

The sample size calculation described in *Audit Sampling* (pp. 93-94) permits control of the risks of incorrect acceptance and incorrect rejection to desired levels by varying the ratio of the desired allowance (A) to the tolerable error based on the table of ratios in Appendix C of the guide (p. 115). If the sample statistics are reported in the context of incorrect acceptance (i.e., A′) or if the evaluation process is to focus on A′, the audit guide discusses an evaluation strategy that may be used (pp. 94-99). This strategy is pictured in Figure 1 and is termed the "rejection risk control option." The first step in this process is to ensure that the *ex post* level of control of sampling risks can be at least equal to the planned level of control by determining that the condition $A' < A$ exists. If not, the sample is regarded as insufficient and fallback options must be considered. If $A' < A$, a direct test can be employed. If $B \epsilon \hat{X} \pm A'$, the reported value can be accepted. In contrast to the acceptance risk control options, the rejection risk control option strategy initially tests with the risk of incorrect rejection set to the original planned level. In this case, the risk of incorrect acceptance is allowed to vary, and it will be at a lower level than planned (except in the rare case where $A' = A$, when it will be at the planned level). If $B \epsilon \hat{X} \pm A'$ is not true, additional steps are suggested by the audit guide. They are described below. These steps ensure that the reported amount will not be rejected simply because sample estimators are more efficient than planned.

If $A' < A$ but B does not exist in the region $\hat{X} \pm A'$, the auditor may still be able to accept without computing an allowance for sampling risk related to the risk of incorrect acceptance. To do so, two conditions must be met. One condition requires that $\alpha < 2TD$. This condition ensures that an allowance for sampling risk based on α will also be associated with a risk of incorrect acceptance that is no more than TD. To ensure that such is the case, the reliability coefficient used in computing the (far) end of the range $\hat{X} \pm A'$ in relation to book value must be greater than the reliability coefficient which would be used in determining A″ and the associated allowance for sampling risk as related to TD. Because the reliability coefficient for α risk is associated with two-tail testing, that coefficient will be greater than the reliability coefficient for

TD only if the condition $\alpha < 2TD$ exists. Satisfying this condition effectively eliminates the possibility that $B-(\hat{X}-A')$ could be less than TE or that $(\hat{X}+A')-B$ could be less than TE even though B does *not* exist in $\hat{X} \pm A''$.

Without the first condition the situation which follows could arise, when $\alpha > 2TD$:



This would indicate acceptance even though the risk of the incorrect acceptance is greater than TD.

The second condition requires that $\hat{X} \pm A'$ exist in the region $B \pm TE$. In other words, it requires that the difference between the book value and the end of the range $\hat{X} \pm A'$ farther from the book value be less than the amount TE. When this condition is met, the risk of incorrectly rejecting the notion that the proper value of the account or balance in question is not materially different from the book value is less than (or equal to) the level α initially established for control of the risk of incorrect rejection.

If either of these two conditions fails to be met, computation of an allowance for sampling risk based on TD should be undertaken. Sample evaluation is then conducted in accordance with the acceptance risk control option steps previously discussed.

The Two Strategies Contrasted

As discussed, the acceptance risk control option will permit an initial acceptance test regardless of the relationship between A′ and A. If $A' < A$ then the sample size is sufficient to control the risks of incorrect acceptance and incorrect rejection to the planned levels. On the other hand, if $A' > A$, then the sample is not sufficient to control both risks to the planned level, and the initial decision process holds the risk of incorrect acceptance to the planned level by using the decision interval $\hat{X} \pm A''$. The auditor will not permanently reject the reported amount based on this decision process; however, if rejection were allowed, the risk of incorrect rejection would be greater than planned where $A' > A$.

The sufficiency test within the rejection risk control strategy prevents such an occurrence. This is accomplished by declaring the sample to be inclusive and then pursuing fall-back options in any instance for which $A' > A$. In all other instances $A' < A$.

Without the sufficiency test, classical statistical hypothesis evaluation using the acceptance risk control option is more likely to lead to acceptance than would the rejection risk control or sufficiency test options. Two conditions are necessarily associated with those sampling outcomes that lead to acceptance under the one strategy but not in the other. First, the *ex post* estimate of variability must exceed the level used in sample size determination. Second,

the allowance for sample risk associated with *ex post* control of the risk of incorrect acceptance at the planned level must be small enough to warrant rejection of the alternative hypothesis (i.e., $B \epsilon \hat{X} \pm A''$).

It is possible to employ the acceptance risk control strategy with a sufficiency test by including the sufficiency test option with the acceptance risk control option as shown in Figure 1. In this case, the condition $A' < A$ would always exist under both approaches, and rejection could be held to levels equal to or less than originally planned under either strategy. However, the two strategies differ as to which risk to hold at the original level.

The acceptance risk control option with its decision rule based on the interval $B \epsilon \hat{X} \pm A''$ holds the risk of incorrect acceptance to the originally planned level. If we assume the sufficiency test, then the risk of incorrect rejection will be allowed to vary and will be smaller than originally planned.

By contrast the rejection risk control option with its decision rule based on the interval $B \epsilon \hat{X} \pm A'$ holds the risk of incorrect rejection at the planned level, and the risk of incorrect acceptance is allowed to vary and will be smaller than originally planned.

Thus both strategies will hold one risk at the planned level and allow the other risk to vary to a level lower than originally planned. The rationale for holding either risk at the planned level and allowing only the other risk to vary has not been adequately discussed in the literature. The rationale for either approach may appear to be questionable if we assume that the auditor considered, even in an intuitive way, the possible losses that might be associated with incorrect rejection or acceptance.

Both risks α and TD can be reduced by increasing sample size, but for any size sample α and TD have a wide range of trade-offs. These factors must be considered, at least intuitively, in deciding on planned levels of α, TD and sample size. Presumably the auditor balances the expected loss from each risk in some way when attempting to minimize the total expected loss from testing. The fact that the level of α and TD are often not the same may imply that the associated losses are also not equal. If so, it is not clear that either *ex post* strategy of holding one risk at the planned level will be optimal from an expected loss perspective.

By now it is clear that the choice of an appropriate evaluation strategy is less than obvious. A more formal examination of the implicit preferences employed when judging the sufficiency and competence of evidence using alternative strategies follows. An additional strategy is then developed. This additional strategy—the balancing strategy—seems logically defensible in relation to the formal analysis of the differences in extant strategies.

One means of more formal examination is to consider the expected value of the alternatives suggested by the alternative options. For simplicity we assume risk neutrality. In turn, we shall examine each of the two primary decision rules.

Within the context of the necessary conditions for different sample evaluation outcomes, the probability of incorrect acceptance is, of course, TD, if the acceptance risk control option is employed. If there is no error in the amount being tested then the probability of (correct) acceptance is the complement of the risk of incorrect rejection associated with A". We designate this probability as $1 - \alpha''$. The numeric value of α'' may be determined after

computing the associated reliability coefficient. The appropriate two-tailed reliability coefficient can be computed by determining the number of standard errors of the estimator contained in A″ (A″ ÷ $S_{\hat{X}}$).

Under the assumption that the auditor will act rationally to minimize maximum expected loss, acceptance using the primary rule from the acceptance risk control option implies that $\alpha''\ell_1 > TD\ell_2$, where ℓ_1 is the loss associated with incorrect rejection and ℓ_2 is the loss associated with incorrect acceptance. Under this assumption $\alpha''\ell_1$ is the maximum expected loss associated with a decision to reject the book value and $TD\ell_2$ is the maximum expected loss associated with a decision to accept. The relation, $\alpha''\ell_1 > TD\ell_2$, holds true without regard for the specific value of α'' since the value of α'' does not influence the decision rule calling for acceptance when $B \in \hat{X} \pm A''$. The rule is based on TD alone. In the extreme, this implies that even as the risk of incorrect rejection disappears ($\alpha'' \to 0$), or simply becomes very much smaller than TD, the consequences of incorrect rejection heavily outweigh the consequences of incorrect acceptance at the planned level. Such a conclusion requires that $\ell_1 >> \ell_2$, which is counter-intuitive. It demands that the negative consequences of incorrect rejection far exceed the negative consequences of incorrect acceptance. This seems a particularly undesirable artifact of any audit strategy since, in the extreme, it may favor accepting client results when the probability of their being correct is significantly smaller than the probability that they are without material error.

On the other hand, this decision rule seems to have greater intuitive appeal when $\alpha'' \to 1$ or whenever $\alpha'' >> TD$. In such circumstances the primary decision rule from the acceptance risk control option implies that $\alpha''\ell_1 < TD\ell_2$ and hence that $\ell_1 << \ell_2$. This result seems intuitively more appealing.

As a prima facia matter, this observation seems to favor the more liberal acceptance strategy associated with the acceptance risk control option. On those occasions when the other option employs this decision rule as a secondary criterion it is subject to the same criticism concerning the consequences of $\alpha'' \to 0$ or α'' becoming much smaller than TD because of unanticipated efficiency of the sampling process. On the other hand, because this option employs the adequacy criterion ($A' < A$) as a necessary condition for acceptance, it prevents the rule from operating and hence from indicating acceptance in those very circumstances where the rule seems intuitively most appealing. This occurs because α'' is less than the reliability coefficient for α. This can occur only when the allowance for sampling risk based on *ex post* control of TD at the planned level forces the range of estimators which leads to acceptance to be contained in a quite small region about the book value. Such limits on the range of acceptable estimators will approach the book value from above and below only as the variability of sampling results increases from planned levels. Of course this is the very condition which will cause the adequacy criterion test to nullify use of the decision rule by screening out the sample result as unacceptable.

Acceptance using the primary rule of the rejection risk control option requires exploration of the adequacy criterion. The adequacy criterion rule suspends judgment when $A' > A$. Suspension is called for regardless of the

relationship between the projected audit value and the acceptance region about the book defined by controlling the risk of incorrect acceptance at the level TD.

Obviously, this suggests that the expected loss associated with (α, TD′) for all TD′ greater than TD exceeds some maximum acceptable level (where TD is the *ex post* probability of incorrect acceptance associated with the region $\hat{X} \pm A'$, which controls for α at the planned level). In addition the sufficiency test suggests that the maximum acceptable expected loss associated with reliance on sample evidence should be $\alpha\ell_1 + TD\ell_2$. If this condition cannot be achieved based on results of a sample, then incurring the costs associated with fallback option(s) becomes necessary. Any such fallback should be planned to produce sufficient additional competent evidential matter. Theoretically, planned fallback should reduce the risk of incorrect acceptance to the level TD while maintaining α at the planned level.

Conversely, the acceptance risk control option, without the sufficiency test as a primary screen, may permit acceptance without regard to the implicit level of the risk of incorrect rejection associated with its primary test which is based on TD alone. As pointed out above, this may implicitly allow α'' to become quite large when the variability of sample results exceeds planned levels. Therefore it might be inferred that $\alpha''\ell_1 + TD\ell_2$ is small enough to negate the cost benefit of fallback procedures even when $\alpha'' \rightarrow 1$. This seems an undesirable result. It suggests that *either* available fallback options are 1) extremely costly, 2) inefficient, or 3) ineffective at reducing risk of incorrect rejection (e.g. $\alpha''\ell_1 < \alpha\ell_1$ + cost of employing feasible fallback option(s)); *or* that the loss associated with incorrect rejection is trivial ($\ell_1 \approx 0$).

If the latter were true, there would be no reason to have controlled incorrect rejection risk in the first place during sample size planning. If something from the former set of conclusions is true then no cost effective practical means for further reducing risk is available after sampling *nor* were such procedures considered subsequently available prior to sampling. Had they been considered subsequently available then the risk of incorrect rejection would have been worth controlling explicitly in formulation of the primary decision rule.

These results seem to favor use of the acceptance strategy associated with the rejection risk control option rather than the more liberal acceptance strategy of the acceptance risk control option. Of course, this finding is in direct conflict with the prior prima facia results which favored the logic of the acceptance risk control option. This paradox suggests that another strategy for sample evaluation be contemplated.

The Balancing Strategy

As depicted in Figure 2, the balancing strategy begins with and employs the same straightforward decision rules as the other strategies when $A' = A$. When $A' \neq A$, the adequacy criterion rule (as employed by the rejection risk control and sufficiency test options) is invoked as a primary screen. When results indicate that the variability of sample observation exceeds the planned level ($A' > A$), the sample is deemed inconclusive and appropriate fall-back options are considered. This is also consistent with the other adequacy criterion options.

The balancing strategy takes its unique character from its next stage decision rule. When invoked, the rule calls for acceptance of the amount being tested if the book value falls in the region $\hat{X} \pm A^b$, where A^b is the monetary amount which balances the *ex post* risks of incorrect rejection, α_b, and incorrect acceptance TD_b, such that $\alpha/TD = \alpha_b/TD_b = \ell_2/\ell_1$. This condition is equivalent to $\alpha_b\ell_1 = TD_b\ell_2$. When the expected losses of incorrect rejection and incorrect acceptance balance one another in this fashion, the critical limits based on control of α_b and TD_b respectively will be equivalent. In each case these limits are $\hat{X} \pm A^b$. The determination of A^b requires simultaneous solution of the following equations:

$$2F_N(Z_{\alpha_b/2})/F_N(Z_{TD_b}) = C_1$$

$$TE/S_{\hat{X}} = Z_{\alpha_b/2} + Z_{TD_b} = C_2$$

where $C_1 = \alpha/TD = \ell_2/\ell_1$ and C_2 = the number of standard deviations of the sampling distribution in the region bounded by the null and alternative hypotheses. $F_N(\cdot)$ is the cumulative standard normal density function for the specified standard deviate. $Z_{\alpha_b}/2$ is the number of standard deviates which provide for control of the risk of incorrect rejection at level α_b and Z_{TD_b} is the number of standard deviates which provide for control of the risk of incorrect acceptance at level TD_b.

There is no closed formed analytical solution to these two equations because the $F_N(\cdot)$'s are integrals of a normal probability function. However, as a practical matter, numerical approximate functions (e.g., see Abramowitz and Stegun, 1964, p. 299) can readily be employed to produce $F_N(\cdot)$ values. Other numerical algorithms may be used in conjunction with these approximations to compute $Z_{\alpha_b/2}$. Once a solution for $Z_{\alpha_b/2}$ is computed then $A^b = Z_{\alpha_b 2_{/2}} S_{\hat{X}}$ is available and the decision rule can be employed based on whether $B \epsilon \hat{X} \pm A^b$.

By employing both the sufficiency test rule and balancing rule, the balancing strategy avoids the pitfalls associated with prior strategies. The sufficiency test, as a primary rule, assures that consideration of fall-back procedures will not be ignored and that the consequences of incorrect rejection will not be treated as trivial. In this sense, it is equivalent to the rejection risk control option and sufficiency test option which dominate the acceptance risk control option with respect to primary rule selection.

If $A' < A$, the balancing rule, when allowed to operate, will reduce both risks below planned levels. Therefore, $A'' > A^b > A'$. Acceptance will occur less frequently with the balancing strategy than either of the other strategies. The balancing strategy has a higher potential for failing to accept than the acceptance risk control option because it employs the sufficiency screen and because the critical acceptance region for secondary testing is smaller, $\hat{X} \pm A^b$, than the region of acceptance, $\hat{X} \pm A''$, associated with the acceptance risk

control option. It is also more conservative than the other sufficiency test options with which it shares the primary rule because they also rely for secondary testing on the larger region $\hat{X} \pm A''$.

The more efficient the sample in relation to planned efficiency the closer A^b will be to the midpoint between the alternative hypotheses. (When $\alpha = 2TD$, $A^b = A$ without regard to sample size because the reliability coefficients for both risks will be equal, before and after sample results are available.) For $\alpha < 2TD$, A^b and hence the acceptance region $\hat{X} \pm A^b$ will become smaller as sampling efficiency improves. For $\alpha > 2TD$ the acceptance region $\hat{X} \pm A^b$ becomes larger as sampling efficiency increases.

By converging on the midpoints between hypotheses as critical limits, the rule assures that as α_b approaches 0 so too will TD_b (and vice versa), thus permitting the expected loss from either error to be reduced from $\alpha\ell_1 + TD\ell_2$ to $\alpha_b\ell_1 + TD_b\ell_2$ with $\alpha_b < \alpha$ and $TD_b < TD$, while maintaining control of both risks.

The balancing strategy concludes with the same decision rules as the other strategies, except that the balancing strategy rebalances A^b, in accordance with the ratio of α_R/TD_R when considering the adequacy of adjustments in relation to statistical results.

Other Issues

The previous sections have been concerned with a single issue—the merits of alternative strategies that are available to the auditor when the *ex post* efficiency of the statistical estimator appears to be different from the planned level of efficiency. More specifically, what is the nature and result of the trade-offs between the risks of incorrect acceptance and incorrect rejection that are implied by several commonly available alternatives? In addition, we considered a possible strategy for determining levels of these risks by incorporating the losses that might be associated with these risks.

We also briefly consider some other unresolved issues in classical auditing sampling in the following sections. These issues have only recently been recognized by researchers in the audit sampling literature, and may prove to be fertile ground for future research.

Assessing the Risk of Incorrect Acceptance

A good deal of work has been produced suggesting that the assessment of TD is a tricky task and that current models of determining that risk level for sample evaluation purposes are overly simplistic. Both Leslie [1984] and Kinney [1984] and implicitly the CICA study, *Extent of Audit Testing* [1980], point out that the current SAS 47 approach for developing TD may be viewed as intending TD to be a conditional risk. Under this view, the SAS 47 approach invokes TD as a conditional posterior risk. This is the risk, *given that material error exists,* that the auditor will incorrectly accept. This may be significantly less than the Bayesian type posterior risk of incorrect acceptance which would consider the conditional probability for incorrect acceptance in relation to the marginal probability of acceptance, where the marginal is the probability of sample results leading to acceptance without regard to whether that decision to

accept is correct. Among other problems associated with risk assessment are the need to contend with the impact of artificial specification of simple rather than complex hypotheses [Dacey & Ward, 1986] and the potential benefit of considering extension of Bayesian type models to include posterior consideration of correct and incorrect acceptance in relation to the results of all evidential procedures rather than only detailed sampling procedures. In addition, as highlighted by Cushing and Loebbecke [1983], nonsampling risks may not be as limited in their potential impact as current practices would suggest.

Ex Post Sampling Risk

Beck and Solomon [1985] have observed that the achieved sampling risks may be dependent upon the decision rule used and the estimator selected when highly skewed populations force defacto violation of the normality assumptions associated with the sampling distribution. This observation suggests that the auditor faces different *ex post* risks exposures and hence different audit consequences when the statistical assumptions are violated. Under such conditions, it becomes important for the auditor to choose an appropriate estimator and an appropriate decision rule for evaluating the sample results so that he can minimize his risks exposure. The Beck and Solomon study provides suggestions for meeting this objective by pairing decision rules with statistical estimators based upon an *ex post* analysis of the sample evidence (e.g., error pattern).

The (two) decision rules that Beck and Solomon refer to are based on the two alternative hypothesis testing approaches. Under one approach the auditor tests null hypothesis that the account book value is fairly presented (the decision rule based on this approach has been referred to as Elliott and Roger (E & R) decision rule). In essence, this is a test of the type associated with the rejection risk control option described above. Under the second approach the null hypothesis being tested is that the account book value is misstated by an amount greater than tolerable error. This approach was used in Statement on Auditing Procedure (SAP) 54. This is a test of the type associated with the primary decision rule from the acceptance risk control option as discussed above. It should be mentioned here that the E & R and SAP 54 decision rules are equivalent for planning purposes as demonstrated by Roberts [1974] when normality of the sampling distribution is assumed.

Beck and Solomon then illustrate how the achieved sampling risks are changed when the decision rule used is changed. Assume that the accounting population is highly skewed (as is often the case usually, see Stringer, 1963) to the right and the estimator used is the ordinary mean per unit (MPU) estimator. Since the accounting population is highly skewed, the MPU estimates are likely to exhibit skewness, and in the presence of skewness the estimator of the population mean and the estimator of the standard error are found to be highly positively correlated (see Neter and Loebbecke, 1975). Suppose now that the client's asset account book value is fairly stated, but the auditor's sample estimate of the account mean (total) value is drawn from the lower region of the sampling distribution and thus is less than the actual mean (total) value of the account. Since the estimator of the mean is positively correlated with the estimator of the standard error, a smaller than average mean estimate would be

accompanied by a smaller than average standard error estimate. In this situation, the two-sided confidence intervals computed under the E & R decision rule would be centered below the actual mean and also would be too narrow. Consequently, the risk of efficiency error would be higher than what was planned. However, when the SAP 54 decision rule is used, because of small estimates of the mean and standard error, a large estimate of monetary error would result and with a smaller achieved precision measure the risk of efficiency errors would become smaller than the risk determined using E & R decision rule. A similar argument can be presented for the risk of effectiveness which also is lower under the SAP 54 decision rule than under the E & R decision rule when the mean estimate is such that a larger than average estimate of standard error is projected from sample results.

Asymmetric Materiality Thresholds

There is empirical evidence suggesting that decisions about materiality may not be symmetric. In some circumstances auditors may be less tolerant of overstatement than understatement and wish to establish audit testing hypotheses accordingly (Ward, 1976). Recently, Srivastava and Ward [1986] have developed a methodology that incorporates such an asymmetry for variable sampling. Their preliminary results show that the auditor can achieve a significant reduction in the sample size when the asymmetric materiality thresholds are used in the planning stage. It is interesting to note that the sample size reduction is achieved without sacrificing the two-tail test for control of the risk of incorrect rejection.

Conclusion

The objective of this paper was to identify and discuss some unresolved issues in classical audit sample evaluations. The selection of which issues to consider was not random and, in fact, was very biased. The bulk of the paper was devoted to a discussion of the implications of common evaluation strategies that are presented in the audit sampling literature for situations where the achieved efficiency of the estimator appears to be different from the planned efficiency. When this occurs, both the acceptance risk control and the rejection risk control strategies create a decision interval such that one risk (TD or α) is held to the originally planned level and the other risk is allowed to vary from the planned level. Little discussion is presented in the literature concerning the rationale for selection of one or the other risk to hold at the planned level, or why it is so logical to allow the other to vary from the planned level. In fact, this type of trade-off process may seem contradictory if there is at least a rough, intuitive balancing of expected losses from the two risks when the acceptable risk levels are initially planned. From this viewpoint, a strategy was presented which attempts to balance the expected losses for the two risks based on *ex post* information. This process would appear to have some conceptual merit and to warrant further investigation. In addition, brief comments on several other recently discussed issues were presented. Although these issues have just been identified and thus are perhaps further from solution, they merit mention and probably future discussion and investigation.

End Notes

1. Much of the discussion of evaluation of samples in Bailey is based on the same premise as the audit guide option approach; however, he recognizes the alternative approach similar to the acceptance risk control strategy in footnotes.

2. Guidance for establishing the two risk levels, TD and α, is available elsewhere. See, for example, Arens & Loebbecke [1981, p. 136] and SAS 39. A significant amount of prior effort has been expended to assist the auditor in understanding how to establish an appropriate level for TD. Some issues and problems raised by these studies are reviewed in a separate section of this paper.

3. The statistical evidence may be considered conclusive if the number of standard errors of the estimator contained in the tolerable error amount, TE, for the account being tested exceeds the sum of the number of standard errors of the estimators required to control α_R and TD_R at the reassessed levels.

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Discussant's Response to "Unresolved Issues in Classical Audit Sample Evaluations"

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Laventhol & Horwath

I am happy to be here at Kansas to discuss the paper by Nichols, Srivastava and Ward. Our firm uses an assertion based audit approach; we use classical variables sampling when we expect to find many errors or when we perform accounting applications. In general, I have little question that the authors understand the mathematics of classical variables sampling and the various approaches. While their mathematics are generally right, I am not sure they have considered all of the practical aspects. I will discuss some of the practical problems that are based on the many telephone calls received in our National Accounting and Auditing Department from our practice offices.

Discussion Points

1. The paper places equal emphasis on the risks of incorrect rejection and acceptance when evaluating sample results. For accounting applications, these risks might be equally important. For auditing applications, however, auditors are much more concerned about the risk of incorrect acceptance. Incorrect acceptance leads to audit failures. Incorrect rejection leads to audit inefficiencies. In today's environment, with insurance difficult to obtain, incorrect acceptance and audit failures are "unacceptable." Incorrect rejection is a cost of doing business that is directly or indirectly passed on to clients. In the short run, we may even realize revenue when there is incorrect rejection.

   Audit efficiency can be controlled by means other than sample size; for example, proper planning and supervision, analysis of error risks and determination of materiality levels, selection of nonsampling procedures when justified, and use of modern technology to reduce clerical time. Thus, auditors do not rely solely on risk of incorrect rejection levels to control audit efficiency.

   We recognize that the rejection method is conservative and may yield higher than necessary sample sizes. We also recognize that teaching people the more efficient method will be expensive, more so than the sampling cost to be saved.

   As a result, auditors determine the risk of incorrect acceptance for sampling applications, then select a somewhat higher risk of incorrect rejection. This selection is somewhat arbitrary and is based primarily on the difficulty of extending procedures if unacceptable results are obtained. For example, an auditor might select a 10 percent risk of

incorrect rejection (and a larger sample) for difficult to extend procedures (accounts receivable confirmations or inventory test counts). For easy to extend procedures (inventory price tests, additions to productive assets), the auditor might select a 20 to 30 percent risk of incorrect rejection (and a smaller sample). Thus, the emphasis is on not making a costly mistake (the need to extend difficult tests, incorrectly accepting a population that is misstated materially), rather than keeping sample size to the minimum.

We recognize that the risk of incorrect rejection has to be higher than the risk of incorrect acceptance! More practical guidance is needed on selecting an appropriate risk of incorrect rejection.

2. In most cases, auditors will use ratio and difference estimation rather than the direct projection method of classical variables sampling. Ratio and difference estimation requires a minimum number of differences, either overall if the combined ratio method is used, or by strata if the separate ratio or difference method is used. As a result, the auditor needs to choose a sample size large enough to provide enough differences.

   Further, most applications of classical variables sampling require a minimum sample size to obtain an accurate measure of the standard deviation of the variable of interest. Thus, for example, we require a minimum of 30 per strata if two or more strata are used and 75 if one strata is used. This means that if the test is easy to extend, it does not pay to worry about incorrect rejection. Instead, one approach that is often used is to select a minimum sample size, say 75 items if unstratified, or 30 items per strata, plus perhaps some larger, 100 percent tested items. The test is done and the auditor calculates the point estimate and the distance to the limit the auditor is interested in at the appropriate risk of incorrect acceptance. If the auditor can accept, he does not have to worry about rejection. If the auditor cannot accept, he decides whether to investigate the errors or to expand the test. If he expands the test, he might consider risk of incorrect rejection or he might just arbitrarily expand the test a fixed number, say, an additional 50 items. While this is far from scientific, for many auditors it is much simpler than trying to understand the mathematics of acceptance and rejection.
3. The paper implies that the auditor places reliance on internal control and other substantive tests when determining risks of incorrect acceptance and rejection. Because classical variables sampling ordinarily is used in high error rate situations, the auditor ordinarily does not rely on controls. The auditor considers inherent error risk in determining the population to sample, how to select the sample and what supporting documents to examine.

   This high error expectation also means a Bayesian approach might be difficult to apply because the auditor will have difficulty expressing prior expectations.
4. In evaluating sample results, the paper suggests that the auditor control either the risk of incorrect acceptance or rejection at the planned level, or balance the risks and compute achieved precision accordingly. In

practice, the auditor ordinarily is concerned with a one-sided evaluation based on the planned risk of incorrect acceptance.

In our assertion based audit approach, our auditors consider the inherent risk of error and the inherent direction of risk. For example, auditors might conclude that overstatement of inventory is much more risky to them than understatement and is much more likely given the client's controls and the nature of the business. In that case, they would be interested primarily in measuring the maximum overstatement (the existence error). They would use analytical review to consider understatement (completeness). Accordingly, they would want to know that the distance to the lower limit (the maximum existence overstatement) is less than materiality or tolerable error at the appropriate one-sided risk level. In that case, the auditor could accept and the risk would measure the risk of incorrect acceptance. If the auditor could not accept, he would have to consider expanding the test and at that point might measure risk of incorrect rejection.

Two-sided evaluations generally are limited to accounting situations and situations in which the auditor is concerned about both overstatement and understatement errors (because he has little feel for the inherent risk). Auditors are not concerned about controlling the relationship between the risks of incorrect acceptance and rejection.

5. The authors talk about a balancing approach, using estimates of the cost of acceptance and rejection. It is extremely difficult to calculate these costs, especially cost of incorrect acceptance. Since we know that acceptance risk is much more costly, the balancing approach seems unnecessary.
6. Auditors in practice need more guidance on how classical variables sampling can be used simply, without statistical formulas or complicated computer programs.

   As this paper has amply demonstrated, classical variables sampling can become complicated unless the approach is easy for the auditor to understand. Thus, for example, many firms have adopted a rule of thumb setting precision equal to one-half of materiality. This causes risk of incorrect rejection to be twice the risk of incorrect acceptance and provides a simple way of calculating sample sizes. Although it is inefficient, the costs of training auditors to understand a more complex approach far outweigh the savings resulting from auditing fewer items. While I am hopeful that the academic world can better train auditors to understand classical variables sampling, until that happens, we will have to use simplified rules to reduce both our training costs and the risk of auditor error.
7. In the same way, the authors of the Audit Sampling Guide were faced with the need to simplify and to deal with various computer programs. Although there may be a more efficient approach (from the sampling risk viewpoint), I believe the Audit Guide approach is understandable to most auditors.
8. Classical variables sampling can be complex. Auditors often avoid using it even where they know it might yield a lower sample size (or a tighter precision) than alternative methods, such as dollar unit sampling. We

need a relatively simple method of classical variables sampling that auditors can learn as quickly as dollar unit sampling and apply without risk of making a major error in the situations where it should be applied—high error rate situations where a reasonably tight precision is needed and adjustment is possible.

To summarize, the authors' understanding of the math is fine, but it is essential to consider the practical impact in the audit environment.

5

The Impact of Technological Events and Trends on Audit Evidence in the Year 2000: Phase I*

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Introduction

This research project is an exploratory study that attempts to identify and analyze:

(1) the most significant changes in information technology that will affect future audit evidence,

(2) the impact of such changes upon auditing, and

(3) the nature of audit evidence in the year 2000.

The success of items two and three is contingent upon results obtained in the first phase of the study, which is reported in this paper. Phase I is designed to identify not only the relevant future events and trends but also the likelihood that these events may occur at various points in time in the future. To accomplish this goal, the researchers have performed an extensive review of the technological literature, interviewed experts in auditing and various technical areas, and solicited expert opinions via a questionnaire. A Delphi study will also be conducted to elicit and analyze experts' predictions of important future information technology events and trends.

Using these data, phase II of the research will identify and analyze the effects of predicted technological events and trends on audit evidence and the audit process. Scenarios will be developed to extract potential new strategies for dealing with future audit evidence, audit technology, and auditor roles.

This paper is divided into six sections as follows:

1. Statement Of Problem And Need For Research
2. Review Of The Information Technology Literature
3. Research Issues And Proposed Methodology
4. Preliminary Findings Concerning Information Technology
5. Preliminary Findings Concerning Audit Evidence
6. A Tentative Scenario Of Future Audit Evidence

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Statement of the Problem and Need for the Research

The basic problem addressed in this project is that changes affecting the nature and availability of audit evidence are occurring so rapidly that auditors have difficulty making practical plans to gradually adapt their auditing techniques and processes to deal effectively with future forms of audit evidence. Consequently, the auditing profession needs research that (1) identifies the most significant future events and trends expected to affect future audit evidence; (2) indicates when such events and trends are expected to occur; and (3) analyzes their impact on audit evidence, audit technology, and the role of auditors. For example, in planning future auditing techniques, auditors would likely give more attention to a particular new form of information processing if a consensus of experts indicates that it will be technologically and economically feasible by the year 2000 than if a consensus indicates that it will not be feasible or if no consensus exists.

The audit environment is greatly affected by technological change. The means by which information is captured, entered, retrieved, modified, and distributed has changed dramatically over the past 30 years. The state-of-the-art of computer auditing is clearly superior to that which existed at the beginning of this decade but probably not adequate for the highly sophisticated innovations in information technology that are likely to occur in the next 10 to 15 years.

The nature of auditing will undoubtedly continue to undergo substantial changes as the level of technology improves. Experts are forecasting continued improvement in the power and flexibility of computers and communication devices, while costs are expected to decrease over the next 15 years. A proliferation in the number of computers and terminals is expected over the next decade.

Numerous social, economic, and political factors are likely to be important to the future of audit evidence and auditing; consequently, they will be considered in the study. However, we have chosen to place less emphasis upon specific predictions of these factors because they seem to be inherently more difficult to predict reliably and somewhat less important to the future of audit evidence than changes in information technology.

Given the need for reliable predictions of future information technology and of other factors that will likely affect future audit evidence, our research is designed to address the following two basic research questions:

1. What will be the status of information processing technology in the year 2000?
2. How is the information processing environment in the year 2000 expected to impact the nature and adequacy of audit evidence?

The basic research approach for the first question includes: (1) a review of the literature concerning future information technology, (2) interviews with information technologists and auditors, (3) an open-ended questionnaire survey of information technologists and auditors, and (4) a Delphi study of information technologists to predict the likelihood of future technological events and trends.

The basic research approach for the second question includes: (1) discussions with a relatively small panel of auditors concerning the audit impact of predicted information technology changes, (2) preparation of narrative descriptions of likely audit impacts, and (3) a survey of a larger panel of auditors to test and validate the descriptions and scenarios.

Review of the Literature on Future Information Technology

The first research step was a review of the literature concerning future information technology. The objective of this literature review was limited to identifying *potential* future information technology events and trends that may occur. At this stage of the research, it would be premature to make assertions about when these events or trends are likely to occur or even whether they are likely to occur. Potentially important events and trends that are identified at this stage will be included in the Delphi survey of information technology experts. Research inferences about the degree of consensus among experts will be based upon the Delphi study results.

The three major components of the literature review are: (1) computer hardware, (2) computer software, and (3) data communications and office automation. A brief overview of that literature is presented below.

Computer Hardware

Computer hardware improvements continue to outpace software improvements. Computer processing has become much faster due to advances in integrated circuit technology. Computers are becoming smaller, more powerful, and less expensive which has led to a tremendous surge in end-user computing. AT&T (International Data Corp., 1985) estimates that available computer power is doubling each year. Just three years ago, Lewis M. Branscomb, a Vice President and chief scientist at IBM, estimated that computer power was increasing at a rate of 40 percent per year (Branscomb, 1982).

Proliferation of Computers—Where is this increased computer usage coming from? Of the three broad categories of computers—mainframes, minicomputers, and microcomputers—the growth has largely come from the microcomputer segment. In 1975, the market for microcomputers was virtually non-existent. The U.S. market for personal computers used in business or professional purposes has grown to $11 billion, counting multi-user supermicros. The dollar volume of microcomputer sales is now nearly equal to the market (in dollar sales) for mainframes. By 1989, the market will be more like $39 billion. The number of personal computers used for business or professional purposes in the U.S., either stand-alone or multi-user, will increase to 59 million in 1989 (IDC, 1986). The number of personal computers used for business or professional purposes was 7.5 million in 1984. The key trends causing the shift to personal computers are shift to hard disk storage, faster micros, multi-user systems, and higher resolution graphics.

The number of terminals is also expected to increase dramatically throughout the 1980s and 1990s. International Data Corp. offered several projections in the April 15, 1985 issue of *Fortune* magazine.

1. In 1970, there were less than 200,000 remote terminals. In 1980, there were two million remote terminals, a ten-fold increase. By 1990, 100 million remote terminals will be in use.
2. There were 20 million digital keyboard devices in the U.S. workplace in 1984. By 1989, 80 million are expected to be in use.
3. Expected sales of Voice/Data terminals in 1987 are 250,000 units, a ten-fold increase over the actual number of units sold in 1983.

All of these projections point to a proliferation of computers and a business environment saturated with computers in the year 2000.

Parallel Processing—Machines like Japan's Teradata systems, part of their fifth generation project, have a high level of parallelism; that is, several microprocessors read different sections of the database at the same time. Present computers can read hundreds of transactions per second, but by 1990 some of the large banks will need a computer that can read thousands of transactions per second. With a computer that can read several records at a time, this desired tenfold increase in processing speed may be attainable.

Computer Software

In an interview in *Computer Decisions* (Kull, 1984), James Martin, a noted writer, lecturer, and consultant on information technology, discussed a wide range of topics including programming, fourth and fifth generation languages, Database Management Systems (DBMSs), operating systems, spreadsheet packages, and expert systems. Since the issues raised by Martin are indicative of those raised in the literature on the future of computer software, they are discussed briefly below.

Automation of Systems Analysis and Programming—Martin believes the jobs of programmer and systems analyst will be automated. We are evidently heading in the direction of a "syntax-less" programming language. He favors replacing languages altogether with diagrams because no syntax is required. Fourth generation languages are much more English-like, but Martin does not feel that there are any top-rate languages yet. It is difficult to replace existing languages such as COBOL because companies have so much invested in them.

End-User Programming—Massive growth in end-user programming is predicted in the next ten years. For example, current end-users of spreadsheet software on a PC can use sophisticated financial-analysis tools to perform faster, more accurate, and more complex calculations than were performed previously by fulltime analysts on mainframe computer programs. Martin believes that spreadsheet graphics will move from two dimensions to three dimensions (with cubical structures) and that, eventually, four and more dimensions will be available.

The expected growth in end-user programming and decentralized computer processing raises auditability concerns. In his book, *EDP Auditing*, Weber states:

> With the rapid growth in the use of minicomputers and microcomputers, the unavailability of generalized audit software that runs on these machines may be a problem confronted increasingly by the auditor.

> Further, at least in some cases, it is unlikely generalized audit software vendors will make major attempts to increase the availability of their packages on new hardware/software configurations. Increased availability means increased maintenance costs, decreased efficiency, and a greater risk of the integrity of the software being compromised. (1982, p. 433)

New Database Structures—Continued rapid growth in database construction by professional programmers and end-users is predicted by several experts. Many experts believe that relational systems are far superior to CODASYL/ hierarchical based systems, but there is a vast financial investment in the older systems. For example, Martin states: "By 1990, only a small percentage of major database systems will be relational" (Kull, 1984).

Operating Systems—A clear need exists for increased standardization of operating systems. The lack of program portability is inconvenient and expensive. Martin stated that in ten years we may standardize on an entirely different operating system, one without a UNIX pedigree. UNIX is weak in the human factors area and in machine performance. Furthermore, UNIX is research oriented and is ten years old.

Expert Systems—Many experts are predicting widespread applications of expert systems. Several companies such as Teknowledge, Intellicorp, and Xerox have developed "shells" for building expert systems that are sometimes described as expert system generators. Building expert systems, however, is very time consuming and requires a heavy investment of capital and human expertise. Illustrating the scarcity of human expertise necessary to build expert systems, Martin states: "By 1990, there probably won't be more than 5,000 professionals in the U.S. who can build an expert system, compared with the one million programmers we have presently" (Kull, 1984).

On the other hand, Technology Forecasts (Anonymous, 1984) states that artificial intelligence applications are seen propelling the AI market from its current annual level of $250 million to at least $11 billion by 1990. Expert Systems is one aspect of AI. Expert Systems will probably be the area of AI which has the greatest impact upon the business arena. Sales of expert systems reached $216 million in 1985. Industry analysts project a $3.5 billion market by 1990 (IDC, 1986).

In a personal interview, a Vice President from Information Builders (creators of Focus) stated that artificial intelligence in ten years will be where PCs are today. The development of AI knowledge-based systems will make software truly "user-friendly."

Anne Lampert, staffwriter for Computer Decisions (January, 1985) comments that expert systems are finally out of academe and into the business world. She commented on the expert systems presently in use and concluded her article by stating: "The expert system does not supplant human involvement in the problem-solving process. The system merely makes the problem-solving more efficient and accurate."

The auditing and accounting profession is making a substantial investment in expert systems evident by the attendance of 220 academics and practitioners at the 1986 USC Audit Judgment Symposium which focused on expert

systems. Expert systems have the potential to change both the way we account for economic and social events and the way we audit information systems and reports.

Types of Information Input

The sophistication of computer input is also expected to improve throughout the next 15 years. Papageorgiou (1983) predicted by the mid 1980s computers would be able to optically scan hand-printed information. David Terrie, manager of International Data Corp.'s office automation services, says: "The machine will adjust to the user instead of the user to the machine." Terrie also believes that computers will be accepting unstructured voice input before the turn of the century (Pilla, 1982). Other respected individuals in this field are not as certain of this prediction as Mr. Terrie. In that same article, AT&T stated that voice recognition will not have a major impact upon non-routine decision making before the year 2000. Brian Blackmarr, a principal with the management consulting firm of Lifson, Hermann and Blackmarr in Dallas, Texas, believes it would take a major breakthrough to make it work well.

The Naisbitt Group assisted the Colorado CPAs on an auditing futures project. They concluded: "By 1990, a document will not only include text, but also data, image, and voice" (Colorado Society of Certified Public Accountants, 1984). Forecasters may not agree on the year, but they do agree that these changes are coming. Computers with voice recognition capabilities could substantially impact the nature of auditing. Detailed audit testing and flowcharting are almost completely document oriented. The profession needs to prepare for the changing nature of audit evidence in a paperless society.

Data Communications and Office Automation

Improvements in the data communications industry will also have a substantial effect upon the audit environment. Technological innovations such as communication satellites and fiber optics have increased data transmission speeds dramatically. Papageorgiou states that with this improved speed and reliability the electronic desk is expected to become standard equipment. An electronic desk is defined differently by various technologists. Papageorgiou believes that it is comprised of a large display screen, a keyboard, a pointing device, a local processor, a local file, a storage unit, a local printer, and a link to the rest of the system. Computerized Private Branch Exchange (PBX) technology allows electronic mail, voice, and word processing to communicate with one another.

In addition, video teleconferencing, telecommuting, and picturephone are all expected to make revivals now that the technology has improved. Electronic mail is already being used, but it will become far more pervasive. Electronic communication between organizations will also expand significantly according to Omar Sawy of University of Southern California's Center for Futures Research. Some companies have installed terminals connected to their mainframe computer at customer plants to facilitate inventory ordering (McFarlan, 1984).

The main function of the mainframe will be to handle anything that people want to share, according to several experts. The micro-to-mainframe links will

have to get better. We need standards for data representation so a user can easily download information from the mainframe. Eventually users will not know whether they are using data on the PC or the mainframe, especially if they have a Local Area Network (LAN).

International Resource Development, Inc. estimates the office automation market to be $36 billion by 1990. Much of this money will go toward networking (Pilla, 1982). In addition, multifunction terminals will come of age. A multifunction terminal can do jobs such as word processing, electronic mail, electronic filing and data processing from one workstation. Gerald Maskovsky, Vice President of MIS for Home Insurance Co., believes that the biggest challenge ahead of us is not technological, rather it lies in changing the operational and organizational patterns of organizations. "Everything is designed around a physical piece of paper and now that paper will disappear and drastically change the system" (Pilla, 1982).

LANs which allow individual users to pursue tasks independently from separate PCs while calling on shared resources, such as hard disks, high speed printers, and shared data bases, are expected to increase substantially in the next several years. According to Future Computing, a market research firm specializing in the personal computer marketplace, shipments of personal computer LANs will increase to 166,000 in 1988 from 10,000 in 1983 (Guttman, 1985, p. 43).

The PC has helped to decentralize the information processing within a company. Tim Sammons, director of a computer consulting firm, says that: "Control and centralization of information processing are compelling reasons to get a LAN. I think we'll see some companies go back to a centralized operational structure. Others will centralize locally so a given manager will be able to review the work done by his or her staff" (Luhn, 1985, p. 79).

Many experts predict that the networks and PCs that we know today will soon be obsolete. For example, Sammons predicts:

> The future lies in very high-speed networks that integrate voice and data and blur the distinctions between the telephone and the computer. The whole notion of stand-alone vanishes. That's why I think broadband, fiber-optic-based networks are the future. You'll have a machine that delivers your morning newspaper, the Sears catalog, shopping services, and more (Luhn, 1985, p. 80).

Videotex, the generic label applied to home information retrieval systems, is growing significantly. Management Horizons Inc. predicts that 20 percent of all U.S. retail sales will be done via videotex by 1990. More than eight million U.S. homes are predicted to use videotex by 1990 (Anonymous, *Business Week*, 1981). Transaction processing in financial services appears to be the trigger application (of videotex) that the public would be willing to pay for. However, Edward J. Atorino, a securities analyst for Smith Barney, describes some of the current limitations: "Videotex is providing a service which has too many alternatives that are cheaper and easier. It requires the consumer to perform, to go through too much effort, to get the services" (Granelli, 1986).

Various communication channel options are available. Big users like Seattle-based Boeing Co. are building their own corporate phone networks instead of leasing from the telephone company. Demand is soaring for transmission lines

that carry huge quantities of digital voice and data over one line, such as the so-called T-1 transmission lines. Companies also can continue to ship smaller quantities over separate lines, or send information between buildings with microwaves and their own transmitting and receiving dishes (Simpson, 1986).

Fiber optics is growing at about 25 percent a year, and that growth is expected to accelerate (*Barrons,* 1985). Fiber's favorable characteristics include a digital nature, small size, light weight and low heat, wide capacity,and immunity to electromagnetic interference and eavesdroppers. The telephone companies, especially the long-distance carriers, buy roughly 80 percent of what is produced. Fiber optics has approximately 20 times the bandwidth (capacity) of coaxial cable. However, a worry to the fiber-optic industry is the lack of standards for components.

Limitations of the Existing Literature

Despite the fact that a wide variety of sources have been examined, there are some weaknesses in the literature. The most notable weakness is the limited time-span of the forecasts. Nearly all of the experts confine themselves to a five-to-ten year time horizon. Only the most recently published articles dared to venture into the 1990s. John C. Papageorgiou, the author of the article "Decision Making in the Year 2000," states at the outset of his article that "[f]orecasting is almost impossible nowadays" (Papageorgiou, 1983, p. 77). This statement is particularly appropriate for the forecasting of technology. However, forecasters can offer projections that can give guidance to the auditing profession for the 1990s and beyond.

The preliminary review of the published literature shows that auditors need more *current* forecasts. *Science* magazine devoted an entire issue to all aspects of the computer world in February of 1982. The issue was extremely insightful, but the articles were written over four years ago and there have been many major changes in computer and communication technology since that time. Given the lag between collecting data and publishing a report, most forecasts are several years old. In addition, none of the reviewed studies specifically addressed the implications for business and auditing.

Research Issues And Proposed Methodology

Research Question No. 1 is: What will be the status of information processing technology in the year 2000? The first three of the four research steps for Question No. 1 which are listed below have already been performed.

1. A review of the technological literature to identify the probable status of information processing technology in the year 2000.
2. Interviews with a sample of EDP audit specialists and directors of internal audit.
3. A survey of a sample of information technologists, internal auditors, and external auditors using an open-ended questionnaire to validate the findings of the literature review and to identify other potential changes.
4. A Delphi study of technologists to ascertain the likelihood of future technological events and trends.

To address the first research question, a number of methodologies for "futures research" were considered. Fowles (1978) gives a detailed discussion of ten related approaches in the *Handbook of Futures Research*. Sackman and Citrenbaum (1972) list and rank order 26 "futures-creating" methods. The methods that were given the most serious consideration for this study were: Delphi technique, cross impact analysis, scenarios, simulation gaming, simulation modeling, technology assessment, technology forecasting, and brainstorming.

The most appropriate methods to identify possible future technological events and trends seem to be review of appropriate literature and interviews with experts, particularly those in research environments where future implementations of technology are already on the drawing boards. The most appropriate methods to assess the likelihoods of future events and trends seem to be Delphi and Cross-impact analysis. The literature in the area of futures forecasting leans strongly toward using the Delphi method. The Delphi method has been used successfully in several past forecasts of information technology. The Delphi method is a highly cost-beneficial technique for obtaining the opinions of leading experts in a given field. However, the Delphi approach has been criticized because it does not take into account interdependencies of events/trends. Cross-impact analysis does incorporate interdependencies. However, a recent Delphi study by Eschenbach and Geistauts (1985) did incorporate interactions through a scenario approach in the final round of the Delphi.

The Delphi Method was suggested as an appropriate research tool for forecasting technological changes affecting auditing in a recent article by Garsombke and Cerrulo (1984, p. 6), as follows:

> Since there is little reason to believe the rate of technological innovations will decrease, the auditor is faced with the problem previously described (i.e., how should auditing adapt to changing technology). We believe the auditor's best response to the challenge is to try to predict future changes, rather than simply react to changes as they occur. . . .
>
> The primary goal of any research project designed to address the problem outlined above should be to predict the future direction of change in certain relevant computer technologies, to the extent the change may affect auditors. We suggest using a technological forecasting tool, such as the Delphi Method, which enables one to determine the consensus of views of the future held by experts. Our expectation is that knowing experts' views, auditors will be able to better prepare for changes that are foreseen.

Research Question No. 2 is: How is the information processing environment in the year 2000 expected to impact the nature and adequacy of audit evidence? The research steps to be performed for Question No. 2 include:

5. Preliminary discussions with a selected small number of auditors to identify the likely effects.
6. Documentation of the proposed likely effects in a narrative or questionnaire format.
7. Validation of the documented effects by surveying a larger number of practicing auditors and obtaining their responses.

8. Analysis of the responses.

Preliminary Findings Concerning Information Technology

Nature of the Open-Ended Questionnaire Survey

As recommended in the literature on the Delphi technique, we sent open-ended questionnaires to small groups of experts prior to the preparation of the actual Delphi questionnaire. This procedure was designed to help ensure that the questionnaire would be as complete as possible. We used two sets of open-ended questionnaires because we believed that it was important to obtain information from both technologists and auditors. We performed a more extensive open-ended preliminary survey with auditors because there was very little literature available that referred to the future of auditing. Some of the comments made by auditors did, in fact, influence the questions included in our Delphi instrument for technologists. A copy of the questions included in our Delphi questionnaire is included in Appendix A at the end of the paper.

Open-ended questionnaires were developed at this phase of the project to obtain an unbiased list of responses from our expert respondents. One of the primary concerns of questionnaire surveys is that the wording of the questions may bias the respondent. Using an open-ended questionnaire format at the initial "event identification phase" is favored by most futures researchers.

The questionnaire and methodology for this milestone phase of the study were reviewed by consultants from the USC Center for Futures Research, who made several important suggestions. For example, due to their suggestions, the questionnaire was divided into two sections. The first part of the questionnaire asked respondents to identify the five most important changes/events/trends (within their area of expertise) that they believed would occur by the year 2000. The questionnaire for the auditing and accounting groups was modified slightly. It asked respondents to indicate those changes that would have the most impact upon the nature of audit evidence.

The second section of the questionnaire asked the experts to indicate two "less likely, but still possible," events. Prior experience of futures researchers has indicated that the responses from most experts are similar (identifying the more obvious events) unless respondents are asked to consider "the unexpected" or potential surprises. In many cases, these unexpected events or plausible surprises do in fact occur over a long time horizon such as 15 years.

Type of Technical Experts Surveyed—We surveyed 30 technologists using mailed questionnaires and in-person interviews. Our sample included experts in the areas of artificial intelligence/expert systems, applications software, database systems, data communications, computer hardware, and office automation, including information technology researchers at Bell Labs. In addition, we interviewed experts who made presentations on various emerging information technologies at a computer conference in Los Angeles.

We interviewed two experts in organizational structure and behavior. This area is important to the present study because future organizational structures are expected to have a significant impact on future information flows and audit evidence.

The preliminary findings relating to changes in information technology are divided into the following sections:

a) Office Automation and Transaction Automation
b) Data Communications
c) Computer Hardware
d) Computer Software.

Office Automation and Transaction Automation

Electronic (Paperless) Transactions and Records—The computerization of the business office paperwork and accounting records could be the most significant concern of the auditors whom we surveyed in our open-ended questionnaire. Some of them expressed difficulty in auditing electronic funds transfers at present. The potential lack of an audit trail from a paperless business office could have the greatest impact on auditing of any of the changes being predicted. Already, some companies are ordering inventory from computer to computer with no purchase order involved. Electronic checking and home banking have been explored in a number of areas. Most of the auditors we surveyed responded that a paperless or near-paperless business office would occur by the year 2000. Many believed that the change would occur first in the large (Fortune 500) companies.

Voice Recognition Input—Voice input of data before the year 2000 is predicted by some of the technological experts. It is being used in some cases by inventory counters at present. Questions are included in the survey concerning the expected usage level and reliability level of various input mediums including voice, keyboard, and optical scanning devices.

Data Communications

Data Sharing—Data sharing appears to be a primary goal in business today. Local area networks and multiuser systems seem to be dominating the hi-tech spotlight at present. Most experts agree that there is a tradeoff between data sharing and data security. A truly secure network has not been designed to date. Loss of data integrity is one issue that is exacerbated in the networking/multiuser environment. The physical design of the network can impact the security of the information system. There are presently three common types of LAN designs—star, token ring, and bus. A technical discussion will not be addressed at this time, but the star is considered to be the most secure design followed by the token ring, and then the bus. IBM has adopted the token ring design so it is expected that this design will dominate in the future. A question concerning LAN design is included in our Delphi instrument.

Communication Channel Options—Another very important communications issue is the selection of a communication channel. Using the channel already in existence, the telephone system, is certainly one option. Telephone wire (technically, twisted-pair wire) is slower and slightly less reliable than other wire/cable options. Coaxial cable is faster and more secure than twisted-pair; however, fiber optic cable is much faster and even more reliable yet. A major disadvantage of fiber optic cable (concerning networks) is that the wire

cannot be spliced to add a new node. T-1 lines are massive (1.5 megahertz) communications channels that are extremely popular with large companies. Wireless communication can be achieved via either microwave or satellite. Microwave is usually considered a local communication option. Inclement weather and static discharge can affect the reliability of the signal. Weather does not usually affect satellite communication. Questions concerning local and long-distance communication channels are included in the questionnaire.

Data Security—The security of data travelling over communication channels is a major concern. Data encryption is one possible solution. A question concerning encryption of confidential data is included in the instrument.

Communication Among Computers—Another important issue is the level of communication among computers. Will microcomputers, minicomputers, and mainframes be able to communicate with one another? Will computers made by different manufacturers be able to communicate with one another? Many companies have a variety of computers within the departments of their company. Although some departments may desire to share certain data, often they cannot. Data sharing may improve efficiency and effectiveness, but it could result in an exposure to data security risks.

Computer Hardware

Proliferation of Computers—Our preliminary findings indicate that there will be a proliferation of computers, especially microcomputers. The computers will be faster, more powerful, smaller in size, and less expensive. In other words, the trend of the early 1980s is expected to continue. These findings do not raise many *new* audit concerns; however, they do intensify our existing concerns. The problems of unauthorized data access, program access, and hardware access are certainly not going to go away and certainly could get worse. Separation of duties, one of the cornerstones of effective internal control, is becoming less and less attainable. Hardware failure and lack of adequate hardware backup will become increasing concerns as we become more dependent upon computers. Vastly improved processing speeds are likely to result from parallel processing and other innovations.

Backup Storage—A number of questions arise concerning the types of primary and backup storage mechanisms for accounting data and the location of the backup data (stored off-site/on-site). Some experts have predicted that microcomputer storage will be measured in terms of gigabytes (billions of bytes) in the very near future. Storage and backup of data on microcomputers with this much information will be critical. Microcomputer users are generally not as conscientious in backing up data, which could be a major data security risk. The trend is clearly toward a decentralized computing environment. One concern is that in this type of environment there might be a lack of standard operating procedures at some locations (e.g., backing up data daily).

Data Access—Preventing unauthorized access to data is a critical internal control issue. Password systems have evidenced vulnerability to unauthorized employees and outside hackers in recent years. Technology for biological

"passwords" such as fingerprints and voiceprints has already been developed. A question concerning the nature of access control mechanisms in the future is included in the Delphi instrument.

Computer Software

Resistance to Change—In spite of the predicted proliferation of new programs, change is not easily achieved in the software arena. Such resistance has been encountered with COBOL programming language and hierarchical database management system software. Supposedly "better" languages and database designs have been introduced. However, due to the level of investment in terms of money and trained manpower, it is difficult to replace "adequate" software. We are beginning to witness similar occurrences at the microcomputer level. DOS is the most widely accepted operating system software (for business purposes). Perhaps UNIX has some better features, but to invest the additional manpower and money, the improvements will have to be substantial. In application, software, DBASE III is certainly vastly superior to DBASE II, yet many individuals continue to use DBASE II. Will any new spreadsheet software be able to replace Lotus 1-2-3 (on a large scale)?

The benefits of new software must be substantial for a company to reinvest the money and training needed to make a change. Artificial intelligence based or natural language based software offers those potential benefits. Questions regarding the likelihood of these occurrences are included in our questionnaire.

Natural Language Programming and Expert Systems—Natural language programming and expert systems could have substantial audit implications if they become feasible on a large scale. Program review by the EDP auditor would become more simplified, but unauthorized tampering with programs written in natural language (or close to natural language) could become a greater problem.

Preliminary Findings Concerning Audit Evidence

The Open-Ended Questionnaire and Expert Auditors Surveyed

Prior to formally surveying expert technologists, an open-ended questionnaire was sent to various experts in accounting. This questionnaire was used to obtain a list of the concerns of the professional accountant as input for the eventual survey of technologists.

The (non-random) sample of accounting professionals surveyed included ten directors of internal audit of Fortune 500 companies, 20 partners of large CPA firms, and ten controllers of Fortune 500 companies. The questionnaire simply asked the respondent to list the five trends/changes/events that would have the greatest impact upon auditing which he/she expected would occur within the next 15 years.

Overview of Predicted Trends

The comments obtained centered on approximately ten different categories. The following is a list of those categories:

DESCRIPTION	NUMBER OF COMMENTS (N = 20)
1. Trend toward a paperless society with a reduced audit trail.	19
2. Increased governmental intervention in auditing.	10
3. There will be an increased number of business failures and audit failures. Auditors will be more responsible for predicting these failures. Increased litigation concerns for external auditing firms.	7
4. The financial reporting package will place a greater emphasis on forecasts over historical reports.	6
5. Increased prominence of internal control reporting.	6
6. Changes in financial reporting and information required (e.g., disaggregated data replacing financial statements, current value based reporting).	6
7. Expert Systems used in auditing.	5
8. Increased competitive pressures among external auditing firms.	3
9. Increased trend toward a world economy.	3
10. Trend toward a "Decision Support System" environment.	3

The three categories receiving the most responses—(1) paperless society, (2) governmental intervention, and (3) business/audit failures—are not unrelated. As the computerized accounting environment becomes more complex, auditing becomes more difficult. As auditing complexity increases, the likelihood of audit failures increases. And if audit failures occur, government intervention becomes more likely.

There are also several legal, regulatory/governmental, macroeconomic, and reporting issues that are of much concern. However, the primary focus of comments was with the impact of changing technology upon audit evidence and internal accounting controls. Therefore, the thrust of our research will be directed toward that area.

Potential Future Effects on Types of Audit Evidence

The following section informally discusses some suggested possible effects of potential information technology changes on future audit evidence. Information technology changes will likely have a significant effect on all seven basic types of audit evidence: physical examination, observation, confirmation, vouching or documentation, inquiries of client, tests of mechanical accuracy, and analytical tests.

Physical Examination—The most common types of physical examination are inventory observation and examination of securities. One possible change in this area is that inventory taking could be done "on-line" with voice input or laptop computers. Actually, this may help to improve auditing because a physical inventory listing could be available at the time of observation.

Physical examination of marketable securities could undergo significant change if the physical piece of paper, the certificate, is eliminated. Obviously, other audit procedures will have to be performed to establish validity and perhaps value as well.

Confirmation—Two of the respondents in our open-ended audit questionnaire stated that the reliability of confirmations would decrease in the future. Outside confirmations are one of the strongest forms of audit evidence at present. It would conceivably take significantly more audit effort to establish the validity of the asset or liability presently being confirmed. Further, despite additional audit effort, it is unlikely that the evidence gathered internally would be nearly as persuasive as the external confirmation.

Vouching/Documentation—It seems obvious that auditing in a world without cancelled checks (or even checks), invoices, purchase orders, time cards, etc. would be much different than it is today. Several partners from large accounting firms surveyed in our open-ended questionnaire argue that continuous controls monitoring, auditing at the time of occurrence of the transaction, will become essential. With a reduced audit trail, strong internal controls become more essential. A greater understanding of the computer, accounting controls, and management control systems will be required of the auditor.

Inquiries of the Client—Client inquiries are considered a relatively weak form of evidence that must be substantiated if possible. Substantiation can be difficult even now. In a more electronic environment, the situation may even worsen.

Mechanical Accuracy—In one respect, the mathematical accuracy of virtually all tab runs, spreadsheets, invoices, etc. should improve. However, client prepared electronic spreadsheets, for example, might be an area of concern. Electronic spreadsheets "look" correct, but the assumptions underlying the spreadsheets must be audited. At present, this is a very difficult procedure and audit judgment problems concerning spreadsheets are just emerging. Perhaps the software will improve in that regard.

Analytical Tests—It seems possible that we will be placing more reliance upon analytical review procedures as "hard" evidence becomes less available. More creative uses of analytical procedures may have to be developed to meet the need for audit evidence.

Observation—Observation is generally considered one of the weakest forms of audit evidence. However, observation of computer environment and general computer and office procedures may give added information of the strength of a client's internal controls.

Summary of Preliminary Findings about Audit Evidence—Three of the currently strongest forms of evidence—physical examination, confirmation, and vouching—could possibly all deteriorate in reliability and persuasiveness. It is unknown at this time whether other forms of evidence, or other types of audit procedures, can compensate for these potential losses.

This potential deterioration of evidence is occurring at a time when the complexity of business transactions (especially financial) and accounting rules is increasing. At the same time, Congress and other regulatory bodies are applying increased pressure for improved auditing.

A Tentative Scenario of Future Audit Evidence

The following tentative scenario of future information processing and audit evidence is offered merely as an attempt to provide a stimulus for discussion at the Symposium. In the final research report, such a scenario will be based upon more extensive empirical evidence from the Delphi study information technology experts and the survey of audit experts. In this tentative scenario we distinguish "highly likely events and trends" from "important contingencies," which are not highly likely but which would be important if they occur.

Highly Likely Events and Trends

Based upon the research to date, some of the highly likely events and trends that are expected to have an important impact on the future of audit evidence and auditing are:

1. Vastly increased computer power, reduced cost, and miniaturized size.
2. Commonplace usage of small, highly portable, powerful computers that telecommunicate without a hard physical connection or coupling to a network.
3. Commonplace usage of voice data entry and image processing and ultra high-speed printers.
4. Vastly increased practical use of expert systems for a wide variety of audit tasks.
5. Commonplace usage of imbedded audit monitors to flag items of audit interest on a continuous basis.
6. Vastly increased computer and information processing sophistication by management and employees.

Important Contingencies

Events and trends that are not highly likely to occur but that would have a significant impact on future auditing if they occurred are regarded as important contingencies. Some of the important contingencies that are suggested in the research to date are:

1. Uncertainties about the *specific type(s)* of (a) computer hardware, (b) software, or (c) networks that will prevail.
2. The degree of assurance that can be delivered by future systems with respect to (a) information security, (b) guaranteed privacy, or (c) backup reliability. Technological advances will greatly enhance both the sophistication of security measures and the tools available for overcoming those security measures.
3. The prevalence of expert systems and the specific arena or role of individual human judgment in auditing. Individual human judgment is likely to be used interactively with expert systems.
4. The extent of legal liability of auditors—both external and internal. The presently exploding liability costs may continue to rise or may

be controlled by various legislative, legal, social, or economic remedies.
5. The level of governmental regulation or intervention into the auditing and/or business environment. This could be affected by any major failures related to business enterprises, audits, or databases.
6. The degree of public acceptance of (or disillusionment toward) pressures for higher and higher levels of computer and technological sophistication.
7. The prevalence of the "electronic cottage" or working at home and telecommuting.

Conclusion

In summary, this paper reports on Phase I of a research project that attempts to identify and analyze the most significant information technology changes and other factors that are likely to have a major impact on audit evidence, the audit process, and the role of auditing in the next 10 to 15 years. The literature review, interviews, and open-ended questionnaires used in this phase of the research tentatively identified numerous events and trends that, if they occur, will have a significant impact on the future of audit evidence. In the remaining phase of the research, a Delphi survey will be used to measure and analyze more rigorously the predictions of a panel of information technology experts. The audit implications of these predictions will then be further tested through use of another panel of auditing experts.

In concluding this paper, we are requesting that Kansas Auditing Symposium participants—in addition to critiquing the paper in any way they deem appropriate—also provide feedback concerning (1) specific factors likely to affect future audit evidence that may have been omitted from our discussion and (2) the most likely scenario of audit evidence and the audit process in the year 2000.

Appendix A

Questions Included in the Delphi Survey

Estimation of Trends

Data Communications

1. What percentage of microcomputers and terminals will be able to communicate with any mainframe or minicomputer *made by the same manufacturer* (in the following years)?
2. What percentage of microcomputers and terminals will be able to communicate with *any* mainframe or minicomputer?
3. What percentage of microcomputers used for BUSINESS purposes will be used. . . ?

a) As stand-alone devices
b) As part of a Local Area Network or a Wide Area Network

4. What percentage of *local* data communication will be transmitted over the following channels? (Use whatever your definition of LOCAL is.)
   a) Twisted-pair wire
   b) Coaxial cable
   c) Fiber optic cable
   d) Microwave
   e) "T-1" type lines
   f) Other

5. What percentage of *long-distance* (i.e., NON-LOCAL) data communication will be transmitted over the following channels?
   a) Twisted-pair wire
   b) Coaxial cable
   c) Fiber optic cable
   d) Microwave
   e) "T-1" type lines
   f) Satellite
   g) Other

6. What percentage of local area networks will utilize the following architectures?
   a) Star design
   b) Token Ring design
   c) Bus design
   d) Other

7. Certain data are considered confidential. What percentage of the data which *you* consider confidential will be encrypted when transmitted over communication channels?

Office Automation and Transaction Automation

8. What percentage of payments will be conducted electronically by the following entities?
   a) Large (Fortune 500) corporations
   b) Medium-size companies
   c) Small businesses
   d) Individuals (consumers)

9. What percentage of invoicing and billing will be done electronically by the following entities?
   a) Large (Fortune 500) corporations
   b) Medium-size companies
   c) Small businesses

11. What percentage of business-related transaction data will be input using the following mechanisms?
    a) Keyboard
    b) Voice
    c) Communication channels
    d) External data sources (e.g., from another company's computer)
    e) Optical scanning device
    f) Other

12. What percentage of business office employees in America will telecommute? (The employee does not have to work all five days of the week at home. His/her schedule might call for working at home every other day, for example.)

13. What percentage of business and accounting data will be backed up on the following devices?
    a) Magnetic Tape
    b) Floppy Disk
    c) Hard Disk
    d) Laser Disk
    e) Tape Streamer
    f) Other

14. What percentage of companies will store back-up data at off-site premises?

15. What percentage of back-up business data will be stored on "Read Only" devices?

Hardware, Software, Other

16. What percentage of databases do you expect to utilize the following designs?
    a) Hierarchical
    b) Relational
    c) Network
    d) Other

17. What percentage of user identification/authentication schemes for gaining access to hardware or files will use the following?
    a) Personal characteristics (e.g., fingerprint, voiceprint)
    b) Possessed objects (e.g., card, key)
    c) Remembered information (passwords)
    d) Dialog (typed or spoken)
    e) Other

18. What percentage of business application software for the mainframe will be programmed using the following categories of languages?
    a) Higher level languages (e.g., COBOL, FORTRAN, etc.)
    b) Fourth generation languages
    c) Fifth generation languages (i.e., natural language based)
    d) Other

19. What level of reliability will voice input of data achieve?

20. What percentage of each category of computers listed below will have parallel processing capabilities?
    a) Mainframes
    b) Minicomputers
    c) Microcomputers

WHAT IS/ARE THE PRIMARY SOURCE(S) OF YOUR KNOWLEDGE FOR RESPONDING TO THE QUESTIONS IN THIS SECTION OF THE SURVEY? (Please rank them if your knowledge comes from more than one source.)

_____ First-hand; personal involvement in the area related to these trends.
_____ Professional literature.

_____ Oral communication; information from knowledgeable persons whose opinions you respect.
_____ Popular literature.

RATE YOUR LEVEL OF EXPERTISE ON THESE TRENDS (0 TO 10)
(0 = No Expertise; 10 = Very highly qualified)

Estimation of Events

Specify probability of occurrence for the following (0–100%)

1. SOFTWARE: Sophisticated software is developed capable of creating computer programs that solve complex analytic problems specified by a user who has only minimal computer literacy. The software system identifies the inputs needed, elicits these inputs from the user and writes the program.
2. AI: Breakthroughs in the so-called fifth generation computers result in the development of a complete artificial intelligence capability. These units speak several languages, and respond to oral questions in a wide variety of subject areas.
3. HARDWARE: Microcomputer storage capacity is measured in gigabytes (billions of bytes).
4. OFFICE AUTOMATION: Office automation reaches a level in which elimination of all paper-work from repetitive tasks is feasible for the following items:
   a) Payroll time-cards
   b) Accounts payable vouchers
   c) Expense reports
   d) Purchase requisitions
   e) Purchase orders
   f) Invoices
   g) Job Sheets (for production)

Appendix B

Sample Page from Delphi Questionnaire

Estimation of Trends

Data Communications

1. What percentage of microcomputers and terminals will be able to communicate with any mainframe or minicomputer *made by the same manufacturer* (in the following years)?

BY:	1990	1995	2000	NQ
	_____ %	_____ %	_____ %	___

2. What percentage of microcomputers and terminals will be able to communicate with *any* mainframe or minicomputer?

BY:	1990	1995	2000	NQ
	_____ %	_____ %	_____ %	___

3. What percentage of microcomputers used for BUSINESS purposes will be used. . . . ?

BY:	1990	1995	2000	NQ
As stand-alone devices	_____ %	_____ %	_____ %	___
As part of a Local Area Network, or a Wide Area Network	_____ %	_____ %	_____ %	

4. What percentage of local data communication will be transmitted over the following channels? (Use whatever your definition of LOCAL is.)

BY:	1990	1995	2000	NQ
Twisted-pair wire	_____ %	_____ %	_____ %	___
Coaxial cable	_____ %	_____ %	_____ %	
Fiber optic cable	_____ %	_____ %	_____ %	
Microwave	_____ %	_____ %	_____ %	
"T-1" type lines	_____ %	_____ %	_____ %	
Other_____	_____ %	_____ %	_____ %	

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Discussant's Response to "The Impact of Technological Events and Trends on Audit Evidence in the Year 2000: Phase I"

Stephen M. Paroby
Ernst & Whinney

My compliments go to authors Holstrum, Mock, and West for a well-written and well-thought-out paper and a project that will have a significant impact on all of us. Mark Twain once said, "It's all right to make predictions, but not about the future." Technological forecasting tends to be optimistic in the short run and pessimistic in the long run. Had this paper been written in 1970, I truly wonder if it would have predicted today's environment. However, the authors have taken a compilation of speculations that are often difficult to quantify or fully support and put them in a perspective that will certainly jar today's auditor.

Computerized systems benefit all of us in several ways. Computers process transactions with much greater consistency than is possible in a manual system. In addition, the speed and flexibility of computer processing provide wide-ranging capabilities for a timely, reliable reporting of high volumes of information. These capabilities give management greater opportunity to make informed business decisions and allow management to react quickly to and capitalize on business developments.

As the number of on-line systems and paperless transactions continue to increase, new products will continue to emerge to provide auditors with more sophisticated computer-assisted audit techniques. Advancing technology such as micro-to-mainframe communications, down-loading of information from centralized or decentralized sites, expert systems, and artificial intelligence probably will not change basic audit techniques of review and verification. What this technology will change significantly is the way auditors evaluate and test systems. The traditional approach of examining "hard" copies is neither adequate nor feasible. Computerized techniques have been developed to deal with this task. Various software programs and utilities can provide exception reports and other audit-related information. Embedded audit modules can select and verify all or a sample of transactions and generalized audit software performs calculations faster and much more accurately than we could manually. However, the consistency, speed, and flexibility of the computer can pose additional control concerns for us as auditors. These concerns include:

1. The effect of errors may be compounded. For example, the computer may prepare sales invoices by taking the quantity input and extending it by price on the sales price master file. If the program is not functioning properly (e.g., selecting incorrect prices,

performing extensions improperly), all sales invoices may be incorrect.

2. The reduction of manual involvement resulting from the presence of the computer in the process could lead to inadequate segregation of duties.
3. Audit trails may be reduced or eliminated, or may exist for only short periods of time in computer-readable form.
4. Changes to data and programs may be made by individuals lacking a sufficient understanding of the overall system of internal control and standard operating policies. Also, such changes may be made without adequate testing by a quality assurance group or without the consent of management.
5. More individuals may have access to data, a critical corporate resource. These individuals may be authorized or unauthorized. Authorized access could still lead to either errors or irregularities, and unauthorized access usually leads to computer fraud.

   As recently reported by the FBI, computer fraud ranges from three to five billion dollars annually. The average return to the perpetrator in reported crimes has been calculated at $615,000, quite a difference from the $23,000 average for manual embezzlements. As evidenced by these figures, computers can greatly facilitate the misappropriation of assets and the manipulation of information under certain circumstances.

Therefore we should keep in mind that while a computer's involvement in the accounting system or in a production process often has a positive impact, this does not necessarily mean the data it generates are correct, nor that adequate controls are in place. In most cases, control procedures will exist. However, we need to identify and test them before relying on them, just as we would in a manual system.

Also, all auditors will have to increase their understanding of computerized systems. In order to plan and execute an audit effectively, auditors will have to determine the impact of the computer on the data they are examining. In addition, they will have to gain an understanding of the controls over the processing of the data. Specifically, this will include controls over the development and maintenance of programs and controls over access to data files and programs.

Having painted the picture of what the future that is here today holds, let me focus on some of the significant changes in information technology and the paper presented by the authors. Essentially, the authors take current technology and project it forward, anticipating no new significant technological break-throughs. Clearly, in an area evolving as rapidly as computer technology, such an approach could be risky. For example, had this paper been written ten years ago, the authors may have failed to predict the revolutionary impact of microcomputer technology.

I agree with the authors that the micro-to-mainframe links and local area networks will become much more common. In addition, these links and networks will present control challenges. The more difficult task will be to predict how these technological trends will affect auditing. A clear distinction should also be made between big, unusual transactions and little, normal ones. Although the authors state that three of the currently strongest forms of

evidence—physical examination, confirmation, and vouching—could possibly all deteriorate in reliability and persuasiveness, it is unclear now whether other forms of evidence—or other types of audit procedures—will be able to compensate for these potential losses.

Computer-based information is intrinsically more reliable than printed information. Perhaps the most important effect of new computer technology will not be in a reduction in the quality of audit evidence, but a greater emphasis on computer controls to assure its accuracy and the avoidance of unwarranted reliance on computer-generated data.

Audit failures usually result from not understanding a particular transaction or class of transactions and the related processing and control systems rather than because the inventory listing does not foot. New information technology is not likely to alter this situation but in fact may compound it.

When you relate the changes in information technology that will affect future audit evidence and the impact of those changes on auditing, certain issues come to mind. Some of the specific issues that should be addressed include:

1. How to make computer technology and computer tools accessible to general auditors. In broad terms, audit evidence is what auditors examine. If auditors cannot understand computer technology, computerized files will not be considered audit evidence.
2. It seems likely that analytical review will become the centerpiece of most audits within ten years. An important aspect of increased computer technology is that clients can now accumulate and analyze a much larger amount of information than previously possible. That information makes possible much more detailed and persuasive analytical reviews. Also, through the use of artificial intelligence, more information will be gathered, synthesized, and put into useful form faster than ever before.
3. Audit coverage will increase dramatically. For example, when we test inventory extensions manually, we typically select a small sample of inventory items to recompute. If we use software tools to check the same computation, we generally test all inventory items. As we move toward more computerized auditing, the percentage of transactions we examine will increase. If we had to do it manually, audit fees would be astronomical.
4. The authors cite Weber and suggest that generalized audit software may be unavailable to run on microcomputers and minicomputers for many years to come. At Ernst & Whinney we are now using a multimachine generalized audit software package that runs on a microcomputer, as well as microcomputer software that gives us the ability to extract data from essentially any minicomputer or mainframe. That technology is here today.

Given the rapid change in technology in just the last few years, it will be almost impossible to project what the computerized auditing environment will be in the year 2000. Aside from the obvious concerns and those already mentioned (e.g., data security, lack of audit trails), some additional pervasive considerations are (1) what financial statements will look like 10 to 20 years from now and how financial information will be distributed and (2) how audits will be performed then.

Regarding presentation of financial information, several questions come to mind. For example, will shareholders and other financial statement users have continuous access (via their own computer terminals or other devices) to a company's financial information? Will audits be done entirely by computers from the auditor's office, in which case "field work" would virtually disappear except for some inquiries and observations?

Another major question is how the sophisticated technology of the future will affect the structure of CPA firms and the staffing of audit engagements. A related issue is the impact on accounting and business schools. Accounting students will need to have a much more detailed background in information systems before joining a CPA firm, and the firms themselves will need to provide increased training to supplement normal development programs. We have recently released an interactive computer-based training course, *EDP Concepts for Auditors,* designed to raise the level of computer literacy for all auditors.

How will smaller CPA firms adapt? The impact of technological change generally is not felt as quickly by the smaller firms, since their clients tend to be the last ones to adopt sophisticated technology. However, in 10 to 20 years even small businesses likely will place substantial reliance on the computer. Accordingly, the smaller firms will need to invest in the necessary hardware and software to keep pace with their clients and the rest of the profession. This increased sophistication definitely will place more emphasis on the system of internal controls. Companies will need to turn increasingly to EDP managers to make sure that adequate control systems are installed and then to their auditors for assurance that the controls are functioning.

Better communication between external and internal auditors would seem to be a necessity for coping with the changes in technology. The authors refer to "continuous control auditing." Not only would this cause us to place more reliance on internal audit, but it would seem to change dramatically the nature and timing of our tests. The authors state that "Changes affecting the nature and availability of audit evidence are occurring so rapidly that auditors have difficulty making practical plans to gradually adopt their auditing techniques and processes to deal effectively with future forms of audit evidences." Frankly, what we are doing now in terms of researching and testing new hardware and software and training personnel seems to be the appropriate course of action. Although long-range planning is important, we can realistically look only to the short term because of the rapid advancement of technology.

With tomorrow's technology here today, management's and audit committees' concerns about the computer are intensifying. Management and audit committees are increasingly asking their auditors to provide answers to such questions as: What information is being processed on our computer; why; for whom; by whom? What would happen if our computer system went down for a day, a week, or a month? What would happen if our key data processing personnel left tomorrow? Can someone with a telephone and a home computer access our confidential files? Within our organization, can only people with the need to know gain access to confidential data? Are there proper segregation-of-duty policies? To answer these and other questions effectively, it is imperative for all auditors to be more computer literate.

As an auditor, how do you respond when you ask the data processing manager how things are going and he replies:

> I had just arrived in town to bring the on-site on-line. No sooner had I brought it up than it went down. Rising to the occasion, I went downstairs and gathered my tool kit: Time Domain Reflectometer, logic probe, comm lube, and spare low-order bits.
>
> Going to the SOURCE, I TC'd the packet with some spare protocols until the EtherLink locked up TS0 and broke the SYSGEN. I slipped a Turbo Accelerator into the PC and revved it up until it executed an infinite loop in under three seconds.
>
> Coming in the back door under VMS, I broke the UNIX shell and released the ASCII characters in the error traps. Applying CSMA/CD brought the recovery rate safely below the BIOS buffer overflow. DOS recovered, and the crisis was over. . . .

Many of the skills previously reserved for a few high priests in the data processing center are now required of all of us.

6

Is the Second Standard of Fieldwork Necessary

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Touche Ross & Co.

Introduction

Today's generally accepted auditing standards were primarily framed in 1947 by the Committee on Auditing Procedure (Committee) of the American Institute of Accountants, the predecessor bodies of the current Auditing Standards Board and the American Institute of Certified Public Accountants. The standards were formally adopted by the profession at its annual meeting in September 1948.* These standards have remained in place since that time with numerous statements interpreting them adopted by the Auditing Standards Board or its predecessors. These familiar standards are organized into two general classes: (1) personal or general standards and (2) procedural standards. The procedural standards have two categories: the conduct of the fieldwork and reporting. The objective of this paper is to focus on the procedural standards, in particular, the second standard of fieldwork:

> There is to be a proper study and evaluation of the existing internal control as a basis for reliance thereon and for the determination of the resultant extent of the test to which auditing procedures are to be restricted.[1]

This second standard of field work pertaining to the evaluation of internal control is interposed between the first which covers planning and supervision of the work and the third which requires evidential matter to be obtained as a reasonable basis for an opinion regarding the financial statements being examined. Its mandate has been subject to considerable interpretations in formal statements which include:

Special Report by the Committee on Auditing Procedure *Internal Control—Elements of a Coordinated System and its Importance to Management and the Independent Public Accountant*	November 1948
Statement on Auditing Procedure 29 *Scope of the Independent Auditor's Review of Internal Control*	October 1958

* The fourth reporting standard was subsequently added and approved by the membership of the AIA (AICPA) in 1949.

Statement on Auditing Procedure 33 *Auditing Standards and Procedures:* Chapter 5—Evaluation of Internal Control	December 1963
Statement on Auditing Procedure 54 *The Auditor's Study and Evaluation of Internal Control*	November 1972
Statement on Auditing Standard 43 *Omnibus Statement on Auditing Standards:* Section 2—The Auditor's Study and Evaluation of Internal Control	August 1982

The profession has issued restatements and codifications in 1954 and 1972 in addition to the SAP 33 codification. These were derived from the pronouncements, including the above, reflecting the development of the auditors' actions.

The significance of the system of internal control has transcended auditor's and management's interest when Congress enacted the Foreign Corrupt Practices Act of 1977 which requires "devis(ing) and maintain(ing) a system of internal accounting controls"[2] for objectives that the auditing profession articulated in Statement on Auditing Procedure 54. Again, in the *Report, Conclusion and Recommendations*[3] of the Commission on Auditor's Responsibilities, the subject of internal control and its evaluation was extensively commented upon.

In addition, the standard has been the subject of considerable discussion as to whether its requirements are contained in the first and third standards of fieldwork, and thus its listing as an independent standard is confusing to those in practice. This paper will examine the evolution of the second standard as interpreted in the auditing statements and consider whether the intent of the original authors has been changed in the context of providing more precise guidance. Articles and papers exist on the subject, but the discussion developed herein is primarily based upon the officially issued statements of the profession itself.

Tentative Statement of Auditing Standards—Special Report—October 1947

In the introduction to the *Tentative Statement of Auditing Standards (Tentative Statement),* the Committee said:

> Auditing standards may be set to be differentiated from auditing procedures in that the latter relate to acts to be performed whereas the former deal with measures of quality of the performance of those acts and the objectives to be obtained in the employment of the procedures undertaken. Auditing standards as thus distinct from auditing procedures concern themselves not only with the auditor's professional qualities but also with his judgment exercised in the conduct of his examination and in his reporting thereon.[4]

This distinction has been maintained in the various reissuances of the standards, and may be the reason that the profession has a reluctance to modify or change the original standards. While not entirely comparable, it is interesting to observe in the *Attestation Standards,* recently issued by the Auditing

Standards Board and the Accounting and Review Services Committee, that the fieldwork standards have been reduced to two by absorbing the internal control concept into an element of the evidence standard.[5]

In the *Tentative Statement,* the introductory remarks applying to all procedural standards include a discussion on materiality and relative risk. In particular, the comment upon relative risk on internal check and control is significant as it states that, "The effect of internal check and control on the scope of an examination is the outstanding example of the influence on auditing procedures of a greater or lesser degree of risk of error. The primary purpose of internal check and control is to minimize the risks of errors and irregularities. . . ."[6] The Committee appeared to use this stated purpose as the underlying reason for the second standard. The Committee referred to the Statement on Auditing Procedure No. 1 issued in 1939 which states that, "It is the duty of the independent auditor to review the system of internal check and accounting control so as to determine the extent to which he considers that he is entitled to rely upon it."[7]

The Committee also stated that, "The review of internal control is one of the most important steps in proper planning of the audit. . . ."[8] The Committee recognized that the study and evaluation is to help plan the approach to evidential matter; yet it did not see fit to include it under the planning standard. I believe it is particularly significant to note the words chosen by the Committee to describe the process envisioned by the second standard: words such as outstanding, primary, duty, one of the most important. These words all indicate a standard that the Committee believed to be extremely significant.

The Committee also identified the documentation requirements that should be employed in the procedures to evidence the second standard of fieldwork: "A systematic and clear record should be made of the facts developed by the review."[9] This documentation requirement imposed by the discussion on the standard itself again seems to emphasize the importance as to which the Committee attached to the review.

Internal Control—Special Report—November 1948

A year later, the Committee issued its special report entitled *Internal Control—Elements of a Coordinated System and Its Importance to Management and the Independent Public Accountant* (hereafter referred to as the Report). I believe it is worth noting that the *Tentative Statement* and the Report were issued not as releases under the Statements on Auditing Procedure but as special reports. While the former was directed to the auditing profession, the latter was directed to the public accountant and management due to "the complementary nature of their respective responsibilities and of their interdependence upon each other in discharging those responsibilities."[10]

The Report indicates that the public accountant's review of the system of internal control serves two purposes:

> First, it enables him to formulate an opinion as to the reliance he may place on the system to the end that, by adjusting his audit procedures accordingly, he may express an opinion as to the fairness of management's financial statements; and, secondly, where the review indicates

apparent weaknesses, recommendations for possible corrective measures may be conveyed to management.[11]

This section continues with its advice which indicates that:

> This secondary aspect of his review frequently enables the public accountant to render broader services than those generally associated with his capacity as an independent reporter to stockholders upon management's conduct of stewardship responsibilities. His aid to management in attaining more efficient operation can and should be an equally important function.[12]

This duality of purpose, while not stated precisely in the second standard, was, I believe, framed in the Report in the broader context of the profession and its clients for whom services were rendered.

In the introduction to the Report, a statement is made, "In earlier periods the independent accountant frequently had to examine practically all transactions and make dozens of journal entries before reasonably accurate financial statements could be prepared."[13] This statement was made to establish how internal control had served to impact the audit in producing financial statements, and also assist management in fulfilling its responsibilities. Howard Stettler, in his auditing textbook, observed that Robert H. Montgomery, in his work, felt it necessary to prepare an American treatise on auditing as he had observed in professional practices in the United States, a growing departure from the principles and procedures expounded by Dicksee.[14] *Dicksee's Auditing* was largely directed to the balance sheet and a determination of the amount of surplus legally available to serve as the basis for the payment of dividends. Montgomery had observed that more was expected of the auditor, and a broader extension of the services of practitioners over the entire field of business activity had resulted. These comments emphasized the broader relationship that the engagement of an auditor by an enterprise had become. The *Tentative Statement* and the Report represent the culmination of a thought process on the profession's responsibilities to its clients and to society.

In *The Accounting Profession—Where Is It Headed?*, edited by John L. Carey, the role of the auditor is expressed in this context:

> The auditor, whether internal or external, plays a strategic role in the discharge of the accounting function. By tests and observation, he ascertains the manner in which the economic data are being measured, recorded, summarized and communicated, and whether all this is in conformity with the established plan. He passes judgment upon records, reports, and the performance of people, all to the end that the output of economic data be sustained at a high level of quality. Without auditing, degeneration of the accounting process sets in.
>
> The auditor also performs another important task—he looks beyond the presently established plan for carrying out the accounting function to determine whether some different or modified plan is called for by changed conditions. Organizations, methods, people, and economic environments are constantly changing; the equivalent changes occur in the actual or potential contribution of the accounting function and in the methods of discharging it. Without auditing, any accounting process is exposed to the risks of losing effectiveness because of obsolescence.[15]

Statement on Auditing Procedure No. 33—December 1963

The *Tentative Statement* and the Report remained in place as authoritative auditing pronouncements until the codification in Statements on Auditing Procedure No. 33 (SAP 33) which combined the standards, the Report and the previous Statements on Auditing Procedure into a single document. Therefore, the official position of the profession was contained in these documents for a 15-year-period until 1963.

Chapter 5 of SAP 33, "Evaluation of Internal Control," became the interpretive section for the second standard of fieldwork. The difficulty of the profession's dual role of attest for third party and services to the engaging client caused a significant rewording of the auditor's responsibility for internal control.

This codification now stated, "[a]s a by-product of this study and evaluation (of internal control), the independent auditor is frequently able to offer constructive suggestions to his client on ways in which internal control may be improved."[16] This wording arose in Statement on Auditing Procedure No. 29 which was issued in 1958. The concept outlined in the Report of equality of purpose was now stated as a by-product.

This evolution may have been influenced by a movement that was occurring within the profession: the concept of specialization, and in particular, the concept of management services. In the aforementioned *The Accounting Profession—Where Is It Headed?,* Carey includes an article by Robert M. Trueblood, "The Management Service Function in Public Accounting" which appeared in the July 1961 *Journal of Accountancy.* Mr. Trueblood makes the statement:

> Independent auditing results in the expression of an expert opinion on financial representations made by management. The CPA bases his opinion, in large part, on a comprehensive understanding and evaluation of management's system of internal control—the systems and procedures used to generate the financial information under evaluation. This expert knowledge of financial information systems and controls is requisite for the CPA's performance of a professional audit. The same expertness that is applied to sound audit performance may also be logically applied by the CPA to management consulting activities.
>
> Over the years, the performance of both the audit and management consulting, or management service, function has been an accepted practice of CPAs. Largely because of the clear connection between the knowledge required to perform a professional audit and the knowledge useful in management consulting activities, the staff performing both activities was frequently the same. Today, however, developments are taking place that tend to force a more explicit delineation of audit and management services activity.[17]

This statement indicating the thrust of the forces of the profession, I believe, has caused the second standard of fieldwork's requirements to move into the area of specialization, and thus, narrow the role of the CPA in his position as auditor of financial statements. This delineation of activity obviously has been much more pronounced as firms grew in size. While the wording of

the second standard remained the same, its interpretation had significantly changed.

Statement on Auditing Procedure No. 54—November 1972

The Committee on Auditing Procedure felt it necessary to "Amplify and clarify the application of (the second standard) in the light of subsequent developments in business and in the profession."[18] Accordingly, it issued Statement on Auditing Procedure No. 54, *"The Auditor's Study and Evaluation of Internal Control"* (SAP 54). This statement reflects the continuing difficulty faced by the profession with respect to specialization and the furnishing of advisory services and audit services directed to the examination of financial statements. Paragraph 2 of SAP 54 clearly states this issue:

> The increasing trend for certified public accountants to provide management advisory or consulting services involving the study, evaluation, and improvement of management information systems increases the need to clearly distinguish between these special services and those audit services required for compliance with the auditing standard for study and evaluation of internal control incident to an examination of financial statements.[19]

Apparently, the profession's need to compartmentalize activities with a client was a significant driving force to restate the requirements of the second standard. The certified public accountant was engaged as auditor of financial statements or as consultant on systems, and the two functions could not be delivered at the same time. The reasons for this delineation may be subject to considerable speculation. These may include the difficulty of complying with the increasing requirements for financial statement disclosures and information; the difficulty of increasing litigation; or controlling fees. The purpose of this paper is not to reflect on these causes, but they might be the subject of additional research.

SAP 54 stated, "The purpose of the auditor's study and evaluation of internal control . . . is to establish a basis for reliance . . . in determining the nature, extent and timing of audit tests to be applied in his examination of financial statements."[20] It went on to indicate:

> The study and evaluation made for this purpose frequently provide a basis for constructive suggestions to clients concerning improvements in internal control. . . . Although constructive suggestions to clients for improvements in internal control incident to an audit engagement are desirable, the scope of any additional study made to develop such suggestions is not covered by generally accepted auditing standards.[21]

Thus the concept of the second standard embracing two primary purposes as articulated in the Report and then redefined in SAP 33 as a by-product was further reduced in SAP 54 as incidental and suggesting that a special engagement should result for the study.

SAP 54 also undertook a discussion of how the evaluation mandated by the second standard interfaced with other standards. The other standard which was specifically considered was the third standard of fieldwork covering evidential matter. It is interesting to observe that in the *Tentative Statement,*

the framers of the second standard noted planning as significant, and as time has passed, it has been interpreted that the study and evaluation of internal control is significantly associated with the evidence standard. Thus, SAP 54 continued the narrowing of effort to the first purpose of the review suggested by the Report and disregarded the second.

Statement on Auditing Standards 43—August 1982

In August 1982, the Auditing Standards Board issued SAS No. 43, *Omnibus Statement on Auditing Standards* with a section entitled "The Auditors Study and Evaluation of Internal Control." In SAS No. 43, the Board clarifies its position on "the minimum study and evaluation of the system of internal accounting control contemplated by the second standard of field work" and "[t]he minimum documentation required."[22] In brief, if the auditor does not plan to rely on the system, he need not document his understanding of the system but only record his reasons for not reviewing. Thus, the most basic sequence is a minimum understanding which need not be documented, but requiring documentation as to the reasons why he did not extend his review past the minimum level which was not documented. The thrust of SAS 43 represents, again, a significant reduction from the original adoption of the standard which indicated that a systematic and clear record be made. In addition, it appears to significantly diminish the second standard's application in the audit process.

Conclusion

The second standard of fieldwork appears to have embodied a broader concept of engagement of an auditor. This is evidenced in the Report where it stated:

> Determining the effectiveness of the organization plan, division of responsibilities, and such special control procedures as budgetary controls, reports, analyses, and cost systems are among the areas which the public accountant should cover in his review. It is not anticipated that the independent auditor will be able to review all the control procedures within the course of any one audit. The review may very well be so arranged as to entail complete coverage over a period of several years. However, the review of those controls which relate directly to the accounting records should, if practicable, be conducted each year.[23]

The evolution of the interpretations of the second standard was to focus solely upon the purpose of financial statement examination and substantially diminish the purpose of communicating with management. While the profession in SAS No. 20, *Required Communication of Material Weaknesses in Internal Accounting Control,* did require communication of material weaknesses in internal accounting control[24] and evidence a continuing responsibility, it continues to move in the direction of a secondary role of communication at best.

In the *Studies in Accounting Research No. 6, a Statement of Basic Auditing Concepts* published by the American Accounting Association, the statement is made:

> An information system is a necessary subject matter attribute because it is needed to record assertions. Such a system provides a record of the actions or events which is essential to the preparer of accounting information and to the auditor for verification. The reliability of this record is enhanced if it is generated within a system of adequate internal controls. Without such controls, the verifiability standard could be tenuous, indeed.[25]

In a later section, it is noted that "[t]he system of internal control (is) of paramount importance to the auditor."[26] This is another articulation of the significance of internal control to the audit process as well as the management process.

In the Commission on Auditor's Responsibilities *Report,* a conclusion is reached that the, "Traditional association of independent auditors with annual financial statements is an obsolete, limited concept."[27] This statement is made in the context of expanding the responsibility of the audit function. The Commission would "require the auditor to expand his study and evaluation of the controls over the accounting system to form a conclusion on the functioning of the internal control system."[28] Looking back to the Report, such an admonition appears to be a call to return to basics. The formulation of the auditing standards as originally stated seems to me to embody this requirement and only the subsequent interpretations have undertaken to restrict its application. While these restrictions may have arisen from events such as the evolution of specialization in the profession and the impact of litigation as alluded to previously, it still appears that this narrowing diminishes the significance of the audit process and its relevancy to not only third parties, but also the client who has engaged us.

The *Statement on Auditing Standards No. 30* states that:

> The study and evaluation of the system of internal accounting control in an audit is generally more limited than that made in connection with an engagement to express an opinion on the system of internal accounting control. Nevertheless, an accountant's opinion on a system of internal accounting control does not increase the reliability of financial statements that have been audited.[29]

The financial statement report stands on its own at any given point in time. However, as the time frame moves forward, the significance of internal control is increased and management has the right to receive the considered opinion of its auditors. The question of reporting to users other than management has received considerable guidance, but it is independent of the responsibility of reporting to management.

While the second standard of fieldwork gives guidance on the conduct of the "current" audit of the financial statements, it also is giving guidance in reporting to management so that "future" audits would be able to be conducted. Thus, the second standard of fieldwork is necessary to the articulation of our profession's judgment of this significance, and it should be reemphasized in our professional statements and engagements.

End Notes

1. American Institute of Certified Public Accountants, *Codification of Statements on Auditing Standards*, AU Section 150.02, "Generally Accepted Auditing Standards" (1985).
2. Foreign Corrupt Practices Act of 1977, P.L. 95-213, Sec. 102 amending Section 13 (b) of the Securities Exchange Act of 1934 (15 U.S.C. 78q (b)).
3. Commission on Auditors' Responsibilities (Cohen Commission), *Report, Conclusions and Recommendations*, New York: The Commission on Auditor's Responsibilities, 1978.
4. American Institute of Accountants, Committee on Auditing Procedure, *Tentative Statement of Auditing Standards*, Special Report (1947), p. 9.
5. American Institute of Certified Accountants Auditing Standards Board and the Accounting and Review Services Committee, Statement on Standards for Attestation Engagements, *Attestation Standards* (1986) p. 4.
6. *Tentative Statement of Auditing Standards*, p. 21.
7. *Ibid.* p. 25.
8. *Ibid.* p. 26.
9. *Ibid.*
10. American Institute of Accountants, Committee on Auditing Procedure, *Internal Control—Elements of a Coordinated System and its Importance to Management and the Independent Public Accountant*, Special Report (1948) p. 5.
11. *Ibid.* p. 20.
12. *Ibid.*
13. *Ibid.* p. 5.
14. Howard F. Stettler, *Auditing Principles* (4th Ed.; Englewood Cliffs, N.J.: Prentice Hall, Inc., 1977) p. 21.
15. John L. Carey, *The Accounting Profession: Where Is It Headed?* New York, American Institute of Certified Public Accountants (1962).
16. American Institute of Certified Public Accountants, Committee on Auditing Procedure, Statements on Auditing Procedure No. 33, *Auditing Standards and Procedures*, New York (1963) p. 33.
17. John L. Carey, *The Accounting Profession: Where Is It Headed?* p. 77-78.
18. American Institute of Certified Public Accountants, Committee on Auditing Procedure, Statement on Auditing Procedure No. 54, *The Auditor's Study and Evaluation of Internal Control*, (November, 1972), p. 232.
19. *Ibid.*
20. *Ibid.* p. 233.
21. *Ibid.*
22. American Institute of Certified Public Accountants Auditing Standards Board, Statement on Auditing Standards No. 43, *Omnibus Statements on Auditing Standards* (1982) p. 2.
23. *Internal Control—Elements of a Coordinated System and its Importance to Management and the Independent Public Accountant*, p. 20.
24. *Codification of Statements on Auditing Standards*, AU Section 323.05.
25. American Accounting Association, Studies in Accounting Research No. 6, *A Statement of Basic Auditing Concepts*, Sarasota, Florida (1973) p. 5.
26. *Ibid.* p. 34.
27. *Report, Conclusions and Recommendations*, p. 59.
28. *Ibid.* p. 60.
29. American Institute of Certified Public Accountants Auditing Standards Board, Statement on Auditing Standards No. 30, *Reporting on Internal Accounting Control* (July 1980) p. 5.

Discussant's Response to "Is the Second Standard of Fieldwork Necessary"

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Introduction

Mr. Bintinger's paper is very interesting reading. The historical perspective it brings to the topic is a useful one and one often forgotten by many of us who have a tendency to treat extant practice as if it has always been and ever will be. I found the evolution suggested by this scenario intriguing. We seem to have come nearly full circle in Mr. Bintinger's mind, beginning with a limited view of the control system where audits were very much balance sheet oriented, progressing to a broad business and management orientation to client service and now to a narrower focus which Mr. Bintinger believes ". . . diminishes the significance of the audit process and its relevancy to not only third parties, but also the client who has engaged us." Mr. Bintinger's position is that

> [w]hile the second standard of fieldwork gives guidance in the conduct of the 'current' audit of the financial statements, it also is giving guidance to management so that 'future' audits would be able to be conducted. Thus the second standard of fieldwork is necessary to the articulation of our profession's judgment of this significance, and it should be reemphasized in our professional statements and engagements.

The Policy Approach and Precedence

The approach taken in Mr. Bintinger's paper can be characterized as historical or constitutional/precedence oriented [Danos, et al. 1986]. By this I mean that the argument flows by the development of the historical role of the framers of the "constitutional" elements of the auditing standards related to the study and evaluation of internal controls. This is quite clear in the statement of objectives put forth by the author:

> This paper will examine the evolution of the second standard as interpreted in the auditing statements, and consider whether the intent of the original authors has been changed in the context of providing more precise guidance. . . . [T]he discussion developed herein is primarily based upon the officially issued documents of the profession itself.

If my interpretation of Mr. Bintinger's basis of argument is correct, Mr. Bintinger's attitude towards the newly promulgated Statement on Standards

for Attestation Engagements [AICPA, 1986] is of interest. While noting the continuity of the standard setters focus on internal controls as a fundamental aspect of the audit, Mr. Bintinger introduces comments on the newly adopted *Attestation Standards* indicating that "[w]hile not entirely comparable, it is interesting to observe in the *Attestation Standards* recently issued by the Auditing Standards Board and the Accounting and Review Services Committee that the fieldwork standards have been reduced to two by absorbing the internal control concept to an element of the evidence standard." Mr. Bintinger is quite correct in noting the lack of total comparability. This point is made in the standard itself where it is stated that:

> The second standard of fieldwork in GAAS is not included in the attestation standards for a number of reasons. That standard calls for 'a proper study and evaluation of the existing internal control as a basis for reliance thereon and for the determination of the resultant extent of the tests to which auditing procedures are to be restricted.' The most important reason for not including this standard is that the second standard of fieldwork of the attestation standards encompasses the study and evaluation of internal controls because, when performed, it is an element of accumulating sufficient evidence. A second reason is that the concept of internal control may not be relevant for certain assertions (for example, aspects of information about computer software) on which a practitioner may be engaged to report [AICPA, 1986, pp. 24–25].

The anomaly in Mr. Bintinger's observation is that he ignores its position in his historical argument. The issuers view "[t]he attestation standards [as] a natural extension of the ten generally accepted auditing standards," and indicate clearly that "[t]he attestation standards do not supersede any of the existing standards . . ." [AICPA, 1986, p. 3]. As a natural extension of the historical and/or constitutional/precedence process the attestation standards should have the same weight as prior legislative action or amendment processes. In that sense they reflect the nature of the constituent desires or beliefs either as to the framers' original intent or their likely "intent" under the new environmental conditions. To oppose this line is to suggest that Mr. Bintinger intended not to call upon the historical process to support his conclusion, but to call for a strict constitutional interpretation of a past position as he sees it. Recall his comment as to ". . . whether the intent of the original authors has been changed . . . in the context of providing more precise guidance." This will leave Mr. Bintinger in the awkward position of having to decide upon which past period to focus on, those with which he agrees or those with which he does not agree. This is always the danger of a call for strict constitutional interpretations where interpretations vary over time as they seem to in this case. *If he wants to use historic precedent to support his opinion, he must, or for the sake of consistency should, accept the continuing evolution of that precedent.*

The Normative Service Approach

While generally taking what appears to be a strict constitutionalist approach, including citations suggesting the framers' original intent ". . . [using]

words such as outstanding, primary, duty, one of the most important" in describing the second standard of fieldwork, Mr. Bintinger also offers a more normative service oriented argument as well. He clearly sees the profession's responsibility to the client as running beyond the audit to a support and service activity. He also perceives that during the audit activity one of the primary means of meeting this client service function is through a broader interpretation of field standard two than he perceives as currently in place or likely to be in place given the trends evidenced by the newly promulgated *Attestation Standards*.

The difficulty with this position is not in asserting a broader role, but in using the audit as a means of implementing that role. As Mr. Bintinger points out, public accounting firms have specialized by creating large and diverse consulting practices including substantial practices in tax consultation. The profession clearly desires a broader business role than represented by auditing. The question is not in the breadth of the role, but in the means of implementation. By proposing that the second standard of fieldwork be retained to enhance that role, Mr. Bintinger proposes to use audits as a feed to the other specialized areas of consulting. Unless he can propose a criteria by which it is necessary to adhere to field standard two in order to perform a viable financial audit or attest engagement, his proposal stands as a feeder line to consulting. Mr. Bintinger did not provide such a justification in the body of his paper although his conclusion does suggest that future auditability is conditional on the implementation of the second field standard.

Auditor Incentives

The feeder orientation noted above is implicit but not developed by Mr. Bintinger except in several references to auditor incentives such as those that follow. Midway through the paper Mr. Bintinger notes that:

> [t]he reasons for this [separation of consulting on internal control from the auditing function] delineation may be subject to considerable speculation. These may include the difficulty of complying with the increasing requirements for financial statement disclosures and information; the difficulty of increasing litigation; or controlling fees. The purpose of this paper is not to reflect on these causes, but they might be the subject of additional research.

Again in the conclusion he notes that:

> . . . these restrictions may have arisen from events such as the evolution of specialization in the profession and the impact of litigation as alluded to previously, it still appears that this narrowing diminishes the significance of the audit process and its relevancy to not only third parties, but also the client who has engaged us.

I quite agree with Mr. Bintinger that the various forces that led to the current evolution of attitudes toward internal control study and evaluation may be the topic of future research. It is unfortunate that he did not focus on these issues to a greater extent in that it may be among these ideas that a normative justification for field standard two could be developed. The economics of auditing and risk sharing may provide grounds for the second standard.

It seems that Mr. Bintinger's motives are the laudatory ones of service to clients and third parties. However, a less charitable interpretation might be that his motives are for the stature and profitability of the profession to which he belongs, i.e., his special interest group. After all, his argument for retention of the field standard is that the ". . . narrowing diminishes the significance of the audit process and its relevancy . . ." and thus by extension the stature and likely future profitability of the profession and professionals. The only way to counter this motivation observation, one rampant in the Dingle Commission Hearings, is to offer arguments that support the conceptual need for the study and evaluation of internal controls beyond the level implied or suggested by the elimination of field standard two. Mr. Bintinger has offered no such arguments in the body of his paper, although as noted earlier, his conclusion alludes to the conditional nature of future auditability and the implementation of the second standard of fieldwork. He clearly believes that this service is desirable to clients and third party users.

If the service is desirable, presumably clients will pay for it when it is offered as a distinct activity. Also, presumably, if the public accounting profession is uniquely capable of offering the service at a higher value added than other consulting organizations, then public accountants will get the work and the stature and profitability of the profession will be maintained and enhanced. Whether field standard two is maintained as a separate standard or merged into the evidence field standard will have little or no impact if this is the case.

A Quality Control Argument

I was surprised that Mr. Bintinger did not offer up the quality control argument as an additional reason for maintaining field standard two. This argument would require some development of the position that a study and evaluation is essential to the audit. However, he could basically rely on existing pronouncements on this matter as none of them, including the new *Attestation Standards,* explicitly argue the contrary. Given that the need for some level of study and evaluation is established, it can be argued that without the explicit standard some auditors will be tempted to ignore the study and evaluation of internal controls even to the minimum required level. On this basis, guidance of an explicit nature is necessary to maintain a minimal quality level throughout the profession. This basic regulatory argument has been used successfully in many arenas, including the auditing arena.

A Normative Argument

This argument proceeds from the position that any audit must consider internal accounting controls, not as a feed to other service oriented matters but as a necessary condition for efficient and effective audits. I believe this to be the case in any complex organization where the computer is an integral part of the system and have elaborated on this point elsewhere [Bailey, et.al., 1984]. Mr. Bintinger does not develop this argument in the paper but does include it in his conclusion. Perhaps he has also developed this point elsewhere.

However, the fact that internal controls need consideration does not mean that the external auditor requires a specific field standard such as that under

discussion. A collapsing of this standard into the general evidential standard will in no way alter the need to consider internal controls. The consideration may be tailored to the needs of the particular audit and could involve only a very limited auditor effort in small companies or where an independent and effective internal audit function exists and can be relied upon. Much more extensive special consideration by the external auditor may be required under other circumstances. I do believe that, whatever the extent of consideration, the external auditor's role should proceed no further than necessary for audit purposes unless specifically contracted.

Conclusion

I believe that auditor involvement in the design of systems is essential to system auditability. The design for auditability function can be done by external consultants who might be a part of a public accounting firm, however, the economics of the situation alone is likely to be sufficient to cause this activity to become a part of the internal audit function in larger firms. Further, the testing of systems for compliance and reliability is necessary if these systems are to be relied upon in establishing the nature, extent and timing of substantive audit tests. Reliance on such systems becomes a more important part of the audit as systems become larger and more complex, e.g., in large organizations with highly integrated computer processing systems. Again, I believe that the economics of auditing will cause much of the testing on such systems to be done by internal auditors.

Despite the increasing role of the internal auditor, the external auditor's role will also expand in these areas and in the use of computers to support audit activity. External auditors will continue to develop design and testing criteria as well as searching for effective means of reliance on the work of internal auditors. I cannot foresee how this relationship will develop in such areas as risk sharing and litigation, but I believe that these matters will receive substantial attention in the near future.

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7

Interim Report on the Development of an Expert System for the Auditor's Loan Loss Evaluation

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Introduction

The Audit Research Group at Peat, Marwick, Mitchell & Co. has been interested in Artificial Intelligence (AI) and Expert Systems for a number of years. Under the auspices of the Research Opportunities in Auditing program, we have funded a number of academic research projects on the application of AI to the audit task. With the growing interest in the field and the advances in technology, it was decided to undertake a project oriented toward the development of an application model. The initial thrust was to build a prototype model for test and evaluation with the implicit intent that the model would eventually be developed into a useful audit tool for field work. This paper reports on that project in terms of the rationale for the project, the current status of the project, and the future directions for this project.

Rationale for Expert Systems

The rapid advances in computer technology and ensuing applications require that those engaged in the accounting and auditing profession be involved in exploring new application opportunities. Artificial intelligence and expert systems are clearly in the forefront of these technologies; however the conventional wisdom of expert system developers suggests that considered applications ought to be limited to environments that exhibit certain characteristics. For example, it is suggested that there should be clearly definable experts in the problem task, that there should be appropriate measures of correct vs incorrect judgments, and problems should be small yet have a high payoff.

The auditing environment has some unique characteristics that tend to make it a less likely candidate for successful deployment of expert systems. For example, many areas of auditing do not have a feedback mechanism that allows for determination of correct vs incorrect decisions. Auditing is more process oriented than results oriented, wherein the quality of work is judged not by results, but by traces of process to be found in the work papers. Moreover, auditors learn acceptance of processes that may diverge signifi-

cantly from their own as long as they "appear reasonable." A side effect of this is that we do not have a set of clearly defined "experts" whose technical skills find "material errors" in an audit with a significantly higher frequency than other auditors.

While these factors may mitigate against using expert systems, we do not believe they are fatal. The issue surrounding the feedback and correctness of judgments in the audit environment is, we believe, a knowledge representation issue that will clarify itself through the knowledge engineering tasks. We also believe that there is expertise, albeit spread out, and that the professed need for a singular expert is a knowledge engineering problem that can and will be addressed pragmatically as the art of knowledge engineering advances.

We believe that AI technology offers the following significant benefits:

1) *Support of Field Work:* There are any number of applications for the AI technology that, when harnessed, can be used as tools in the support of auditing field work, thereby freeing the auditor from many of the more mundane tasks and making the work of the auditor significantly more interesting. At the same time, the technology can lead to a greater consistency in the quality of field work, and hopefully reduce the time requirements for the field work.

2) *Diffusion of knowledge:* The complexity of modern auditing, as dictated by the complexity of modern business, leads to areas of audit specialization. Expertise relates to certain industries, such as banking or oil and gas, and across industries as in EDP auditing. Even within industries, there are pockets of expertise, e.g., in the banking industry there are those who are expert in auditing community banks, moderate size banks and the extremely large banks. Additionally, many banks themselves perform in specialized industries, e.g., agricultural banks, oil and gas, etc. The data or information available in these varying circumstances require varying types of expertise. It is very difficult if not impossible for one auditor to be an expert in all these areas. By capturing the expertise in specialized areas, however, we can provide knowledge where the expert is not available.

3) *Uniformity of documentation:* Through the proper design of an expert system, the required documentation to support a given judgment can be automatically provided as the output of the judgment exercise and included in the working papers of the audit. The expert system not only provides uniformity of documentation, but also frees the auditor from another time consuming and costly chore.

4) *Staff Training Aids:* Training is an extremely costly investment in a large public accounting firm. Technological advances are providing the potential vehicles for both increasing the effectiveness of training while concurrently reducing the huge costs involved.

5) *Research:* We should not forget the role of research in the design of expert systems. Designing expert systems is research oriented, in that problems chosen are seldom well enough understood to be solved algorithmically. The knowledge engineering process can and should lead us to a greater understanding of the problems, thereby advancing our knowledge.

Based on the above reasoning, a decision was made to embark on the development of an expert system that would at once provide insights into the development process, provide knowledge about resource requirements, and produce a useful audit tool.

Selecting a Project

Since the project to be developed had multiple objectives, it was agreed that the project should be of a very limited scope and nature, yet have the potential for a very high payoff. Additionally, since we were not overly committed to the expert system technology, we wanted to attempt the development at a minimal investment. The decision was therefore made to develop the model in a microcomputer environment using commercially available development shells.

Hoping for the potentially high payoff, we wanted to focus on a problem that was meaningful to our firm's audit practice and yet might be successful given the constraints we were imposing. Since bank audits are a large part of our audit practice, it was decided to focus on a problem in that area. We found that there was significant support from bank audit partners in the form of enthusiasm and willingness to invest expert bank auditors' time and cooperation. This was considered important, since we knew the development work would require a considerable amount of time and effort from bank experts at no small cost.

The next issue was to settle on a specific problem. We were guided by two considerations: 1) the problem had to be small enough to accomplish within a reasonable time, and 2) it had to be sufficiently important within the context of a bank audit. An area of bank audits that filled both of these requirements was the loan loss evaluation, the process of estimating the dollar amount of the reserve for the bank's portfolio of loans. This problem is basically a classification problem, which is a type of problem that has been successfully attacked by rule based systems before. (Most commercially available development tools for microcomputers are rule based.)

Project Description

Since we did not have an in-house AI capability for the development of such a system, we contracted the project to an outside consultant. The consultant's project proposal suggested the following stages of development:

1) Review current literature.
2) Develop a preliminary model of the loan loss evaluation process.
3) Implement the preliminary model as a computer program.
4) Extend knowledge acquisition to include the process of expert loan evaluation.
5) Combine knowledge into a final task expertise model and complete prototype expert system.

The proposal initially indicated that the above stages would require nine months to complete, employing one full-time consultant with the availability of audit experts in the loan loss evaluation task. To date we are somewhere in the fourth stage. What follows is a description of our model and how the system works.

Description of Model

For ease of reference, we have named the model CFILE, for *c*redit *file* analysis. The current working model is based on the conceptual model shown in

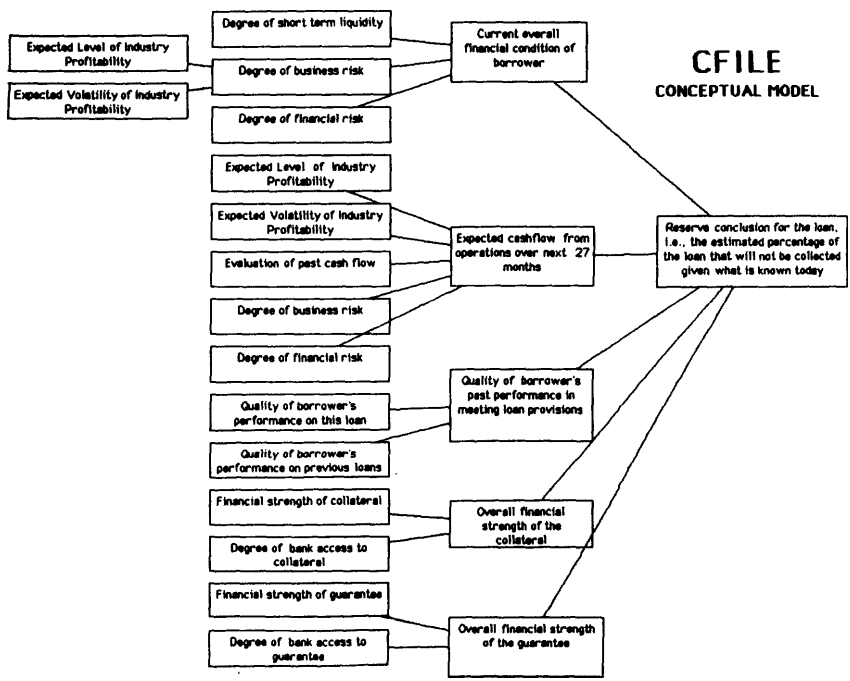
Figure 1. The model is modularized and illustrates the various factors considered when making the reserve judgment. The first column of factors to the left of the reserve conclusions are 'level one subgoals' and the second column of factors are 'level two subgoals' which affect the level one subgoals. For example, the conclusion on the current financial condition of the borrower is based on conclusions concerning the borrower's short term liquidity, finanical risk, and business risk. These judgments are reached internally by the model with the exception of the industry profitability and volatility, which temporarily are user inputs.

The consideration underlying the control structure of CFILE is efficiency. Efficiency is often considered one of the hallmarks of the expert. Like an expert, the model is designed to arrive at a conclusion as soon as possible with the minimum amount of information.

A session with CFILE begins with screens explaining the purpose of CFILE and what it will do. Immediately following this explanation, the user is asked for some basic information about the loan including its size, due date, and what kind of collateral and/or guarantees exist relating to the loan.

What CFILE asks next depends on the answers to the initial questions. If, for example, it is indicated that there are bank deposits pledged as collateral, CFILE will ask a series of questions about those bank deposits. These include questions about both access and financial strength, which are the two 'level two subgoals' relating to collateral. CFILE will want to know whether or not the bank has the legal right to dispose of the collateral in the event of a default. It

Figure 1



might also ask if those bank deposits were pledged as security for another loan. If the model concludes that there is adequate access to those deposits and their strength is sufficient to cover the loan, the analysis would stop with a no-reserve decision.

If the bank deposits were not sufficient, the model would start dealing with the three 'level one subgoals' that are needed to perform an analysis on an unsecured loan: current financial condition, overall loan history, and expected net cash flow. The model would ask the usual questions about hard data such as the current ratio of the borrower and would also ask about soft information, such as whether or not the borrower is planning any major projects that are going to be financed through the use of current assets. Again, how many of these subgoals would be pursued and to what extent would depend on the situation. For example, if the loan were due in the next 12 months and the borrower had a very strong current financial condition, no reserve would be necessary and the system would conclude without asking any questions about loan history or expected cash flow.

The system has some other interesting features. In general the questions are asked in abbreviated form. This is useful for the experienced user who will be familiar with the system. For example, the question about major projects alluded to above would appear as illustrated in Figure 2. However, help screens are available to provide more details and guidance to understand the question. The help screen for the same question as shown previously appears in Figure 3.

Another feature of the system is the ability to do limited sensitivity analysis. It is possible for the user to see how sensitive the conclusion is to a particular question. For example, one might be interested in determining the impact of the loan officer's opinion of the borrower's liquidity (see Figure 4), given an otherwise constant set of input judgments.

Figures 5 and 6 illustrate the conclusion reports provided by the model. Both conclusions came from identical information except for the response to the question noted in Figure 4. One can see that, in this case, the answer to the question had a fairly substantial impact. There is a difference in the evaluation of current financial condition which leads to different conclusions. In one case, we find an evaluation of the current financial condition of the borrower as weak and a conclusion of a 25 to 34 percent reserve before considering collateral. In

Figure 2

PMM—CFILE Preliminary version 2.02 November 25, 1985

Select what describes:

current assets used for new commitments

MMM no

yes

2 UNKNOWN 3 REPORT 4 EXPAND 5 MENU 6 HELP

Figure 3

PMM—CFILE

Based on your judgment, is there a significant chance the borrower will use a substantial amount (i.e., at least 25 percent) of current cash, accounts receivable and marketable securities or incur a significant amount of new short term liabilities for commitments to finance a major new project?

A major new project could be an acquisition, stock repurchase, an expanded advertising campaign or plant expansion program. A yes response would also be appropriate here if the borrower is involved in a continuing problem situation (e.g., a legal dispute) such that it is possible (FASB #5) that a new significant liability will emerge for the borrower.

enter no if any new commitments will not use significant current assets or generate significant new current liabilities.

enter yes if new commitments will use significant current assets or generate significant new current liabilities.

2 RESTART 5 GO BACK 6 HELP 7 EXIT

Figure 4

PMM—CFILE

Based on your judgment, if a set of financial statements were to be generated as of today, do the comments provided by the loan officer suggest to you that the loan officer, based on his/her knowledge of the borrower's current financial condition, believes the borrower is in a strong, moderate or weak short term liquidity condition?

enter

strong if the loan officer believes the short term liquidity condition of the borrower is strong

moderate if the loan officer believes the short term liquidity condition of the borrower is moderate

weak if the loan officer believes the short term liquidity condition of the borrower is weak

2 RESTART 5 GO BACK 6 HELP 7 EXIT

Figure 5

PMM—CFILE Conclusions

Client Name: ABC BankCorp
Audit Period: 12-31-85

Borrower: XYZ Company

Analysis prepared by Joe Auditor on 12-1-85

Extent of available information is adequate.
Based on the available information, the following factors are indicated:

Industry prospects: expected profitability = moderate.
expected profit volatility = high.

Intermediate conclusions (scaled from very weak to very strong):
Current financial condition is weak.
Future cash flow potential is weak.
Borrower's past loan performance is moderate.

The amount of the loan is $150,000.

The loan is covered by bank deposits having an accessible value of $100,000. Of this, $90,000 is considered available to cover the loan.

No guarantee is available for this loan.

A reserve of 25 to 34 percent of the loan would appear appropriate, if it were unsecured. After considering the collateral available, no reserve would appear to be required.

I agree with the conclusion suggested by the system and the underlying reasoning.

_____ preparer.

Figure 6

PMM—CFILE Conclusions

Client Name: ABC BankCorp
Audit Period: 12-31-85

Borrower: XYZ Company

Analysis prepared by Joe Auditor on 12-1-85

Extent of available information is adequate.
Based on the available information, the following factors are indicated:

Industry prospects: expected profitability = moderate.
expected profit volatility = high.

Intermediate conclusions (scaled from very weak to very strong):
Current financial condition is moderate.
Future cash flow potential is weak.
Borrower's past loan performance is moderate.

The amount of the loan is $150,000.

The loan is covered by bank deposits having an accessible value of $100,000. Of this, $90,000 is considered available to cover the loan.

No guarantee is available for this loan.

No reserve appears to be required.

I agree with the conclusion suggested by the system and the underlying reasoning.

_____ preparer.

the other we find a moderate evaluation leading to a no-reserve conclusion even before the collateral is considered.

This facility is useful to both user and developer. It gives the user, who is uncertain about the appropriate response, the ability to see the impact of alternatives without repeating a lot of data entry. It gives the developer a tool for testing the reasonableness of the rules in the system.

Perhaps the most important feature in this system is the user's ability to find out why a question is being asked. Through function key, one can look at the rule that has caused a specific question to be asked, and in turn ask about that rule. Figure 7 illustrates the screen that would appear asking about the loan officer's view of the borrower's liquidity. In this way it is always possible for the

Figure 7

PMM—CFILE Preliminary version 2.02 November 25, 1985
The highlighted fields indicate the antecedent
and conclusion being pursued.
The rule currently being pursued is:

RULE 3850
IF
MMM quick ratio is (are) weak
AND current ratio is (are) moderate
AND current ratio trend is (are) decreasing
AND loan officer liquidity judgment is (are) strong
THEN
stliquid is (are) very strong CF 0
AND stliquid is (are) strong CF 0
AND stliquid is (are) moderate CF 100
AND stliquid is (are) weak CF 0
AND stliquid is (are) very weak CF 0

2 ALL RULE 3 OR CLASS 4 FORWARD
5 GO BACK 6 HELP 7 EXIT

user to understand the line of reasoning that the system is using. This not only allows the user to understand the basis for the conclusion the system reached but facilitates review and avoids the blanket acceptance or rejection that is common with algorithmic systems. The model becomes a transparent box which is essential to the audit review process and it places the user in a position to be able to make constructive criticism, which may aid in further system development.

Limitations of Current Model

The current model has limited capabilities that have resulted from design decisions intended to keep the project manageable. CFILE applies only to loans due on demand or within one year and are either unsecured or secured by bank deposits or marketable securities. The model requires two years of audited financial information or three years of unaudited financial information from the borrower and is limited in its ability to perform and integrate cash flow analysis into its decision process. The model is further limited by its inability to deal with situations involving bankruptcy and liquidation analysis.

These limitations resulted from design decisions made early in the project and compose a major portion of the work yet to be performed. Again, our intent was to build a working prototype model that we hoped would be easily expanded to cover situations through the addition of modules to the knowledge base. It is envisioned that the prototype will then be of assistance in future knowledge engineering work.

With the prototype model working, it was decided that we should test the system against the modeled 'expert' to determine how well we captured the

experts' decision model. A field test of CFILE was carried out in late February and early March of 1986.

Field Test of CFILE

For a number of reasons dealing with logistics, time constraints and purpose, the field test was not set up as an experimental design but rather as a pilot test to determine if we were on the right path with our model. It provided the opportunity to deal with actual loan files in bank audit environments and to compare how different auditors performed the tasks in process as well as judgment.

The testing was carried out at four of our client banks. Two of the banks are large regional banks and the other two are smaller community banks. A total of 16 cases were chosen either from client's listings of unsecured loans or with the assistance of the local audit team. First priority was given to loans which had a reserve allocated to them either by the audit team or by the bank's internal loan review department.

Each case was reviewed by three subjects, two at the partner level and one at the senior accountant level. The partners chosen were from our bank audit practice. One of the partners was the 'expert' employed in the development of the model. The other partner had only a cursory understanding of the model. The senior accountant had neither bank audit experience nor knowledge of the model to be tested. Our intent here was to see how much the model might assist the novice in the field and the senior accountant level is the appropriate level for performing this task during an actual audit.

Cases were reviewed first without the use of the model and then with the use of the model by each of the three people. Unfortunately, one of our partner subjects, the 'expert', was unable to participate at the first bank setting due to illness and therefore only evaluated ten of the 16 cases.

The results of the test are summarized in Figure 8. By way of explanation, CFILE uses nine reserve classifications expressed in percentage: no reserve, 1 to 10, 11 to 15, 16 to 24, 25 to 34, 35 to 44, 45 to 59, 60 to 74, and 75 to 100 percent. All analyses of the data were made using these ranges. If the reserve suggested by the subject fell into the same range or on the border, the comparison was marked OK. If the reserves fell in different ranges, the number of ranges by which they are different is noted. Starred entries indicate that one party suggested a reserve and the others did not. In addition the cases were analyzed for a comparison of the reserve vs. no reserve decision.

Comparisons were made between individual judgments with and without the use of the model. This comparison allowed us to consider how closely the unaided partner's judgments agreed on the same loan and how closely the non-expert's judgment agreed with the partners. Additional comparisons were made between the partner's judgments without the model and between the senior's judgments with and without the model in order to determine if the system was moving the non-expert judgment closer to the partner judgment. The loans were also analyzed according to whether no reserve or some reserve was required without respect to the reserve amount in order to test how the model did on the reserve vs. no reserve decision.

CFILE TEST RESULTS

Loan	Primary Bank Eval	Expert Partner w/o CFILE	Expert Partner w/ CFILE	Expert Partner Difference	Second Partner w/o CFILE	Second Partner w/ CFILE	Second Partner Difference	Senior w/o CFILE	Senior w/ CFILE	Senior Difference	Partner Divergence	Average Ptr Judgement (AP) w/o CFILE	AP vs. Snr w/o CFILE	AP vs. Snr w/ CFILE
D2	n/a	n/a	n/a	n/a	0	0	OK	0	0	OK	n/a	0	OK	OK
D3	0	n/a	n/a	n/a	0	0	OK	0	0	OK	n/a	0	OK	OK
D8	n/a	n/a	n/a	n/a	0	0	OK	0	0	OK	n/a	0	OK	OK
D10	0	n/a	n/a	n/a	0	0	OK	10	0	*1	n/a	0	*1	OK
D11	0	n/a	n/a	n/a	0	13	*2	18	20	OK	n/a	0	*2	*2
D13	0	n/a	n/a	n/a	10	0	*1	20	0	*2	n/a	10	1	*1
P1	0	0	13	*2	0	0	OK	25	52	2	OK	0	*3	*4
P3	2	0	0	OK	0	13	*2	0	0	OK	OK	0	OK	OK
P4	66	67	67	OK	75	67	OK	60	40	1	OK	71	OK	1
P6	52	75	87.5	OK	50	87.5	2	60	13	4	1	62.5	OK	5
M-P1	n/a	0	0	OK	0	0	OK	0	0	OK	OK	0	OK	OK
M-P2	n/a	0	0	OK	0	0	OK	0	0	OK	OK	0	OK	OK
M-D4	n/a	0	0	OK	0	0	OK	0	0	OK	OK	0	OK	OK
M-D5	n/a	0	0	OK	0	0	OK	0	0	OK	OK	0	OK	OK
M-D6	n/a	87.5	87.5	OK	90	52	2	70	87.5	1	OK	88.75	1	OK
M-D7	n/a	0	0	OK	0	0	OK	0	0	OK	OK	0	OK	OK

Note: Evaluations are given in percentages of the outstanding loan balance.
Differences are in number of CFILE categories (as discussed on page 3).
Starred differences also indicate a disagreement about the reserve vs. no reserve decision.

SUMMARY STATISTICS	Expert Partner w/ & w/o CFILE		Second Partner w/ & w/o CFILE		Senior w/ & w/o CFILE		Agreement between Partners		Average Partner Judgment vs. Senior w/o CFILE		Senior w/ CFILE	
ALL CASES												
AGREEMENTS	9	90%	11	69%	10	63%	9	90%	11	69%	11	69%
DISAGREEMENT	1	10%	5	31%	6	38%	1	10%	5	31%	5	31%
AVE. CATEGORIES DISAGREEMENT	1		1.8		1.8		1		1.6		2.6	
RESERVE VS. NO RESERVE DECISIONS												
AGREEMENTS	9	90%	13	81%	14	88%	10	100%	13	81%	13	81%
DISAGREEMENT	1	10%	3	19%	2	13%	0	0%	3	19%	3	19%
CASES WITH RESERVES												
AGREEMENTS	3	100%	1	33%	1	20%	2	67%	2	50%	1	33%
DISAGREEMENT	0	0%	2	67%	4	80%	1	33%	2	50%	2	67%
AVE. CATEGORIES DISAGREEMENT	0		2		2		1		1		3	

Figure 8

Summary of Results

The following table summarizes the results of the individuals' judgments compared to the model's judgments when the model is used by that individual.

	All Cases		Res vs. No Res		Reserve Cases	
	Agree	Disagree	Agree	Disagree	Agree	Disagree
Expert partner	90%	10%	90%	10%	100%	0%
Second partner	69%	31%	81%	19%	33%	67%
Senior	62%	38%	88%	12%	20%	80%

In terms of the test's first objective, i.e., determining whether the system is consistent with the judgments of the designated expert, the results are very positive. On ten loans, the model's judgment is consistent with the expert partner's judgment nine times. Reserve vs. no reserve decisions were consistent in 90 percent or nine out of ten loans. In three cases where the expert and the model both suggested a reserve, the reserve amounts are in agreement. On the one disagreement, the model suggested a reserve of 11–15 percent while the partner suggested no reserve. We interpret these results as very positive and we intend to expand the scope of the model to produce a significant audit tool.

The second partner's percentages do not look quite so good in terms of agreement with the model. The second partner evaluated 16 loans and agreed with the model 11 times while disagreeing on five of those loans. These results become much more positive, however, when viewed in relation to other data. First of all, the percentages improve when looking at the agreement between a reserve vs no-reserve judgment. Here the model disagreed on only three loans. If we then scrutinize the degree of disagreements we note the model was never more than two classifications away from the second partner.

In attempting to explain the disagreement we note that the two partners' judgments, independent of the model, agree in nine of ten or 90 percent of the cases, (with only one classification separating them on the one disagreement). Since the use of the model is the only variable, and we know that the model is constant when given the same inputs, we hypothesize that the problem is not in the model itself, but in the user/model interface. We explain this as follows. The expert partner, who was instrumental in the design of the model, fully understands the questions and the impact of the responses on the model since he essentially wrote the questions. The other users of the system only had the cryptic wording of the questions and the help screens to indicate what the questions intended to ask. To support this hypothesis, we looked at the model's consistency of performance across users. We have 42 runs of the model which consisted of running ten cases three times, once by each subject and six cases two times by the subjects which we designate as partner-2 and senior. This provides us with 36 two-way comparisons. Of these 36, 20 runs involving ten of the 16 cases had complete three-way agreement. All of these agreed on zero reserve. In the additional 16 comparisons, involving only six of the cases, the consistency of the model was significantly different, agreeing with itself only five times or 31 percent of the time when a reserve is indicated.

Based on this it appears that the model performs well on the easy cases that require no reserve, but struggles when the case becomes more difficult and

where more user judgment comes into play. While one reason for the degradation may be the user interface, we also suspect that the depth of the knowledge base may be inappropriate, thereby requiring too much user judgment in interpreting what the model is asking for. If the model were sufficiently robust to deal with facts rather than user judgments about, for example, the strength of the current ratio, we would expect that a good deal of the inconsistency would disappear. Yet another cause may be the attempt to be too specific about the amount of the reserve. In attempting to specify the ranges, it is possible that we have overrefined by attempting to be more specific than the experts themselves. While this may be a cause, we tend to discount it somewhat since there was no definable pattern to the disagreements between the model and the users. The model was not consistently higher or lower nor off by one or two classifications. The differences appeared to be more random, leading us to believe that the shallowness of the model's knowledge coupled with the user/model interface are the major problems.

We could apply the same analysis to the figures associated with the senior subject performing the task; however, in this case, we are not primarily interested in whether the model agreed with the senior. Since one of the objectives of the model is to improve the inexperienced decision maker's ability to emulate the partner decision, the more important data deal with how the senior's judgment independent of the model compared to the partners' judgment independent of the model, and then how the model altered the senior's judgment in relation to the partners'.

The data indicate that the senior's unaided judgments agreed with the partners' unaided judgments in only 69 percent of the cases. This, of course, is expected based on experience and knowledge of the senior. Ideally, when using the model, the senior's judgments should be closer to the partners' decisions. The data show that the model did alter the senior's decision in four of the cases; however, the model moved toward the partners' decision on only two loans and moved further away from the partners' decisions on the other two loans. While these results are inconclusive, we again hypothesize that the interface or communication problem cited above is the major culprit. In any event, negative conclusions should not be drawn on the basis of this test. Further testing with improved user interface will provide more insight in this matter.

Summary of Field Test Results

Based on the results obtained from the field test, we conclude that the model performs very well within the stated limitations of the design and when used by the expert who was involved in the design of the model. We must also conclude that the model performs less well in the hands of others.

This problem can be thought of as an interface or communication problem that may be very simple to rectify, or may require a considerable amount of effort. The solution lies in determining how to structure the questions in such a manner that, given a specific loan, user responses to the model's questions will be consistent. To obtain the solution, existing questions may need to be restructured and/or users may need more training in the use of the model. A

third and more time consuming solution is to enhance the model's knowledge base to a depth that allows the model to work from more basic information.

Additional Insights from Field Testing

Through observation and recording verbalized protocols of certain cases, we were able to gather additional knowledge that a) lends more support to our hypotheses above and b) provides a focus for the immediate development work that is required. Since the analysis of the protocols is not yet complete, we will informally discuss these in the following paragraphs.

We are pleasantly surprised in finding that our bank partner's unaided judgments agreed in nine of ten loans and disagreed by only one reserve classification on the tenth. We are fortunate that this one case is included in the six cases for which we have protocols, and these protocols provide a plausible explanation for the partner's disagreement.

The second partner made reference in the protocol to having just recently read an article in a leading business journal concerning the borrower's history of problems, actions taken, and forecast for their survival. (In a later discussion we found he had read the article on the airplane in route to the lending bank's city.) The expert partner made no such reference to any additional outside information. The article provided an optimistic outlook for the company's ability to turn its problems around and survive in its market. While both partners recommended a rather high reserve (75 and 50 percent), the second partner was lower, perhaps indicating the impact of the article on the amount of his reserve judgment. This would indicate the need for the model to account for more soft data in greater detail than currently available. This is further supported in other parts of the various transcripts.

While we have not yet completed our analysis of the protocols, they appear to provide clear evidence of a significant weighting differential based on two primary characteristics of data: the recency of the data in relation to the date of evaluation, and the independence of the source of the information. While this is not terribly surprising, it is surprising in that the degree of change in the weighting appears to be significant. While we have not yet drawn any conclusion, it appears at this point that the model will have to account for these information characteristics.

Another fact that is becoming increasingly evident is the need for the model to deal with cash flow. It was originally thought that cash flow projections would not be a significant factor until we expanded the scope of the model to longer time horizons. Our protocols clearly indicate otherwise. In fact, as soon as a loan is considered to be a candidate for a reserve, the cash flow model comes into play. Furthermore, as the loans become increasingly suspect, there is a point when the partners change to a liquidation model, attempting to determine how much the bank may salvage from a liquidation and/or bankruptcy proceeding. These are important considerations even within our limited scope model.

Conclusions

We are basically pleased with the results of our field test not only because they indicate the model provides results consistent with the expert, but also

because we believe that the model will provide significant assistance to the senior in the field. While we are aware that in the longer term the model's knowledge base must be expanded depthwise, we also believe that many of the user/model communication problems can be rectified through a restructuring of questions and help screens, as well as training of the intended users.

Our intention is to pursue the development of this model in three directions: a) to improve the interface to the point we can release the model to the bank practice personnel for more extensive field tests, b) to improve the model's current scope by increasing the depth of its knowledge and provide the ability to deal with the cash flow and liquidation requirements, and c) to begin expanding the scope of the model to handle other types of security and time horizons.

Discussant's Response to "Interim Report on the Development of An Expert System for the Auditor's Loan Loss Evaluation"

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It is a pleasure for me to comment on the paper by Kelly, Ribar and Willingham. As someone who has spent a major part of the last five years in expert systems research, it is good to see this technology begin to impact audit practice. I will make one caveat before I proceed. There are times in my discussion where I raise questions about or criticize this work. In those instances, please recognize that I am fully cognizant of the difficulties of doing this type of research and, more importantly, sympathetic with those difficulties.

Before discussing the specifics of the paper, I would like to make a few overall comments on this work. The research by Kelly, et al. is noteworthy for three reasons. First, it demonstrates the application of expert systems technology to an important audit problem, the assessment of loan loss reserves. Application of this technology to auditing is important because public accounting firms are facing a more competitive environment that will require audits to be conducted with the same level of effectiveness but with increased efficiency. Relatedly, the types of decisions auditors face today are more complex (e.g., EDP auditing) and require more expertise. Expert systems are intended to assist with such complex decisions.

Second, since this is a proprietary system, it is especially noteworthy that Peat Marwick is willing to share the details of the system with academics and practitioners. Until recently, many public accounting firms were unwilling to share these types of developments with the public. I make a point of this because I believe that it is important to our profession to disseminate research and that it should be a two-way street.

Finally, this paper shows that public accounting firms are willing and able to build expert systems. This realization was also brought home to me at the recent expert systems conference at the University of Southern California where Coopers & Lybrand demonstrated an expert system for deferred taxes [Shpilberg and Graham, 1986]. For that project, Coopers & Lybrand hired a full-time computer scientist to assist in developing their system. By bringing their enormous resources to bear on the problem, they were able to construct the system in approximately a year. Peat Marwick has been able to do a similar sort of thing with CFILE. In spite of the generous support from Peat Marwick's Research Opportunities in Auditing grants, most academics who are developing expert systems have faced much longer development times. This raises a question about whether academics any longer have a competitive

advantage in developing these systems or whether some type of joint collaboration is necessary. If the second alternative is the most appropriate, then academics have to ask themselves whether this work is research or consulting. My thoughts on this question are that as long as sound research issues are addressed and no limitations are placed on the dissemination of those results, the work qualifies as research.

My specific comments on the paper will center on three topics: the rationale for expert systems, the CFILE model, and the field testing.

Rationale for Expert Systems

Successful development of expert systems requires that certain characteristics be present in the problem domain. These include acknowledged experts, an ability to extract their knowledge, some measure of the correctness of the decision, and manageable problems with high payoffs. Kelly, et al. properly point out that auditing does not have all of these characteristics. For example, in auditing it is very difficult to state *specific* criteria by which to label someone an expert. This is unlike domains such as chess or certain specialities in medicine. Thus, there is some difficulty with identifying an expert(s) to assist in designing a particular system. This is further compounded by the fact that auditing is "process oriented" and two experts may solve the problem differently. Hansen and I [Hansen and Messier, 1986a, b] have encountered some of these problems in developing and testing EDP-XPERT.

In addition, the ability to extract the necessary knowledge from the expert is perhaps the most difficult and time consuming part of constructing an expert system. Given that in auditing we have difficulty identifying an expert and the fact that two experts may solve the problem in different ways, knowledge acquisition poses a major hurdle for constructing expert systems.

Finally, the fact that many audit judgments do not have outcome feedback about the correctness of the decision is an important characteristic for expert system development in auditing. Kelly, et al. argue that this is "a knowledge representation issue that will clarify itself through knowledge engineering tasks." I am not convinced that this is true in all instances. In the loan loss reserve situation, the auditor will get feedback (not immediately, of course) about the collectibility of this short term loan. This situation is probably not true for areas such as the reliability of internal controls (manual or EDP), evaluation of inherent risk, analytical review, or similar areas where expert systems are currently being developed. The absence of a true criterion value by which to evaluate the goodness of the expert system's decision poses the greatest difficulty in validating expert systems in auditing. Note that in validating CFILE, the system's judgments were compared against the expert or the user's unaided judgment rather than against the true outcome of the loan.

The comments just made should not be interpreted as an indictment of the use of expert systems in auditing. They are intended to point out that construction of an expert system is not an easy task. Individuals and firms who decide to build such systems must recognize that this process is long and costly in terms of both time and money[1]. However, I agree with Kelly, et al. that expert systems technology does offer some significant benefits for public accounting firms.

In that vein, I would like to discuss the benefits that Kelly, et al. believe will result from the application of expert systems. They suggest five potential benefits: support of field work, diffusion of knowledge, uniformity of documentation, staff training aids, and research. I will limit my comments to diffusion of knowledge and research.

Expertise in any discipline is usually a scarce commodity. The complexity of auditing today requires individuals within firms to develop expertise in specific areas. Kelly, et al. mention this in the area of banking. Most of my expert systems research has involved the work of computer audit specialists. I am sure we could identify a long list of audit areas where experts exist, and I am fairly certain that future development in auditing will only increase this trend. My point here is that perhaps the greatest potential benefit of expert systems is the ability to provide the expert's knowledge to novices. In auditing, most of the expert's knowledge is not textbook knowledge. Most of it is experiential knowledge accumulated over many years. If firms are able to capture this type of knowledge and make it available throughout the firm, there may be cost savings and improvements in audit effectiveness and efficiency.

Kelly, et al. underplay the role of research in designing expert systems. As they point out, the problems chosen for expert systems development are generally not well understood and the knowledge engineering process can contribute to our understanding. My experiences indicate that the process of developing the knowledge base can provide a major contribution to our understanding of the specific problem and auditor decision-making in general. For example, a number of audit researchers have used a Bayesian formulation for modeling auditor judgment. However, two recent studies by Biggs, Messier and Hansen [1987] and Biggs, Mock and Watkins [1986] that were conducted to develop a knowledge base for expert systems seem to indicate that expert auditors do not follow a Bayesian revision process. Instead they seem to use "reasoned assumptions" and "analogies" to arrive at decisions. This finding not only has implications for modeling auditor judgment but also the type of model used in the inference engines of expert systems. So from a research perspective, I think that construction of an expert system for a complex problem will contribute immensely to our understanding.

The CFILE Model

The section of the paper which describes the CFILE model leaves a number of important questions unanswered. For example, what expert system shell was used to develop CFILE? On what basis was this shell chosen? What type of evidence accumulation model is contained in the inference engine? Is this evidence accumulation model appropriate for auditing? How many rules are contained in the system? Additionally, there is little discussion of how the knowledge was captured from the expert.

The answers to these questions would be helpful to our understanding of the system. For example, the answer to the question concerning the type of model used in the inference engine. It is not clear in the expert systems literature [Gordon and Shortliffe, 1985; Shafer and Srivastava, 1986] which type of model should be used to accumulate evidence in problem domains where some degree of uncertainty exists. Information about the model would

provide insight into the reliability of the system's reasoning process. Based on the presence of "CF" factors in the rule shown in Figure 7, I can speculate that the inference engine contains some type of Bayesian process. This is exactly the model that has come under recent criticism in the expert systems literature. However, I am sympathetic with the authors. When expert system developers decide to use an expert system shell, their choice of models is severely limited.

Similarly, if we knew how many rules were present in the current prototype we would have an idea about the number of questions the system asks the user. This question is important because if the system contains a large number of rules there is always some question concerning the consistency of the rule base. The rule contained in Figure 7 is numbered 3850. I am quite certain that the system does not contain that many rules. Obviously, there is some numbering convention within the system. However, a close examination of the rule contained in Figure 7 would suggest that the system does contain a large number of rules. Rule 3850 contains four antecendent conditions and there appears to be five possible categories (e.g., very strong, strong, etc.) for each antecedent. This would suggest that there are 625 possible combinations of this rule.

The system does appear to have some important capabilities. The questions posed by the system are asked in an abbreviated form for users familiar with the system. The less experienced user is assisted by help screens which provide more information on the question. This feature should improve usage of the system. It should also increase consensus in the way the questions are answered since there will be less chance that two users will misinterpret the question and respond differently even though the circumstances are similar.

Two other features appear quite interesting. The ability to do limited sensitivity analysis should prove very useful. Since expert systems are intended to support rather than replace experts, the ability to do this type of analysis should lead to improvements in decision making. I also found the final report generated by CFILE to be very comprehensive. The report not only contains the conclusions about the reserve but it also contains important information on the variables that led to that conclusion. Thus, the report can be used for audit documentation.

I am a little disappointed with the system's explanation capability. Early research demonstrated that experts were interested not only in a system's conclusion but how the system arrived at the conclusion. I suspect that expert auditors will require a similar capability.[2] CFILE's ability to respond to why a question is asked is typical of most expert system shells. The response is a limited parse (see Figure 7) of the rule that led to the question. It would be more helpful to the user if the system could provide an explanation in a more user-friendly manner.

Field Test of CFILE

As I mentioned earlier, the validation of expert systems in auditing will represent one of the major challenges for implementation of such systems. Before expert systems will be adopted for use in the field, public accounting firms will have to be sure of the system's reliability (i.e., ability to yield a

correct answer a high percentage of the time). The difficulties with validating expert systems were alluded to earlier. In many auditing areas, the outcome to a particular problem is not immediately known with certainty or may not be known for some time in the future (usually after the audit report has been issued). As a result, it is not possible in many audit settings to test the correctness of the expert system's decision. The alternative in these situations is to compare the system's conclusions with those of the expert. Note that this testing is similar to earlier behavioral research on consensus.

I will not take exception with the fact that the field test of CFILE did not use a formal experimental design. Buchanan and Shortliffe [1984] have suggested that the validation process must be undertaken throughout the life of the system and that the evaluations should get more formal as the expert system is developed further. The authors admit that the system is still in the early stages of development.

My comments are first directed at some relatively simple changes that could have been made or added to the testing. First, it would have been interesting to compare the results from the three subjects (expert partner, second partner, and senior) with the conclusions reached by the audit teams on each of these clients. Second, it should have been possible to use loans from previous years where the client had already determined the amount collectible. In this instance, the subjects' aided judgments could have been compared to a known criterion. Both of these extensions would have provided increased external validity for CFILE's performance.

In terms of the results of the field testing, the system does an excellent job of replicating the expert's judgments. CFILE agreed with the expert in nine of the ten cases. However, performance decreased with the second partner (69 percent) and the senior accountant (62 percent). Additionally, most of the favorable performance is found on cases where no reserve is the suggested answer. Seven of the ten cases evaluated by the expert without CFILE result in a no reserve answer and the second partner agreed with all of those cases.

I am not sure how valid it is to look at the reserve versus no reserve results. It seems to me that differences in the size of the reserve is an important criterion to measure because it relates to materiality. Certainly, the results that examine only the cases with reserves are not very encouraging. However, these results are quite limited since they only include three cases for the partners.

Kelly, et al. contend that the differences in the performance of CFILE can be attributed to two possible causes: (1) interface or communication problems and/or (2) the depth of the knowledge base. The first cause is correctable but may be more difficult than the authors speculate. Hansen and I have encountered this problem in some of the recent field testing of EDP-XPERT. Sometimes the wording of the question (and its explanation) can cause the user to misinterpret what is being asked or cause the user to make an incorrect assumption. We might expect this type of problem in an area such as auditing where there are no "natural laws." I do not know if there is an easy solution to this problem. Adequate training with the system may be one alternative.

The second cause, depth of the knowledge base, is an even more difficult problem. The authors acknowledge that the current prototype has a number of limitations (e.g., cash flow and bankruptcy analysis) and that there is a need to

refine the knowledge base to handle more basic information. However, the results indicate that the system handles easy cases (i.e., no reserve) quite well. The difficulty occurs when the system encounters a case where more judgment is required (i.e., the situation where a reserve for the loan is required). It is such loans that are of real interest to the auditor. From my perspective, it appears that it will be necessary to do some detailed refinements to handle the more difficult cases. As a suggestion for future testing, it would seem appropriate to add more cases where a reserve is necessary. It is important to test the boundaries of the system's capabilities.

It is unfortunate that we do not have more detail on the protocol data. It would be interesting to compare the decision processes of the two partners, both with and without the use of CFILE. Such an analysis might provide important insights into expert auditor decision-making.

This last comment raises an important area for future research: auditor expertise. While a lot of effort has been devoted to developing expert systems, relatively little research has examined expertise. There are a number of questions that we are unable to answer at this time. For example, how does an expert become an expert? We know very little about this process. How do expert auditors categorize their specialized knowledge? Do experts use different types of memory structures than novices? Answers to these types of questions will improve our understanding of expert decision-making and may contribute to building better expert systems[3].

Summary

Kelly, Riber and Willingham should be commended on this work. Construction of an expert system is a long process full of many ups and downs. I look forward to seeing the results of the ongoing development of CFILE.

End Notes

1. It should be recognized that there will also be ongoing maintenance costs for updating the knowledge base after the system is introduced into the field.

2. In the questionnaire used in Hansen and Messier [1986b], the question "An expert system when fully developed *should* be able to explain decisions to auditors" received the second highest agreement score: 1.59 on a -2 (disagree) to $+2$ (agree) scale, out of 13 questions.

3. There is a growing recognition in the expert systems literature [Buchanan and Shortliffe, 1984] that a better understanding of *how* experts solve problems may be necessary before expert systems achieve expert level performance.

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8

The Work of the Special Investigations Committee

R. K. Mautz

In describing the work of the Special Investigations Committee, I must assume that you already have some understanding of the SEC Practice Section of the American Institute of Certified Public Accountants, its purpose, structure, and self-regulatory program. If that is a false assumption, there will be time for questions during the evening. I warn you, however, that you ask at your own peril. My interest in this remarkable effort is such that you may learn a great deal more than you ever wanted to know about the profession's self-regulatory program.

Initiation of the Special Investigations Committee

When the AICPA's Division for CPA Firms was first created by resolution of Council in 1977 with an SEC Practice Section and a Private Companies Practice Section, the organization of the former Section did not include the Special Investigations Committee. The self-regulatory program relied completely on peer review for the improvement of audit practice, supplemented, of course, by the Section's membership requirements. Peer review was an adaptation of the internal inspection programs utilized within many firms to assist them in maintaining a uniformly high quality of audit work throughout what, in some cases, was a dispersed and decentralized practice.

One of the first matters identified by the Section's Executive Committee for consultation with its Public Oversight Board related to the action to be taken by the Section with respect to an alleged or possible audit failure by a member firm. What investigative activity might or should the Section undertake and what possible disciplinary action should be imposed? To provide you with a basis for appreciating the sensitivity of this issue, let me take a few minutes to discuss litigation from the viewpoint of a CPA firm.

The Litigation Problem

With exceptions so rare as to be nearly nonexistent, no one sets out to do a bad audit. Professional opinions differ as to the amount of audit work required under varying sets of conditions, judgments with respect to the propriety of accounting methods, provisions, and estimates are not always the same, and the work is often performed, unavoidably, under pressures of time, client concern, and plain old uncertainty. Consequently, there is almost no audit that is

completely secure from criticism, no matter how diligent and professional the effort.

Combine these facts with a legal system that permits class action suits proposing damages of staggering amounts, and assessing joint and several liability so that the CPA firm may be charged not only with the share of any loss that its activities may have caused but with the entire loss, whoever was primarily at fault, and accountants' concerns increase. Now recognize that litigation under our present legal system is an extremely complex undertaking with many factors besides professional performance of audit work in compliance with established standards bearing on the outcome, and you can begin to comprehend in some small degree why CPA firms resist every and any action, however otherwise desirable, that they believe will weaken their ability to defend themselves in the face of litigation.

Historically, the AICPA has taken the position that it should keep clear of litigation involving members unless the suit was perceived as a threat to the profession as a whole. The rationale justifying its position is that the legal system is fully equipped to determine the validity of allegations of audit failure, and certainly far better provided with mechanisms and means to protect the rights of all parties to such a contest than could be any organization not possessing equal authority and means. Hence, possible charges of ethical misconduct against members for alleged audit failures are held in abeyance as long as the member is involved in litigation.

One more factor requires consideration. At the time the SEC Practice Section was faced with this problem, litigation against major CPA firms was increasing in number and in financial importance to the point where such actions were considered highly newsworthy. The financial press, which had for many years shown little interest in accounting, was then featuring stories alleging audit failure accompanied by substantial losses to investors and others, and some critics of the profession were crying for stern reprisals.

The POB Recommendation

In brief, these were the realities facing the new SEC Practice Section and the Public Oversight Board when the Section addressed its question to the Board. What should the Section do in the way of self-regulatory measures when charges alleging audit failure were filed either in civil litigation or by a regulatory agency? The POB's response was prompt and to the point. The following words are taken from the POB's annual report for 1979–80.

> After extended study, the Board concluded that protection of users of audited financial statements should be the dominant consideration in any action taken by the Section with respect to a possible audit failure. The Board recommended that a permanent committee be established to monitor, and to determine what action, if any, should be taken with respect to alleged or possible audit failures involving member firms. The principal purposes of the committee and its monitoring efforts would be to determine whether facts relating to any audit failure indicate that auditing standards are inadequate or that the quality controls of the member firm need strengthening. In developing these primary purposes, the Board concluded that disciplinary proceedings directed toward the punishment of a member firm were of less immediate

importance, particularly in view of the fact that the firm and individuals involved in an audit failure would be facing punitive and compensatory actions by governmental and regulatory bodies and by private litigants. Nonetheless, the Board recommended that the Section have the authority to institute formal disciplinary proceedings in those circumstances where such action is deemed appropriate, notwithstanding the pendancy of litigation or governmental action.

The SIC—Composition and Operation

The Section accepted the recommendation of the Public Oversight Board and appointed a nine-member committee composed of active and retired partners, all with extensive audit experience. By the rules of the Section, member firms are required to report litigation charging deficient audit performance to the Section within 30 days of receiving notice of such litigation. Accompanying this notice is a copy of the official complaint. Staff members assigned to the Special Investigations Committee forward copies of the complaint to the members of the committee and proceed to prepare a summary of the case including the staff's recommendations for action by the Committee.

Though few in number, some cases are so without merit that no investigation is required. Rather the case is closed on staff recommendation plus a reading of the allegations and financial statements by committee members.

For most cases, the chairman of the SIC at the next meeting assigns the case to a one or two-person task force to work with the staff in formulating a recommendation to the committee. Working with the staff, task force members read the complaint, the relevant financial statements and any press notices and, in case of an investigation by a regulatory body, any available releases. They may also and frequently do meet with representatives of the firm to learn how the firm has responded to the charges, read the most recent peer review report on the firm's quality controls, and may meet with members of the peer review team to obtain additional information. The task force does not have the right under normal conditions to see the working papers or interview the staff members involved in the audit in question. In a few instances, firms have made personnel who participated in audits that are the subject of litigation available to a task force, but this is the exception rather than the rule. At the date of this presentation, SIC members have no authority to "investigate" the case in litigation. Their concern is with the subject firm's quality control system only.

The Confidentiality Requirement

Two points deserve attention here. When the SIC was first established, the profession's concern for litigation resulted in a requirement for complete confidentiality for SIC activities. Members of the committee are not to discuss matters under investigation with anyone other than committee members and members of the staff who serve the committee. No one attends committee meetings but its members' staff and representatives of the POB. Within a meeting, discussions are free and open. The POB staff keeps itself and the POB members fully informed on developments as SIC inquiries proceed. Once the SIC has completed its work on a "case," all working papers and notes are destroyed.

Recall that the purpose of the SIC investigation is not to try the case; that is left to the judicial system. Its purpose is to determine, first, whether the professional literature is lacking in instructional material to aid professionals in responding to similar circumstances; second, to discover whether weaknesses exist in the design of or compliance with the quality control system of the firm involved. Neither of these purposes, at this time, is considered to require access to the audit work papers of the case under litigation or to the personnel involved in that audit.

Confidentiality and SEC Oversight

The Securities and Exchange Commission is charged by the Congress with responsibility for oversight of the CPA profession. In meeting that responsibility, the SEC staff has access on a stratified random sample basis to selected peer review working papers and to the working papers of the POB staff resulting from its peer review oversight activities. The SEC does not have access to SIC working papers nor to the working papers of the POB staff in the performance of its oversight with respect to the activities of the SIC. The SEC staff takes the position that without some access to SIC activities, it is foreclosed from formulating any valid conclusion as to the effectiveness of that committee. The SEC staff has refused to accept unsupported statements from the POB that the SIC is functioning effectively and well. Time after time we have been told that if the SIC is ever to be accepted as an effective part of the self-regulatory program, some way must be found to provide the SEC with more access than it now has. That would constitute a breach of confidentiality that the member firms have not as yet been willing to accept. Negotiations are still in process. It seems inevitable that a solution to this impasse be found if the self-regulatory program is to be fully accepted.

SIC Courses of Action

In the original organization document for the Special Investigations Committee, provision was made for an initial investigation of the implications of the case that could be followed by (a) a continuing monitoring of the case for subsequent developments, (b) an investigation of the firm, or (c) an investigation of the case. Monitoring was utilized when it appeared that the investigations of a regulatory body of some kind might produce information relevant to the committee's final decision and not otherwise available to the SIC. When the information available to the committee was such that there appeared a strong likelihood that the firm's quality control system had not been effective, the committee could call for a special investigation of the firm's quality controls. This might run to a review of the firm's quality controls with respect to a given industry, a given office or offices, or the work of specific professional personnel. Just what an "investigation of a case" might entail was not clear.

Not long after it began operation, the committee found it necessary to undertake a limited number of investigations of firms (which soon came to be referred to as "special reviews"). A number of these have now occurred. Needless to say, no firm desired to be the first one investigated by the SIC and to this day, no firm seems to welcome a special review. They do occur, however, and I will describe their results in a moment.

No investigation of a case took place, however, and none has to date. As the committee acquired experience with these matters and as the philosophy of self-regulation developed, the members of the SIC became convinced that they could perform their function satisfactorily without ever undertaking an investigation of a case. That is, their purposes, as stated above, could be met with special reviews directed at the firm's activities in a given industry, or at the functioning of specific offices or personnel, without going directly to a case in litigation. That is where the matter stands at this time.

Effect of a Special Review

What results from a special review? First, consider the obvious fact that the self-interest of any firm is best served by bringing damage control to bear on a problem as rapidly as possible. Contrary to the apparent expectations of some critics, this does not consist solely of employing the best legal talent available, although that may be necessary. If there is a weakness in a firm's quality control, it must be repaired immediately or additional damage may occur. If that weakness is one of personnel rather than system, repairs are still necessary. This may involve transfers of personnel, other changes of assignment, remedial training, improved supervision, or, in some cases, termination of employment.

In most cases, by the time an SIC review of a firm has been mounted, the firm has already taken measures to shore up its system of quality control. Where this has not yet occurred, recommendations by the SIC are unequivocal and are followed up to assure that whatever the deficiency in quality control was, it no longer constitutes a threat to the public that relies on the firm's audit opinions.

Professional Acceptance of the SIC

How has the work of the Special Investigations Committee been accepted by the members of the SEC Practice Section? At the beginning, it met with very mixed enthusiasm. There was general recognition among the member firms that something of the sort was needed. The attention being given to allegedly unsatisfactory audits demanded that the profession have a mechanism for dealing with them, and there was more than a suspicion within the profession that strengthened audit procedures were both possible and needed. But when your own firm is the one threatened with the need for and the cost of a special review, then the "dedication" of the SIC bordered on "over-zealousness." With time, however, and the necessity of responding in writing to the findings and recommendations of a special review, there has come a reluctant but general recognition that the SIC is a necessary and useful part of the self-regulatory program.

SIC Procedures

What happens at a meeting of that committee? After some preliminaries by the chairman and the senior staff member present, generally designed to bring the committee members up to date on developments within the Institute and the Section that bear on the work of the Committee, the chairman leads into an

organized discussion of the cases on the committee's agenda. Each member assigned to serve as or on a task force reports on activities concerning that case since the last meeting. That activity may have been a discussion with firm representatives, with the leader of the team for the most recent peer review, or, in the case of a special review, a visit to an office to supervise the review of quality controls and audit work papers. The intent in reporting is to convey to the rest of the committee the understanding acquired by the committee member so that when he offers a motion either to close the case, to monitor it, or to initiate a special review, the rest of the committee will be in agreement.

Some cases are closed rather quickly because the allegations are so general as to have no real meaning and the review of the financial statements in question shows no deficiencies related in any way to the allegations. Others remain open for some time while a variety of inquiries take place and the committee member assigned satisfies himself that he has learned everything necessary to make a reasonable and supportable recommendation to the committee.

Quality of SIC Activity

How satisfactory is the work of the committee as an essential part of the self-regulatory program? Overall, I regard it as an essential feature of that program. SIC work is generally of very high quality. The astuteness and dedication of the chairman, the quality of the staff, and the support of the section's membership are all important. Ultimately, however, the work is done and the recommendations are made by the members of the committee. Any committee of nine members selected from different firms and possessing different backgrounds of experience and authority will experience some unevenness in its work as those members undertake their assignments. The chairman and the staff can do much to overcome shortfalls in diligence and pursuit, but not all.

The committee has been blessed with high quality members and with some whose concern for the profession is genuine and apparently limitless. I continue to be impressed at what people who love and respect their profession and have high standards can accomplish in making others aware of the necessity and the opportunity to bring about change.

A Personal Evaluation

I attend almost all SIC meetings and occasionally participate in task force meetings with firm representatives. I think of SIC members as secret heroes. Questioning fellow practitioners from other firms about the quality of their work is seldom pleasant and can be very difficult. Refusing to accept ready answers, penetrating to the heart of possible failures, hanging on to a line of questioning until satisfactory answers are received are far from easy. And all this must be done with the utmost confidentiality. There is no discussing one's work with one's partners. SIC members received few plaudits; there is no fan club. But those who have served a term on that committee and have performed to the best of their ability have made an important contribution to the well being and to the environment of the profession, and they have strengthened the self-regulatory progam immeasurably.