

1990

Auditing Symposium X: Proceedings of the 1990 Deloitte & Touche/University of Kansas Symposium on Auditing Problems

University of Kansas, School of Business

Rajendra P. Srivastava

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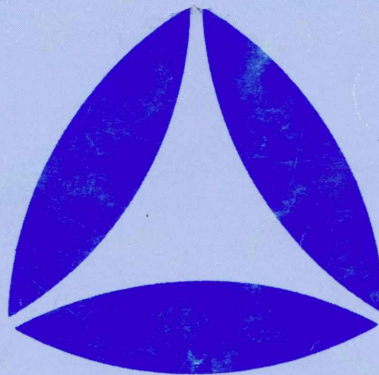
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Auditing Symposium X

Proceedings of the 1990
Deloitte & Touche/University of Kansas Symposium
on Auditing Problems

Edited by

Rajendra P. Srivastava



The University of Kansas, School of Business

Auditing Symposium X

**Proceedings of the 1990
Deloitte & Touche/University of Kansas Symposium on
Auditing Problems**

Edited by
Rajendra P. Srivastava

**May 17 and 18, 1990
Division of Accounting
School of Business
University of Kansas
Lawrence, Kansas 66045**

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This issue of the proceedings is
dedicated to the memory
of
Rodney A. Kessler,
Partner,
Deloitte & Touche,
for his enthusiasm, commitment, and dedication
for the auditing symposium and the accounting program
at the University of Kansas

**1990 Deloitte & Touche/University of Kansas
Auditing Symposium
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Willingham, John J., KPMG Peat Marwick
Wilson, Beverley, University of Kansas
Wright, Arnold M., Northeastern University
Zebda, Awni, Louisiana Tech University

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James K. Loebbecke

Preface

I begin by dedicating this issue of the proceedings to the memory of our friend Rod Kessler, Partner, Deloitte & Touche. Rod graduated from the University of Kansas with a B. S. in accounting in 1975. He died of a heart condition two days after the 1990 Auditing Symposium. We are deeply saddened by his untimely death. He will always be remembered for his enthusiasm, commitment, and dedication for the symposium and for our accounting program.

The 1990 symposium was the tenth of the series of biennial auditing symposia held at the University of Kansas. Nineteen-ninety was a special year for us because of a five-year \$300,000 grant from the Deloitte & Touche Foundation to support the auditing symposium, a faculty fellowship, student fellowships, and the introductory accounting course. We would like to thank the Deloitte & Touche Foundation for their generous support. In particular, we would like to thank Ed Kangas, Managing Partner of Deloitte & Touche, Todd Rossel, Partner in the National Office, David Hunerberg, Managing Partner of the Kansas City Office, and the late Rod Kessler, Partner in the Kansas City Office, for their support.

Continuing with the tradition of the Kansas symposium, topics relevant to both academics and practitioners and individuals serving as presenters and discussants were selected after extensive consultations with faculty members at the University of Kansas and professionals in auditing at other universities and in practice. In particular, I am indebted to my colleagues in the accounting area, Bruce Bublitz, Lyn Cravens, Allen Ford, Betsy Goss, William Salatka, Tim Shaftel, Chet Vanatta, and Beverley Wilson, for their valuable assistance in planning the symposium. Special thanks are due to Jim Waegelein, another of my colleagues, who very happily served as a co-chairman for the 1990 symposium. Also, I would like to express my thanks to Dorothy Jones and Susan Carlson for their secretarial help, to Val Alexander for her editorial assistance, and to the graduate students in accounting for their general support.

The symposium started with a paper on professional ethics and concluded with a panel discussion on "The Impact of Mergers of Accounting Firms on the Auditing Profession." Each paper was critiqued by a discussant. Maintaining the symposium tradition, we selected a practitioner to be the discussant for a paper by an academician and vice versa. However, in the case of the paper "Illegal Acts: What is the Auditor's Responsibility?," we had two groups of discussants. In addition to the regular academic discussant, three students who were selected as the Deloitte & Touche Symposium Fellows responded to the paper. The selection of these symposium fellows was based on their academic performance and personal interviews. The 1990 symposium was unique with the introduction of student discussants and a panel discussion.

All papers, except for the keynote speech by Ed Kangas and the papers presented during the panel discussion, were distributed in advance. Each paper was allocated about 90 minutes – 20 minutes for the presenter to summarize

his or her observations and conclusions, 20 minutes for the discussant's remarks, and about 50 minutes for open discussion with the participants. As expected, the open discussion provided the opportunity for lively discussion and debate by the distinguished participants on many of the major issues confronting the profession.

About fifty-five invited participants were present each day of the two-day symposium. A roster of the participants is given before this preface. Also, a number of observers, such as doctoral students, faculty members from accounting and other disciplines, and practitioners in the area, attended parts of the symposium. We would be pleased to receive an indication of interest from those who might like an opportunity to participate in a future symposium.

The proceedings of each of the symposia except the first are still in print and may be purchased from:

Kansas Union Bookstore
University of Kansas
Lawrence, Kansas 66045

Proceedings are shipped only on a prepaid basis. The 1990 symposium proceedings are priced at \$15.00 each. The prepaid price covers mailing costs with the exception of orders outside of the United States and Canada, in which case an additional \$3.00 for each copy should be included for surface transportation. For the benefit of those who may wish to refer to a paper in one of the previous volumes the contents and prepaid price of available proceedings are given below.

Rajendra P. Srivastava

Contemporary Auditing Problems (1974) \$5.00

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

Auditing Symposium III (1976) \$5.00

1. An Auditing Perspective of the Historical Development of Internal Control
Willie Hackett and Sybil C. Mobley
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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. Sorokin
5. Has the Accounting Profession Lost Control of Its Destiny?
D. R. Carmichael
6. The Role of Auditing Theory in Education and Practice
Robert E. Hamilton
7. Resolving the Auditor Liability Problem—An Appraisal of Some Alternatives
Richard H. Murray
8. Observations on the State of Shareholder Participation in Corporate Governance
Barbara Leventhal

Auditing Symposium V (1980) \$7.00

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

Auditing Symposium VI (1982) \$7.00

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

Auditing Symposium VII (1984) \$8.00

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

Auditing Symposium VIII (1986) \$10.00

1. Historical Perspective-Legal Liability
Paul J. Ostling
2. Assertion Based Audit Approach
Donald A. Leslie, Stephen J. Aldersley, Donald J. Cockburn and Carol J. Reiter
3. Product Differentiation in Auditing
Dan A. Simunic and Michael Stein
4. Unresolved Issues in Classical Audit Sample Evaluations
Donald R. Nichols, Rajendra P. Srivastava and Bart H. Ward
5. The Impact of Emerging Information Technology on Audit Evidence
Gary L. Holstrum, Theodore J. Mock and Robert N. West
6. Is the Second Standard of Fieldwork Necessary?
Thomas P. Bintinger
7. Interim Report on the Development of an Expert System for the Auditor's Loan Loss Evaluation
Kirk P. Kelly, Gary S. Ribar and John J. Willingham
8. The Role of the Special Investigations Committee in the Self-Regulatory Process
R. K. Mautz

Auditing Symposium IX (1988) \$10.00

1. Using and Evaluating Audit Decision Aids
Robert H. Ashton and John J. Willingham
2. Audit Theory Paradigm
Jack C. Robertson
3. Why the Auditing Standards on Evaluating Internal Control Needed to be Replaced
Jerry D. Sullivan
4. Auditor's Assistant: A Knowledge Engineering Tool for Audit Decisions
Glenn Shafer, Prakash P. Shenoy and Rajendra P. Srivastava
5. Reports on the Application of Accounting Principles- A Review of SAS 50
James A. Johnson
6. Auditor Evidential Planning Judgments
Arnold Wright and Theodore J. Mock
7. The Relative Importance of Auditing to the Accounting Profession: Is Auditing a Profit Center?
Norman R. Walker and Michael D. Doll
8. Accounting Standards and Professional Ethics
Arthur R. Wyatt

1

New Global Realities and Their Impact on the Accounting Profession[†]

Edward A. Kangas*

Deloitte & Touche

It's great to come back here. Back east we don't have a sky like this. You can't see the clouds on the horizon because you can't see the horizon. It's different. I remember so many things about my days at KU, five of the best years of my life. Some of the people here helped me get to where I am, and a lot of faculty members such as John Tollefson, Joe Pichler, John Blocker, Howard Stettler, Arno Knapper, and a bunch of others were very important to me. I learned a lot of things here about business, accounting and finance, but I learned a lot more about things that I have reflected on with my colleagues a number of times: The importance of communication and the ability to write. Leadership is a team sport. Sometimes in life, in business and life, taking the trip is more important than the destination. I learned about the power of consensus. I learned the fact that in many organizations power flows up, not down. I don't know if I would have learned all this any other place, so I have very special feelings about this University. So I thank you for being here.

My purpose is to talk about one of my favorite topics: the accounting profession. I am not going to talk about auditing because there are too many people here that know more about auditing than I do. But I am going to talk about auditing firms, and some things that I call the new global realities that have impacted our firms, our markets, our clients, causing us to rethink the way we are organized, what we do, how we do it, and what we are all about. I've identified fourteen or so, such realities, just by simply reflecting back on what it is that I have watched happen in the last ten years for sure, but maybe for the last three, four, or five as they became more intense. Let me start. I'll go through them quickly.

Individually, I think you're going to find that none of these are earth shattering, and I doubt that I am going to tell you very many things that you don't know. If you take them together, however, and paint the mosaic of what has confronted the profession, and especially the big international, multi-national accounting firms, I think you may get a sense of just how much buffeting, or

[†]This paper is an audio transcript of the keynote speech delivered by Ed Kangas at the symposium.

*Edward A. Kangas is Managing Partner of Deloitte & Touche. We are very proud that Ed graduated from the University of Kansas with B.S. (1966) and M.S. (1967) in accounting.

as John [Tollefson] would say, just how much whitewater, these firms have been through, and what we are still facing over the course of the next four or five years.

First new reality: The world is balanced. In the mid 1800s the sun never set on the British Empire. The world was centered in London. After World War II, the world was clearly centered politically in Washington and financially in New York. We Americans for many years believed that that's what the world was about. In fact, when we talked about auditing or talked about auditing firms, they really were U.S. firms with overseas branches. We never wanted to say it, but that's the way many behaved. Well, things have changed. A new sun is rising in the Asian Pacific. Tokyo and the Japanese are a powerful economical and political force, with growing strength in Korea and Taiwan and all through the Asian Pacific. Europe is gaining strength with its consolidation and its economy in general. So today we have a very, very balanced world, both politically and economically.

Number two: Specialization. We have talked about specialization for years, but it has come home to roost in the auditing firms. It used to be that everyone wanted to be a generalist. Then we went through a phase in most of the big firms that we focused on industry practice. Well, it's gone a step further than that. Today, if you want, for instance, to focus on health care, you don't just focus on health care. You often have to have expertise in managed care, or HMOs, or some subset of health care. Today you don't just specialize in financial institutions or financial industries. You don't even focus simply in securities. You may have to become an expert in the unit investment trust. The degree of specialization that is driving the firms, especially the larger firms, is significant and is going to continue. It has its advantages. The market demands it. Therefore, it is easier to sell services. The services are probably more efficient when done by specialists and people that focus on them. The quality tends to go up and as a result of the efficiency associated with it and the value, that determines higher prices, you are more efficient and make more profits. The drive toward specialization is significant, but it flies somewhat in the face of what the young people joining the profession want to do with their careers.

Number three: Technology. I won't dwell long here; most of you are very familiar with the advancements. The impact of technology at our clients and how they do business and the way the firms go about using technology to audit is still in what I call the embryonic stages. In the next five years we will see a major, major change in the way the major firms use technology in the conduct of their auditing business.

Number four: The world is becoming seamless. We are clearly not there yet, but the signs are there. Just think about Europe 1992. They may not do all they set out to do, but they will make strides. Barriers will come down, as with the U.S.-Canadian trade pact, and in the Eastern European countries. There's constant pressure to remove trade barriers with Japan. The movement of the trend is clear. The world from the business and financial trading perspective will become more seamless as time goes by.

Number five: Globalization of the big multinationals. Ten years ago companies really weren't multinational companies. They were huge. They had

primary headquarters in the U.S. or the U.K., or wherever they were, and they had overseas branches and subsidiaries. Generally, the overseas branches operated as self-contained companies with their own manufacturing, distribution, marketing, accounting, etc. systems. As a result of that, companies could have the same auditor worldwide, or they could have different auditors in different countries. It was up to them. Well, the world has changed in the last three years, maybe four. It's changed primarily because of telecommunications and computers. Today it's possible for the big multinational companies, if they so choose, to operate in truly one global enterprise. They may design their product in Germany, buy raw materials in Brazil, manufacture in Mexico, distribute all around the world, get their debt financing in London and their equity financing in New York. They behave as one intertwined ball of yarn, all driven by on-line computer and telecommunication systems that have in fact allowed them to operate as one entity.

Number six: Global financial markets are driving global financial reporting standards and the globalization of these big multi-nationals is driving global audits. More and more companies in fact cannot have audits done by one auditor in one country and even refer to another. In fact, the audits have to be conducted more and more as one global audit led by one globalized engagement partner as one engagement on a consolidated basis.

Number seven: The U.S. today is a tax haven. Our tax rates are incredibly low compared to the rest of the world. The dollar is relatively low in relationship to the value of other currencies. Our assets and operating businesses are bargains. What's more, this is a politically stable country.

Number eight: The world has been, for the past eight or nine years and probably well into the future, awash with money. There is more money chasing fewer deals than probably any time in the last fifty years.

Number nine: Direct foreign investment is significant and it will continue. I predict that domestic takeover activity, while at a bit of a lull now with the demise of junk bonds as a preferred source of financing, will come back. Not like it was in its heyday, but it is already strengthening and we've seen it in the last 60 to 90 days. And direct foreign investment has continued, not quite at the same pace, but the amount of money coming from Japan, from the Asian Pacific, from the UK, from the Netherlands and France, is significant and it will continue. In many ways we've had the largest change in equity ownership in American business than at any time since the Great Depression. That probably will continue.

Number ten: The firms, as they look at where growth is going to come from, are finding the greatest opportunities for audit growth do not exist in the U.S. They exist in Europe, they exist in Japan, and the Asian Pacific. Take all the major Fortune 1,000 or equivalent companies from various parts of the world, 95 percent of them will be audited by the Big Six firms here in the U.S. In Europe the number is only 70 percent and in the Asian Pacific, it's only running 65 percent. The opportunities for new and merging multi-nationals and the opportunities for growth are in Europe and the Asian Pacific more than they are in the United States.

Number eleven: Auditing is becoming more important, not less important at this stage in time. There was a period of time during the late 70s when I

was, when probably a lot of us were, a little distraught, because I believed that auditing was in fact declining in its importance, somewhat driven by the competitive behavior of the profession, and it was becoming too much of a commodity. That has reversed. The last two, three, or four years auditing has become more important for a whole variety of reasons.

Number twelve: The Big Six accounting firms, and many others, today in fact are consulting firms. At Deloitte & Touche we have revenues of approximately two billion dollars a year in the United States. Our recurring audit and recurring tax business, out of that two billion dollars, is only eight hundred million dollars. That doesn't mean it's all management consulting. In fact, there is four hundred million dollars of special auditing type consulting work that goes on within the auditing division. There is three hundred million dollars of tax consulting going on out of the tax division, and then there is five hundred million dollars of management, actuarial and other types of consulting going on out of the various consulting divisions. What that says is that as a firm, it's eight hundred million dollars of base, recurring work, four hundred million of audit consulting, three hundred of tax consulting and five hundred of management and related consulting. The realities are that we are a consulting firm with less than half of our volume today coming from recurring business.

What is all that consulting? Lots of debate swirl around what it is. I'm going to give you a list from our firm, which is not too different from most of the other firms. What is common about these businesses? Think as I run through these and I will tell you my conclusions at the end, which also might say something about why there is so much demand for these services.

We do merger and acquisitions, LBOs, capital market service related consulting. A lot of due diligence type of activity, a lot of tax structuring, a lot of takeover defense work. Litigation support, forensic accounting, special investigations, bankruptcy consulting and auditing, restructuring. There's a lot of business in companies like Texaco and LTV and Storage Technology, Eastern Airlines and Continental, etc.. Liquidation work. Actuarial and benefits consulting. Valuation and appraisal type work. Hard assets, soft assets, valuing businesses or assets for tax reasons, borrowing reasons, or in certain cases, buy and sell reasons. Restructuring, financial restructuring, big companies using accountants for significant work. Places like Kroger and Kraft and Mason's that we have been involved with. Legislative assistance in Washington, especially on the tax side. Government contract consulting and related cost accounting services. Utility rate consultations, business interruption type consulting. A couple of examples: Exxon has their refinery destroyed in St. Croix by the hurricane, the Stouffer's Hotel was destroyed by the hurricane in St. Thomas. There is accounting related business, interruption claim consulting to be done. Information technology and computer consulting. Advanced manufacturing systems. Strategy work, in our firm through a division we call Braxton.

What is in common about those businesses? Many people worry about the far flung consulting activities of the accounting firms. I don't see it that way. The businesses that have prospered when the demand is there – and it has almost been pulled out of our firm – have four characteristics. They

have, as a root, a requirement for objectivity, which is akin to independence. They are fact or data driven. They are opinion related in terms of offering consultation or advice. And four, they require highly educated, specialized professionals, which says typically these things are not business services, they are professional services.

In fact, these businesses very naturally and normally fit under the umbrella of what the profession has traditionally done in its base service of auditing. The place where the Big Six firms have prospered, and I believe the profession will continue, is when services are required by businesses or by government that fall back on those fundamental principles of objectivity, fact driven, data driven, advice or opinion or consulting related, and they require highly specialized professionals. When all four are present, there is value added to those services coming out of the Big Six firms. Those consulting businesses will grow, and not so much because the firms decided to do it. Frankly, accounting firms are not that well managed and not great marketers. The market has demanded and wrung these services out of these firms naturally and progressively.

Number thirteen: More and more is being expected of accountants and auditors. There are natural expectations in what we do. Sometimes misunderstandings occur, but expectations of the smart, bright lay person are there. The courts add to that their findings and what they hold the accountants responsible for. Politicians get in the act, regulators get in the act, and, interestingly, the constant examination of competence in these consultive arenas, in fact, builds confidence in what these firms can do and it adds even more to what the expectations are of the firm in its auditing role.

Number fourteen: The firms and the services they deliver are more and more collaborative. More of the work that is provided is done by people out of the different functions. You don't see as many pure tax projects, or audit projects, or management consulting projects, or actuarial consulting projects. What we're finding more and more of is a collection of specialists out of various divisions being applied to projects. One of the big requirements of doing that well is that those specialists have an appreciation and understanding of the other disciplines that they are working with.

You might say, "There are fourteen new realities; so what?" I am going to boil them down to three broad categories. For once and for real, globalization of the big companies. Not only specialization, but sub-specialization is being demanded by the market. And a growing expectation from the profession in terms of what it must do.

Those three things have caused two big things to happen to management as they wrestle with any firm. One is, it has changed our definition of critical mass. Critical mass is a notion that says an office has to be of a certain size, a department has to be of a certain size, for the human resource dynamics, recruiting, development, training, the capacity to build presence, the impact of marketing, and building a reputation – you have to be so big. When we were a general practice there was a definition of critical mass. But as we started to subdivide in specialized and sub-specialized areas, the critical mass factor for those became almost as large as what we thought of as our general practice. As a result, in order to build that specialization and have enough busi-

ness in that specialization, the practices had to be bigger and hence the definition of critical mass grows.

Secondly, the issue of globalization. Specialization expectations have driven us to raise what we viewed to be the standard of adequate capability to serve in many countries throughout the world. We could get away until maybe two or three years ago with having weakness in Brazil or Taiwan or Malaysia or France or Sweden or pick your country. We had to have presence, but frankly, because we tended to do referred audits, we could sort of send someone there to double check it. Or if you needed to, frankly, you could have another Big Six firm or local firm do your work in a given country. As these enterprises have become truly global enterprises, that is no longer adequate because you have to audit them worldwide as one entity, which raised the requirement to have consistent quality every place in the world. And in many of the middle size and smaller countries, there were not eight or nine or ten high quality accounting firms.

It's pretty obvious what that did. It drove mergers, especially among some of the smaller of the Big Eight firms, to the place where today we have a whole new order in the profession in terms of the size and critical mass. I believe these trends will continue and would, in fact, draw more mergers, except for the Justice Department isn't going to allow it. Jim Rill, the head of the Antitrust Department, and I flew together recently between New York and Washington. I had some controversial and testy debates with Jim prior to our current merger being approved. On this trip, we had a very friendly chat, and he said as long as the Bush administration is here there won't be any more mergers among the Big Six, and may not be any mergers from the second tier into the Big Six. He also said, if Bush gets thrown out by the Democrats, I think they'll like big business even less than the Republicans. So, I would guess that the order of the major firms is going to be where it is at least probably for the next ten years.

Let me talk about one last new reality, which, frankly, you probably understand better than I do. That is that young people have changed. I look at the people we have hired today and they are different. They are different from what I was. I still think of myself as a little kid. It just isn't true. They, as a general rule, are smarter, they have broader experience than most of the people we were hiring twenty or thirty years ago, they've traveled more, they've had more experiences. They have grown up in an economy that has allowed most of them to be able to afford to do things many of us were not able to do. They generally have a broader education, not necessarily in terms of the classroom, but in terms of what they seem to have experienced at the time they join one of the firms.

I might digress here and give you a comment or two. That is, all of you are wrestling with the 150-hour program and what that will mean on your individual campus. You know the Big Six firms are generally supportive of that. We have put money and people behind it in terms of the AAA (American Accounting Association) and the AECC (Accounting Education Change Commission) and the projects that are going on there. I would tell you, and I guess you would hear this from other leaders of the big firms, two things. Don't just give them more accounting. Remember the comment I made about the

fact that we now have more collaborative teams – actuaries, auditors, accountants, systems people, tax people, working on teams. One of the biggest problems we have is that we have too few people who understand enough about the other disciplines that they are required to team up with. It's absolutely critical. If the 150-hour program results in simply more accounting and auditing, and students who are better prepared to take the CPA exam, we will have failed. In fact, I will tell you that I believe there will be a crisis point in the late 90s when the number of students declines. We know that's going to happen – they've all been born. The numbers will decline, and I believe we will have trouble attracting them to accounting programs. I believe when they trade off a five year education and the cost and time of that versus other four year programs, we might double it on the downwards side.

If the accounting profession finds the 150-hour education to be truly valuable, you will find the profession will hang tough. If the leaders of the major firms and others finds the 150-hour program is not doing anything for them, I believe you will find such a huge problem on the part of the profession to hire enough people, they will reverse fields on you. And, you will have big problems; you will have a curriculum in place that the profession will not support. It would be a shame if that happens. This issue around accounting education is very, very serious. The firms will put more money behind it, but it is going to be a partnership that the profession and the faculty are going to have to work on and take very, very seriously. For those people who are inclined to say let's take what we've got without changing it much and add another year of the same, you're playing with fire. Don't do it.

I'll switch back to young people. They are smarter, more broadly experienced, better educated. Those thoughts are probably not so earth shattering. The things that are really different is that they are more independent. They are recalcitrant at times. They value freedom intensely. They are more egalitarian than I remember being. They are less class-oriented. They are very impatient. They are less impressed with things. It used to be you'd take a young person entering business and say "He or she is a partner" and they would go "Wow!" Now they say, "Yeah, they're getting kind of old, aren't they?" They are not that impressed with things. They are less inclined to accept the notion of apprenticeship. They absolutely want, have a burning desire, to contribute to the organization they join from the day they walk in the door off campus. They do not want to sit on the bench. They want to get on the playing field from the day they sign up. They hate and reject control as a legitimate approach to managing.

We as accountants are not very well suited to this new reality. Most of us went to school and learned about double entry bookkeeping, and that debits had to equal credits. Many of you took a course in something like controllership. We then learned about auditing and the standards of auditing. We got out of school, we studied, we passed the CPA Exam. We got burned by a few clients that didn't have the kind of integrity we would want. We learned to doubt. We learned to be skeptical. We learned to double check. We got our first management job somewhere five, six, seven years into our careers, and what was our natural tendency, especially in tough times, to do? Control things.

My partners say you can't let the staff vote. I say they vote differently. They don't vote with their hands, they vote with their feet and walk right out the door. The turnover rates in the profession in the last four or five years have gone sky high. It's a very big new reality that impacts how we will do business, how we will organize ourselves, and how we manage. I have the sense that all the big firms will compete reasonably effectively in the market place for clients, with technology, industry, practice, technical excellence, etc. I think that perhaps the firms that are able to deal with these young renaissance people most effectively and, in fact, modify or eliminate the natural desire to use control as a legitimate management approach, may find the real secret to gaining and sustaining a competitive advantage.

Let me wrap up. New realities: Balanced world; globalization of our clients; sub-specializations of specializations; demand for consulting services; foreign investment; merger and acquisitions; LBOs; increasing expectations; a re-definition of critical mass primarily driven by the need to specialize; a requirement, a demand for consistent worldwide service capability; a restructuring of the profession through mergers and other factors, and a group of renaissance young people. These things are causing us as big firms to re-address who we are, what we do, how we are organized, how we lead, and how we manage. The last three or four years have been fascinating. The next five years will be like having the opportunity of a lifetime to try to figure out how to do something better than anyone else in a time when, in fact, management and organization and what we do and how we do it are critical to success, and, perhaps, building a sustained competitive advantage. It is a very, very vibrant time.

I sit back at times and look at our business and the big firms, which is my perspective. We are very fortunate to live in a free enterprise, capitalistic society. The public accounting profession and its role in facilitating and lubricating financial markets is very, very important. It's exciting and challenging. I am personally having a ball. I enjoyed sharing some of these perspectives. They certainly weren't very technical, but I hope they have some value to you as you wrestle with some of these issues as we go on with the symposium. Deloitte and Touche is delighted to be associated with this program. It has emerged and is continuing to emerge as one of the finest auditing symposiums of this type in the country. We're delighted to make a long-term commitment to be part of it. I thank you for inviting me back here. Thank you.

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With Firmness in the Right

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One of the earliest memories I have is, as a child, climbing a set of stone steps in the fading twilight of an early spring evening toward a marble building filled with light. As my father assisted me up the last step I remember being startled by an enormous statue of a bearded man sitting in a large chair whose kindly, though wrinkled, face seemed to be looking down just at me. I do not recall much that happened subsequently except that I could not get that initial view of the statue out of my mind. I do remember that there was some writing on the walls that my father and brothers said something about, but I could not take my eyes off of that statute. I have returned to the Lincoln Memorial several times since then and have been similarly affected. Learning his story and reflecting on the words on the walls that surround his statue have only added to my original sense of awe.

I am not a native of Illinois, but one does not live there for very long without noticing the shadow that the Great Emancipator still casts over the Prairie State. Lincoln remains somewhat of a folk hero as well as a revered resident. The nose on his weather-stained bust in Oak Ridge Cemetery is as bright as gold, rubbed shiny by countless visitors who use it as a sign of friendly respect toward this humble man of the people.

One of the attributes of Lincoln that has attracted me to him is his writing. We have probably never had another president who could write as movingly as he. In this day of ghost writers, it is difficult to know who really originated a presidential turn of phrase that may catch our fancy.

Hark back then to the days when presidents wrote their own material. Certainly there was Jefferson, but his prose, while brilliant, was not of the earthy nature or straightforward metaphor of Lincoln. Teddy Roosevelt was another of our literary presidents, but, again, his prose did not reach to the depths of Lincoln's. Among American writers of any connection, it is hard to match the Old Testament grandeur of Lincoln's style or the rich resonance of his expression.

Despite all the attention given to his Gettysburg Address, Lincoln had many other memorable pieces of prose. Today, I would like to focus on his second inaugural speech. The speech was delivered near the end of the Civil War, when reconstruction loomed as the new challenge. It was not long before the assassination that would keep him from carrying it out.

The particular words I want to recall deal with what Lincoln thought should be the nation's perspective toward that future. In particular, I have

titled this paper after that phrase that so typified his own attitude, “with firmness in the right ...” For, I believe commitment is at the heart of right behavior. Resolution in execution is essential to ethical integrity. Right intentions without follow-through count for naught. We must not forget this in our discussion of ethics with our students.

In his famous address at Cooper Union in February 1860, Lincoln foreshadowed his sense of high resolve with the words, “Let us have faith that right makes might, and in that faith let us, to the end, dare to do our duty as we understand it.”

I would therefore like to use Abraham Lincoln as a frame of reference for my remarks about the development of an ethical orientation in our classrooms. First, I would like to make a few remarks about ethics, just to set the stage. Then I would like to take a few minutes to consider some aspects that we, as teachers, may have overlooked in dealing with this critical topic. There are three: Personalized integrity, little vs. big, and good vs. bad. I would like to close with a discussion of just how we might look at our personal ethical choices.

What Is Ethics?

The term ethics comes from the Greek “ethos” and refers to the character and sentiment of the community. It relates to the collective judgment of human action based on some perceived standards of goodness and badness or right and wrong.

Codes of ethics refer to standards of conduct held in common among members of groups and associations. The term usually relates to rules that govern the moral behavior of its members. It may also refer to a study of principles defining one’s duty to one’s neighbor. The codes typically are derived from a set of values or a system of behavior adopted by the group. Codes can help to clarify what kind of conduct is deemed to promote the general welfare. Though they may be self-serving in some respects, codes may also encourage higher standards of behavior.

Ethics can be an important part of economic activity. It can and should permeate all aspects of administration and decision making. Some have referred to it as the soul of the management profession. The ethics of an organization and its members can therefore have a significant influence on how they conduct their business and how they are viewed by the society in which they function. Is it any wonder that consideration of ethics is creeping back into our classrooms?

The growing renaissance of attention to ethics in the classroom may be looked upon as a reaction to societal pressure – as a concession to critics. Business schools have become sensitive to the charge that they need to develop better standards for the behavior of future American businessmen. I think the increase in attention is the result of more than that, however. I believe that it is also an acknowledgement that you cannot teach business without an awareness of a sense of values. Teaching business or accounting in a vacuum only invites other considerations to take over. Something has to drive consistent actions; otherwise anarchy will ensue.

The generally high level of ethical behavior of individual accountants is

one of the primary reasons the profession still retains the confidence of the public. Our Codes of Conduct provide guidance where laws and regulations do not exist, and challenge practitioners to perform at a level above the minimum expected. A mark of a professional is the ability to correctly perceive ethical dilemmas and to behave appropriately.

Professions enjoy a legal monopoly backed by the power of the state. In exchange for this exclusive franchise, professionals are expected to serve the public good. Codes of conduct are instituted as a guide and a reminder. Students need to be apprised of this contract and of the type of commitment it calls for on their part. This peculiar responsibility of the professional deserves constant reiteration in the classroom.

Personalized Integrity – Living Ethics

I am sympathetic with our nay sayers who tell us that we cannot “teach ethics” in the classroom. That, they say, is something that students should have learned at their mothers’ knee or accepted from early instruction in church, synagogue, or mosque – as if “you can’t teach old dogs new tricks.” Well, I have always felt that you are “never too old to learn,” but my point is that stressing ethical behavior is not likely to be successful if it is only just “learned.” It needs to be internalized, to be believed – like the faith of a little child – if it is to be an effective guide to future behavior.

Fundamentally, our students today seem to have pretty good instincts – from whatever source. In their discussions in class, their hearts generally seem to be in the right place – if I can characterize mainstream beliefs as being “the right place.” If that is so, then why do they make wrong decisions out there, in the work place? One response is that they do not know how to think through the issues. In today’s complex world, without some kind of model or structured response, it is believed that people make “satisficing” decisions or just go with the crowd.

On this very day, in fact, a group of accounting educators will be gathering in Atlanta for a conference on the teaching of ethics. I will be going there tomorrow. One of the things that will be stressed is how to help students structure an approach to an ethical dilemma. There is a seven-step decision model that has been suggested to help bring a resolution.

Step 1: Determine the facts, known and desired;

Step 2: Identify the ethical issues and the stakeholders involved;

Step 3: Define the norms, principles, rules, and values related to the situation;

Step 4: Identify alternative courses of action;

Step 5: Compare the alternative courses of action with the norms, principles, rules, and values;

Step 6: Evaluate the consequences of each possible course of action, both long- and short- term; and

Step 7: Reach a decision as to the appropriate course of action.

Another step might be inserted before making the final decision. If appropriate, discuss the alternatives with a trusted person to help gain a greater perspective regarding the alternatives.

I have found this approach to be very helpful, but it presupposes a willingness and a basis on which to make an often difficult decision. I would submit that one of the reasons our students make wrong choices is not that they don't have any idea of what is right, but that they just don't have firm enough convictions to put their right inclinations into practice.

The bureaucratization of business leads to impersonality, the loss of a sense of personal identity and accountability. Decision making becomes more centralized with the ensuing isolation of various units. Is it any wonder there appears to be a loss of altruism and a sense of personal service and commitment?

A former student told me about a friend of his who was on a job where the budget was more than needed to do the engagement – a rarity these days, I suspect. The senior doled out the added hours (to be reported as overtime work), to preserve the budget and provide a little “year-end bonus.” Besides, as the senior apparently put it, “it provides some compensation for all that time we put in and don't charge.”

The former student asked his friend if he did not realize this was wrong. The friend replied, “If it's wrong, why did the senior do it?” Whose ethics are we to adhere to? If our students' frame of reference is whoever is in charge, then we are in for a difficult time and the profession, indeed this country, is in deep trouble. Was the Holocaust that long ago?

Joseph Wells [1990] reminds us in a recent article in the *Journal of Accountancy* that among those who commit fraud, three common factors are: motive (usually financial), opportunity, and an ability to rationalize the theft, usually by calling it something else – borrowing, for example. It is the third issue, the ability to compromise one's integrity, that has to be the most troublesome.

Professional Codes of Conduct and Corporate Codes of Ethics may very well be necessary and a valuable frame of reference if today's actions are wind-driven. They may be more effective in identifying ethical problems and be more persuasive in gaining adherence. In the last analysis, however, unless individuals know what is fundamentally right, and act on it, our world faces a dim future.

My suggested response to that latter augury is to emphasize integrity – personalized ethics – in broaching the subject in the classroom. As we consider cases with ethical overtones in class, I do not ask what Jones should have done. Rather, I ask, “what would you do in this case?” When explanations rely on the “circumstances,” I ask why the setting has anything to do with the issue, to force the students to come to grips with a more fundamental question.

I have been told that ethics is a personal thing and that to challenge students so boldly on their beliefs is threatening and a mistake. Will life be any more gentle? Isn't it better to force students to confront such a situation in the classroom incubator than have them sweat out the fiery consequences in the furnace of life?

It seems to help my students to recognize that they, not someone else or any code of ethics, are responsible for what they do. Reminding them of the potential consequences of wrong behavior may have some effect, as well. In my experience, however, most students pass that off as not likely to be a prob-

lem inasmuch as they will probably never be in the public spotlight. Being able to live comfortably with oneself also seems to have little power, at least at their age.

In this world of growing depersonalization, students may be helped by being reminded that there is one thing that is still uniquely theirs, and that is their integrity. Though we put it at risk every day, our integrity is very fragile. It is too easily lost and, if lost, almost impossible to recover. Students may not realize what it means not to be trusted any more. We need to remind our students of this and to help them avoid losing their integrity either consciously or unconsciously.

It was Abraham Lincoln who said, "If you once forfeit the confidence of your fellow citizens, you can never regain their respect and esteem. It is true that you may fool all of the people some of the time; you can even fool some of the people all the time; but you can't fool all of the people all the time."

The job is only half done if we let our students escape with no commitment. The memory of a vigorous class discussion may not be sufficient to sustain our students on the firing line if they have not decided which side of the battle they want to be on. We need to challenge them to commit themselves, not just intellectually, but in their hearts, to making this a better world.

This is where "firmness in the right ..." comes in. We need to help students internalize a commitment to what is right to such an extent that they are willing to take appropriate action. I had an executive tell me that one of the reasons for implementing a code of ethics in his company was to develop a corporate culture of loyalty and submission. Specifically, he did not want any opposition, especially any whistle blowers.

Whistle-blowing is not an end in itself. The need for it is rare. It should be employed sparingly and only when established methods of resolution have failed. Yet, in some circumstances, it may be the only way to fulfill an ethical obligation. It is both rational and moral, though most employment contracts may expect that remuneration is in exchange for obedient behavior. Where one is not able to live with a situation or change it, walking away neither ameliorates the wrong nor absolves of any guilt that someone who knows. If making the right choice is difficult, sometimes carrying it out may be even more so. Yet, how can we say we have done our job if we stop with the decision and ignore the implementation.

Whistle-blowing is also a very complex issue. Nevertheless, in considering ethics in the classroom, some attention deserves to be given to the follow-through – to old-fashioned moral courage.

You may not feel that this is what you came into teaching to do. But really it is. Back in your starry-eyed days, didn't you look at teaching as a chance to have some effect, to influence the lives of others, for good? What better opportunity could you have than this?

The impersonality of accounting makes it easy to neglect the people aspect. In our classrooms, and in our research, the world of numbers seems devoid of humanity. The popular epithet "bean counters" underlies this popular perception held by the world at large. But, even in the green-eyeshade era of accounting, people were important. We have long since left that

period. As teachers, it is time we returned people to stage front in our consideration.

Little vs. Big

Lincoln was not known as a churchgoer, but seldom has this nation known a president with a deeper, more abiding, faith. He was fond of Biblical allusions. Let me use one here. Remember the parable of the talents? [Matthew, 1953] A nobleman, going on a journey, entrusts three servants with five, two, and one talents respectively. When he returns he finds that the first two have doubled the amounts entrusted to them but the third simply returns it, having buried it in the ground for safekeeping. The nobleman's comment to each of the first two is, "Well done, good and faithful servant; you have been faithful over little, I will make you faithful over much." The third was cast into outer darkness.

The nobleman in this story tested his servants first with little and then made his decision whether to trust them with more. Life is often like that. As we grow older, the temptations become greater. It is to be hoped that our strength to deal with these situations has grown commensurately.

Sometimes I fear that our approach in the classroom to ethical issues may overlook the need to evolve through these intervening steps. Too often the cases that we use represent major corporations with enormous resources at stake. Often the problems are so complex and situation-driven that they obscure relevant ethical dilemmas. They may, therefore, fail to yield clear principles of general ethical behavior. The state of affairs may be, at once, both overwhelming and impersonal. We have just dealt with the latter; let us therefore turn to the former.

My suggestion is that we not start students off with major corporate perplexities but with more familiar, though perhaps less challenging, situations. Get them interested in simpler predicaments that they may have already faced, or could. Keep the situations realistic. Test the students on a level where they sense a challenge and may feel a personal tug. Then help them to advance from there. After all, firms do not usually start our graduates off at the partner level. Is that the only level at which they will face ethical challenges?

We have to give our students a chance to grow. The old adage that a baby has to crawl before he or she can walk may be more than an aphorism. Some researchers have said, in fact, that children who never crawled may be hampered later in life.

Who among us has not dreamed of making that great decision that will change the course of history? Most of us, however, are not fated to do so. For most of us, the successes in life will come in the little things that we do every day. We need to be sure that our students know this as well. Consider some cases where the issues are not necessarily the survival of a Fortune 500 company, but day-to-day dealings with ordinary people.

By presenting our students with complex cases having much at stake, we may be, in a sense, expecting them to grow up too fast. By missing the intervening steps of smaller decisions, their ability to cope with the larger problems may be incompletely developed. Moreover, they may be over-

looking the very critical point that the whole of life involves being faithful over little things as well as big. Integrity encompasses how we handle all our challenges, not just the big ones.

By starting with the complex, high-level cases we may also be neglecting an important concept in ethics development – the slippery slope. This is that almost impossible task of determining at what point a minor slip becomes a major blunder. The fact that I cannot tell which hair falling out makes a man bald does not mean that there is no distinction between a man with a full head of hair and another with alopecia. Ethics by apparent consequence instead of by intent is risky business.

Over the years the profession has wrestled with this problem in many guises. At what point does a financial interest violate independence? At what point must a pooling become a purchase? At what point does a slight compromise with right become a wrong? I am sure you can recall a case or two where CPAs accommodated their clients a bit too far before they realized just how far they had gone. It would have been better had they never gotten started down that slippery slope.

Another of the comments attributed to Lincoln is, “If you call a tail a leg, how many legs has a dog? Five? No; calling a tail a leg don’t make it a leg.”

Much of the Lincoln lore is comprised of small things that he did or was supposed to have done. Perhaps some of them are Parson Weems-type tales, but many, I am sure, were of the substance that made him a man of high resolve. The stories are legion of his walking miles to return the correct change to a customer of his ill-fated store or how he braved a driving prairie blizzard to borrow a book. The images of his reading by the flickering light of the fire in his parents’ log cabin are also legend, but they reflect a growing sense of dedication and commitment that was to bring this nation through its darkest hour.

You see, it is often the little things that lead to the greater life. It is often the smaller predicaments that build the resolve to face up to the greater quandaries. Lincoln knew both and understood the importance of each. Overwhelmed with the problems of the Civil War, he still took time to write personal letters of consolation to those who had suffered most from its devastation. In discussing ethics in the classroom, we ought not to neglect the small conflicts or how their resolution may lead to successes in confronting even larger ones. Nor ought we to overlook their effects on the people involved.

Good vs. Bad

Just as there may be a tendency in our classes to focus on the big rather than the small, there may also be a similar temptation to feature the bad rather than the good. Cases where auditors have erred or corporate officers have failed the test may be very appealing to students and instructors alike. They point out the consequences of evil and are unfortunately too readily available.

In auditing, wrong choices are at the heart of most of our case studies. We look at the ESM case and at Jose Gomez’s *mea culpa* confession that appeared in *The Wall Street Journal* [Brannigan, 1987]. The list of cases in most textbooks usually consists of those considered by the courts as professional

failures. My colleagues in tax tell me that much the same is true there. We can and do learn from our mistakes. It is reasonable that we use these opportunities to teach our students not to repeat these errors. But, can't we also provide them with some examples of accountants who made some right decisions? Are there no heroes in today's ranks of the profession?

This emphasis on failure tends to inculcate an awareness of things to be avoided, a negative approach to ethics. Actually, it is the positive approach to life that is apt to be the more productive and the more rewarding. Moreover, students need to realize that there is more to this integrity thing than avoiding bad situations. Doing right should be our concern, not just avoiding wrong.

Unfortunately, the news does not seem to work that way. Tales of auditors who made the apparently wrong decisions get the headlines while those of auditors who made right choices, regardless of the pressure or consequences, are seldom, if ever, mentioned. One would like to think that this is because the former are such rare exceptions – and, indeed, they seem to be so. Unfortunately, there are still too many of such instances and they tend to be more fascinating than the ones with a successful ending.

For those who have taken to writing cases, let me suggest that you investigate some where the issues have been correctly diagnosed and through “firmness in the right ...” an appropriate outcome has been achieved. Wrestling with intransigent management over disclosure issues cannot be an easy task nor something to which a CPA looks forward. But, as a watchdog for economic society, the profession can find few other challenges that offer a better chance for a sense of accomplishment.

Let me provide you with a few possible illustrations. Currently, the Savings & Loan crisis is in the financial headlines almost every day. Did you know that in the incipient days of the regulatory accounting blight, one of the Big Six accounting firms backed away from doing savings and loan audits? In the 1960s they resigned from their S&L clients. Congress, as one of the first of several questionable acts, had just permitted S&Ls, for tax purposes, to deduct five percent of their uncollected mortgages as estimated bad debts. Arthur Andersen felt that the differences between this amount and the generally far smaller amount charged on the income statement should be treated as a timing difference. Treating it as a permanent difference as most argued it should be, however, led to an overstatement of capital. Since capital is the amount upon which the amount of loans is based, it becomes a critical number for the operation of the business. Believing this, they resigned from their savings and loan clients who adopted this practice.

They took a similar step with regard to railroad clients because the Interstate Commerce Commission refused to recognize depreciation. When was the last time you heard of a firm resigning from all their clients in an industry because they disagreed with the latter's accounting? Today, I suspect we might consider that there were “better,” more discreet ways, of handling such disagreements. Perhaps so, but this is still one way to make a point. You may recall that this is the same firm that also sued the SEC at one time.

I just got through recommending that we not emphasize the big at the expense of the small, so let me give you a case about a new senior. He had

just been assigned to a small insurance company. Although he had never audited an insurance company, he conscientiously prepared for the assignment by reading and inquiring of others.

Shortly after arriving on the job, he noticed that the company had converted a substantial portion of its investment portfolio just before year-end and converted it back shortly thereafter. The explanation was that the company normally invested in some securities that were not acceptable to the insurance regulatory commission so, they went through this conversion at year-end. This, and other matters prompted the senior to suggest to the partner that a more-experienced staff person take over the job. The partner agreed. Eventually, the firm decided this was not the kind of client with which they wished to be associated. So, in the course of time, someone else was left to clean up the Equity Funding mess.

Those of you who have been in practice know that it must have taken a lot of courage to go to a partner and admit that one may be in over one's head. Still, wasn't that the ethical thing to do? Did it hurt his career? I don't think so. He is currently a well respected partner in his firm's national office.

Accountants take courageous stands every day. We need to get more of these cases into our classrooms. Let our students learn the names of some of our winners and not just of our losers. We do have heroes, too.

. . . As God Gives Us to See the Right

I know that much of what is said about approaching ethics in the classroom cautions teachers to stay away from any particular philosophy. It encourages us, instead, to let students just think about issues and to provide them some opportunity to exercise their judgment – with no right or wrong resolution. Peer pressure is often looked to as providing the appropriate power of persuasion.

I am not convinced that such an approach to moral values will succeed in the long run. I believe that we must somehow challenge our students to think through their positions and develop a philosophy of their own to guide their behavior. To do otherwise is to abdicate our role as teachers and make ethics another sterile, intellectual exercise.

In accounting, we often proceed as though there is only one right answer and all we have to do is find it – and do it. We know better than that with regard to ethics. Philosophers have wrestled with this issue for centuries. One of the perplexing problems with many texts on business ethics is that their survey of ethical approaches sometimes yields diametrically opposed solutions. One such text even takes the position that if there is a majority position on the discussed viewpoints, that must be the right answer. No wonder our students are confused and sometimes do not know which way to turn. Teachers, too, share this bewilderment. This may very well be a reason ethics does not receive more attention in our classrooms.

A colleague recently admitted to me that his problem in dealing with ethics is that he himself has no set philosophy. Who are we as teachers and what is it we are trying to convey if we do not know what we ourselves believe? How convincing can we be if we do not know where we stand? How much of

an example will we be for our students if our own lives are not guided by the standards we imply should be theirs?

The conclusion of Lincoln's phrase "with firmness in the right ..." is "... as God gives us to see the right." I am not sure that is any more reassuring than any of the better developed views. To take such an approach in our classrooms may be looked upon by some as violating the separation of church and state. To others, it may be seen as a cop-out or as creating potentially loose cannons on the decks of our corporate ships of state.

Nevertheless, I think Lincoln was trying to identify an ultimate authority. Lincoln's perception of some of the views of his ultimate authority are evidenced in the words that precede our title. They are "with malice toward none; with charity for all ..." This concept is reflected to some extent in the three levels of thinking patterns developed by John Dewey [see Shea, 1988, for details] and augmented by Lawrence Kohlberg [Lande and Slade, 1979]. I was first introduced to this structure in a book by Gordon F. Shea [1988] called *Practical Ethics* which was written for the American Management Association.

Dewey's three stages of moral development were:

Preconventional: where we concentrate on our fundamental needs, where survival and security are our primary concerns;

Conventional: where we are led by the rules and conventions of society; and

Postconventional: where we think through our principles and are guided by fairness and justice and the rights of individuals.

As a result of studying how subjects solved moral problems, Lawrence Kohlberg suggested six stages of moral development and found that they fit into Dewey's framework as follows:

Preconventional morality

Obeying orders – to avoid punishment;

Marketplace morality – maximizing pleasure, minimizing pain;

Conventional morality

Conforming to group norms – belonging;

Focusing on law and order;

Postconventional morality

Principled morality – autonomous and responsible; and

Universal morality.

Gordon Shea had added to this his own fourth stage:

Transcendent morality

Integrity – integration of thought and feeling (creative, caring, and sensitive).

While this model does not supply answers, it does get the student to think about the level at which he or she is currently situated, compared to the level at which she or he may want to perform. It provides an insight into moral values and can sensitize the student as to the relative status of various virtues. I use it at step 5 in the seven-step decision model.

Conclusion

We need to impress on our students an awareness of personal integrity and the will to make it a habit. We need to nurture its development and direct it appropriately. We need to promote character and the thinking about values. To accomplish this, I suggest we consider approaching our study of ethics "with malice toward none; with charity for all; with firmness in the right, as God gives us to see the right ..."

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Discussant's Response to "With Firmness in the Right"

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Deloitte & Touche

I have an interesting assignment today in a number of respects. First, I am a practicing auditor being exposed to the hallowed halls of academe. This would not be so bad, except for my assignment – to discuss a paper prepared by a well-respected auditing professor. Again, I thought I could cope with that, until I heard the topic – professional ethics. Nonetheless, I prepared for this task by doing background reading on the subject. Then, on April 2, the paper on ethics arrived. Eagerly, I ripped open the envelope and began to read. My heart sank. Professor Neumann, from the University of Illinois, had made "Honest Abe" the cornerstone of his paper. And then for good measure, he brings the Bible into his discussion. I think you get the picture: I'm to try to stir up some controversy about Abe Lincoln and the Bible. Politics and religion – two subjects my mother told me I should never discuss in public.

In my remarks, I plan to discuss the apparent decline of ethics first, followed by illustrations of what I believe constitutes ethical behavior and what does not. In some cases, my comments will contrast with those of Professor Neumann and, in other cases, will expand upon some of his thoughts. I will conclude by discussing what is being done to reclaim the high ground in the war on unethical behavior, especially the impacts on businessmen of "ethics by consequence!" And somewhere in all of this, we might find the time to discuss my work at the Securities and Exchange Commission.

Decline of Ethics

The decline of ethics – we hear it every day – is not just in business, but in sports, government, and religion. It seems that every aspect of society is in pursuit of the pot at the end of the rainbow at the expense of ethical values.

In the sports arena, there are allegations of point shaving (North Carolina State), recruiting violations (Southern Methodist), drug use (Ben Johnson), and gambling (Pete Rose). In the government, there are the Iran-Contra hearings, investigations into the activities of several senators, the HUD scandals, and the seemingly endless rumors of bribes and kickbacks. In the religious sector, we have had numerous controversies surrounding religious leaders. And of course, in the business world, there are the insider trading scandals and the savings & loan crisis, to name just a few.

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The reasons for these actions are difficult for us to understand and impossible to justify. They are a tragedy – not just for those directly affected, but for the taint they cast on others associated with an activity.

Professor Neumann asks what has precipitated the focus on ethics. I suggest that it is events such as those I have mentioned and a realization that we can't stand by passively and allow public confidence to continue to erode. Everyone seems to perceive the decline in ethics as a problem that must be addressed.

What is Ethical? What is Not?

Some philosophers view ethical behavior on two levels: (1) an inner core reflecting objectives and principles of right conduct and (2) outside layers constituting the law, rules, and regulations. I believe, as does Professor Neumann, that individuals fundamentally have good instincts of right conduct. Furthermore, early conditioning by family and society tells us that our own self-interest will be advanced as a result of doing the right thing. As I will discuss later, it may not always be easy to conclude that our own self-interest is best served by doing the ethical thing.

Professor Neumann emphasizes personalized integrity, and I would like to comment on this. Many individuals view professional ethics in very negative terms, as a list of rules describing things to avoid.

This may be illustrated by considering the auditor's independence standard. Independence was once thought of as an important *personal emphasis* on integrity and objectivity in performing professional services. However, some feel that over the years the independence standard has developed into a series of increasingly minute, arbitrary rules. The SEC Codification of Financial Reporting Releases contains over thirty pages of detailed rules and interpretations about auditor independence, all based upon a particular fact pattern.

Deloitte & Touche, like most other firms, has developed a system to monitor independence, and several individuals commit a significant amount of time to handling inquiries and issues related to independence. For a large organization with enough resources to devote a significant amount of time, the detailed rules and interpretations may be viewed as helpful, but for a small practitioner, the rules may seem overwhelming.

If independence and professional ethics rules grow more minute and arbitrary, individuals will continue to find it easier to avoid exercising their professional judgment to determine what constitutes ethical behavior – they either will comply with the rules or they will not.

Rather than imposing arbitrary rules, personalized integrity needs to be so ingrained that ethical behavior is automatic. This means that, for auditors, more emphasis must be placed on the importance of applying independent professional judgment to tough auditing issues in the classroom, in the uniform CPA examination, in continuing education programs, and in the supervision of everyday responsibilities.

Ethics in the Classroom

How do you teach ethics in the classroom? There are over 500 courses in business ethics alone – I’m sure the methods are diverse. Do you really teach ethics, or do you just reinforce what Professor Neumann says you learned at your mother’s knee?

The threshold question is, what is ethical? One view is that anything that is legal is ethical (i.e., just comply with the rules, however minute and arbitrary they may seem). A second view is more of a middle ground – a right versus wrong decision-making process. A third view is the opposite extreme of the first – any time you are in doubt, an action is not ethical. Neither extreme seems quite right. Yet, as with insider trading, what is ethical is very difficult to define. Like so many things that we cannot define precisely, we usually know it when we see it.

As difficult as it may be to define ethical behavior, the general concept of right versus wrong must be emphasized in the classroom. But, how do you teach someone to “do the right thing”?

Making the “right” decision in auditing could mean difficult times for the individual and his firm. Taking a position that is not in agreement with a client will, at a minimum, be unpopular. An individual considering a career in auditing should understand and accept this early in his college studies and professional career.

My experience at the SEC convinced me that the vast majority of auditors subject to enforcement actions are not evil, wicked criminals. They are decent human beings who have families just like you and me. They go to Rotary or Kiwanis meetings, vote in elections, coach Little League teams, and attend religious services. They may have been caught up in some aggressive accounting and may have rationalized a client’s position without a thorough examination of all of the relevant facts. They may have made a “wrong” decision. Unfortunately, these wrong decisions are the news, as Professor Neumann has stated, and not the thousands of right decisions made each day.

I agree with Professor Neumann that case studies tend to focus on complex problems rather than on clear principles of ethical behavior. I do not believe that case studies which attempt to have students reexamine their value systems are the answer. I believe that most students already have an established idea of right and wrong, but that adherence to those values is sometimes difficult in the real world.

Professor Neumann is absolutely correct – students need case studies that illustrate real-world situations they will face once they graduate. Such examples and illustrations should not be confusing situations where there is no right or wrong answer. Instead, they should be the more common situations where the correct response is known. These might include such things as correctly reporting your time, completing all the audit program steps you sign off and, for later in their careers, being willing to take the right, albeit potentially unpopular, course of action in dealing with clients.

Ethics are a habit. Good, or bad, habits formed early in a career will greatly influence decisions made later when the consequences are often far greater. Classroom illustrations of ethical decisions that a student will face

both early and late in his career will help the student make the correct choices, particularly if the reasons for the correct choices are fully explained and discussed.

Each year Deloitte & Touche sponsors a Trueblood Seminar for university professors. During the Seminar, a number of case studies are presented that are based on actual practice issues we have encountered. Cases with ethical overtones elicit a great deal of discussion, because the professors are able to relate to the issues on a personal level. This same theory applies to students, and providing such case studies will allow them to instinctively reach back to their college training when they are faced with these issues in their professional careers.

Doing the Right Thing

Given a good foundation, or inner core, of objectives and principles of right conduct, why then are there so many apparent examples of people going astray? Rather than an inability to think through the issues, which Professor Neumann poses as a possible problem, maybe it is precisely that ability which leads to the headlines we see so frequently. In evaluating an ethical dilemma, an individual's conviction of what is right and what is wrong is a very necessary foundation, but is that conviction, in and of itself, enough to ensure appropriate behavior?

Situations frequently arise where the ethical action and the action that enhances one's self-interest may represent two divergent courses of action. This is where the pressure begins. The individual knows what the right decision is and wants so very badly to make that decision. The difficulty is that another course of action appears very tempting and perhaps more in his self-interest, at least at that point in time. Does the individual lack the self-confidence to do the right thing? If the individual has the foresight to think through all of the future consequences of his action, then the decision should be easy. This is extremely difficult for a young, inexperienced auditor, and it is the responsibility of the firm to provide this auditor with the infrastructure to discuss his dilemma. At Deloitte & Touche, every effort is made to do so in the form of counselors, advisors or mentors, who have the maturity and experience to aid the auditor in making the right decision. This is Step 6 in the decision model discussed by Professor Neumann.

Reclaiming the High Ground

There are a number of initiatives that, if present in any environment – may directly or indirectly influence individuals to abide by their ethical principles. I would like to discuss three such initiatives that I think are very important. The first is what is referred to as the “tone at the top.” I believe this is a necessary starting point for any organization. Second, Professor Neumann acknowledges that codes of conduct may be a valuable frame of reference, and I would like to expand on that. Finally, I would like to focus on what Professor Neumann terms “ethics by consequence rather than by intent,” something I believe is an underlying problem in today's society.

Tone at the Top

In response to several widely-publicized business failures, the Treadway Commission [1987] studied the causes of fraudulent financial reporting and made recommendations that it felt would reduce the incidence of fraudulent financial reporting. I think it is significant that the Treadway Commission focused on the “tone at the top” and called it “the most important factor contributing to the integrity of the financial reporting process.”

An appropriate attitude at the top is essential and must be communicated to all levels of an organization. A lack of leadership and moral guidance creates a vacuum of uncertainty. Over time, an individual’s inner core of principles can be greatly affected by his or her environment.

Businesses that are serious about ethical behavior need to adopt policies that consider ethical behavior in determining advancement and compensation. Such policies must be designed to protect individuals from the negative financial consequences of their ethical decisions. These negative consequences are the responsibility of the organization as a whole. The corporation that institutes such policies is sending a clear message about top management’s commitment to ethical behavior.

Motive, opportunity, and the ability to compromise one’s integrity are the three common factors cited by Wells [1990] as being present among those who commit fraud. Certainly, it is the third factor that is most troublesome. If an individual’s environment seems lax about ethical conduct, it becomes much easier to rationalize unethical actions which can lead to deceptive financial reporting, insider trading, fraud, and all the other events that make headlines.

Code of Conduct

The Treadway Commission also concluded that a code of corporate conduct was an essential component of establishing an ethical corporate culture. A code provides a vehicle to communicate the “tone at the top” to all levels of an organization. It certainly cannot be the only form of communication; newsletters, training sessions, and management actions are also important.

Many people believe that the mere existence of a code can raise the ethical level of an organization because it clarifies what actions are considered appropriate and signals an organization’s expectations to all employees. Unfortunately, most codes are the product of a crisis environment and are reactive rather than proactive. A recent survey [Pitt and Groskaufmanis, 1989] indicates that most codes address conflict of interest, misuse of confidential information, foreign corrupt practices, and insider trading. These topics would seem to indicate that a fundamental purpose of a code of conduct is protection against illegal actions.

To be effective, a code should be tailored to the particular needs of an organization; applicable, in some fashion, to all individuals in the organization; communicated through educational programs and updated on a regular basis; and, most importantly, monitored for compliance. Individuals must understand an organization’s values and principles from their first day on the job. Such training is as important as the technical training programs that are provided.

Some people on Wall Street attribute its woes to the dramatic growth in investment banking. Firms added people faster than they were able to train them in the traditions and values of the investment banking firms. With immediate, big-dollar rewards at stake and limited or no guidance on acceptable conduct, the risks of errant behavior occurring were high.

For CPAs, maintaining the public's trust and confidence has always been critical. Although a 1986 Louis and Harris poll ranked CPAs first among professionals in their moral and ethical practices, the accounting profession has been, and will continue to be, under scrutiny. In the same year of that survey, the Anderson Committee [AICPA, 1986] called for a restructuring of the profession's ethics code. In carrying out this recommendation, the profession recognized that the code should emphasize the attainment of goals rather than only rule compliance. The new Code of Professional Conduct sets forth professional standards in a positive, goal-oriented manner; the former code concentrated on telling CPAs what they should not do.

Ethics by Consequence

A recent article in *The Wall Street Journal* cited a Wharton School study [Robertson and Anderson, 1989] which indicated that highly-supervised employees at bureaucratic firms are more likely to act ethically than those at entrepreneurial firms. The authors of the study noted that there is evidence that people in such an environment think through the risk of getting caught in an activity that would be perceived as unethical. That's an interesting observation – improve your ethics through a centralized bureaucracy.

In dispelling common myths about fraud, the article by Wells [1990] discussed previously notes that people are not immune to the temptation to commit fraud. The greater the promise of reward or the more pervasive the threat of punishment, the higher the motivation for a particular behavior. The above two articles indicate that even with a good foundation of ethical principles – an organization's commitment to ethical behavior and a code of ethics – individuals may still be tempted to act in an unethical manner.

A recent headline in *The New York Times* [Norris, 1990] characterized Michael Milken's guilty plea as reflective of the ethics of the soaring '80s – a willingness to cut legal corners in pursuit of further profit. Shortly after that plea, I overheard a conversation – Milken earned \$1.1 billion in salary alone, and his punishment is a \$600 million fine (of which two-thirds may be tax deductible) and a possible jail term (in a minimum security prison). Wouldn't you trade places with him? "Not such a bad life," was the response.

Risk vs. Reward

What's the risk and what's the reward from my action? Spoken or unspoken, I would be willing to bet that this thought process is inherent in many instances of unethical conduct. I do believe that there are some business people who assess the risks of being caught in an unethical or illegal activity against the rewards of not being caught. Getting caught is, for them, just another cost of doing business.

What is it that has caused this attitude? Is it a result of today's service economy, whose main economic activity is buying and selling stocks, bonds, commodities, real estate, foreign exchange, and futures in everything imaginable? These items are represented by numbers on a computer screen, not by a manufactured product that is judged by its value to society or the quality of its workmanship. Because of the impersonal nature of these financial transactions, it is tempting to rationalize that no individual will be injured by any unethical behavior. There is no intent to do harm to any individual; the intent is solely to make a profit from the financial transaction. Who really gets hurt if you bend the rules slightly in your favor? Is the perceived reward worth the risk?

Sociologists question whether punishing a criminal is effective in deterring others from committing similar crimes. Does this mean prosecution shouldn't be pursued? I believe that failure to punish offenders does send a strong message to other potential offenders – the reward remains, while the risk is diminished. Thus, the consequences associated with the unethical decision are not seen as a deterrent.

Whistle-blowing

In his discussion on whistle-blowing, Professor Neumann notes that walking away doesn't "fix" the wrong. This is true, and I agree that whistle-blowing is a very difficult issue. An individual who blows the whistle may sacrifice his career and his security – there are only negative incentives. What positive incentives can be provided?

The term "whistle-blowing" is usually associated with a disgruntled employee who reports violations of normal business practice to public authorities or the media. Recently, the term has also been associated with the auditor. Legislation was threatened that would make the auditor the "public's watchdog" for detection of fraud and illegal acts. The profession responded with self-regulation – expectation gap Statements on Auditing Standards which, among other things, require communication with audit committees or directors to improve the integrity of financial reporting. In my present job, I deal with management integrity issues quite often. When the auditor suspects an integrity issue, what is he to do? Resign? Walk away? Blow the whistle? To Whom?

Heroes

Are there heroes in the accounting profession? I'm sure there are, but because of the nature of the profession, they are not as glamorous as those in other walks of life, such as corporate business, sports, or politics.

I agree wholeheartedly with Professor Neumann that there is a tendency in classes, in newspaper headlines, and in organizations to focus on the negative rather than the positive. It is much easier to criticize – it sells more papers – but what advantage is gained? Of course we learn from the negatives, but we should provide more examples of people making the "right" choices – our accounting heroes.

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3

Neural Nets Versus Logistic Regression: A Comparison of Each Model's Ability to Predict Commercial Bank Failures

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Introduction

According to SAS No. 59, *The Auditor's Consideration of an Entity's Ability to Continue as a Going Concern* [AICPA, 1988], the auditor has a responsibility to evaluate whether there is substantial doubt about the client's ability to continue as a going concern for a reasonable period of time, not to exceed one year beyond the date of the financial statements being audited. Once this evaluation is complete, if the auditor concludes there is substantial doubt, he is required to add an explanatory paragraph to the audit report reflecting his conclusion. The going concern evaluation is particularly troublesome for commercial bank clients operating in a regulated environment. For these institutions, federal and state regulators ultimately decide whether and when a particular bank will be closed, and the auditor faces the additional challenge of predicting whether regulators will take such actions within 12 months of the date of the financial statements.

This study examines the usefulness of annual financial statement data and alternative modeling methodologies for modeling regulators' decisions to close commercial banks. A bank failure prediction model could be applied at the audit planning stage (using annualized third quarter data) to aid resource allocation decisions. The model could also be applied at the review stage of the audit (using annual post-adjustment data) as an aid to the final opinion reporting decision.

We focus on two different methodologies - logistic regression and neural network computing - and compare their abilities to predict commercial bank failures over a 12-month horizon. Our preliminary results indicate that both methodologies yield similar predictive accuracy across the range of all possible model cutoff values, with the neural network performing marginally better in the "gray area" where some failing banks appear to be less financially distressed.

The remainder of the paper contains sections covering sampling methodology, selection of candidate predictor variables, modeling methodology, estimation of model fit, and prediction results. The paper concludes with a summary of our research findings.

Sample Selection Process

During the period from 1983 through 1988, there has been a dramatic increase in the number of federally insured commercial banks requiring disbursements by the Federal Deposit Insurance Corporation (FDIC). Sheshunoff & Co. of Austin, Texas reported 45 such bank failures during 1983; 79 during 1984; 117 during 1985; 138 during 1986; 164 during 1987; and 179 during 1988. These failures included institutions entering receivership, institutions that had their deposits assumed by others, and institutions merged into others under Federal assistance plans. For this study, we used an estimation sample comprised of 102 of the 117 banks that failed during 1985 (1984 annual financial statement data) and a separate holdout sample containing 131 of the 138 banks that failed during 1986 (1985 annual financial statement data). Failed banks from the 1985 and 1986 Sheshunoff lists that were not included in either sample had been closed by the regulators during the first month of each year, and as a result no prior year's financial statement data were available.

A stratified sampling design was applied to identify nonfailed banks for inclusion in both samples. Nonfailed banks were drawn from the nine different peer groups listed in TABLE 1. These peer groups are based on differing ranges of total assets. The nine strata for the holdout and estimation samples of nonfailed banks are approximately proportional to the population strata proportions as shown in TABLE 1. This stratification design was undertaken to test the general applicability of estimated models to banks of all different sizes. As shown in TABLE 1, 906 nonfailed banks were included in the 1984 estimation sample and 928 nonfailed banks were included in the 1985 holdout sample.

Selection of Candidate Predictor Variables

Candidate predictor variables were identified using the results of prior research, and researcher intuition. Altman, Avery, Eisenbeis and Sinkey [1981] summarize several prior bank failure prediction studies including studies sponsored by the FDIC, Federal Reserve Board of New York, Office of the Comptroller of the Currency (OCC), Board of Governors of the Federal Reserve System, and other studies. Our set of candidate predictor variables includes the most efficacious of the predictors tested in these studies.

During 1988, the OCC published a document entitled *Bank Failure - An Evaluation of the Factors Contributing to the Failure of National Banks* [1988]. The document reports the results of an analysis of banks that failed, became problems and recovered, or remained healthy during the period 1979 through 1987. It identifies eight broad categories where weaknesses had a significant impact on bank declines. To the extent possible, we identified ratios that capture the essence of these categories for inclusion in our set of candidate predictor variables.

APPENDIX A presents a list of 28 candidate predictor variables we identified for possible inclusion in our models. Ratio numerators and denominators are comprised of line items taken from the annual call reports of commercial banks included in our samples. We used call report financial statements in lieu of GAAP financial statements based on the presumption that

TABLE 1
SAMPLE SIZES IN RELATION TO POPULATION OF ALL COMMERCIAL BANKS

Peer Group	Asset Size	Dec - 87		Nonfailed Samples			Failed Samples				
		Population	Ppns.	1984	Ppns.	1985	Ppns.	1984	Ppns.	1985	Ppns.
1	\$5 Billion +	83	0.6%	5	0.6%	5	0.5%	0	0.0%	0	0.0%
2	\$1 to \$5 Billion	265	1.9%	11	1.2%	15	1.6%	0	0.0%	1	0.8%
3	\$500 Million to \$1 Billion	218	1.6%	15	1.7%	16	1.7%	0	0.0%	2	1.5%
4	\$300 to \$500 Million	307	2.3%	18	2.0%	18	1.9%	0	0.0%	0	0.0%
5	\$100 to \$300 Million	1,876	13.8%	112	12.4%	119	12.8%	2	2.0%	12	9.2%
6	\$50 to \$100 Million	2,852	20.9%	158	17.4%	174	18.8%	9	8.8%	18	13.7%
7	\$25 to \$50 Million	3,546	26.0%	266	29.4%	264	28.4%	26	25.5%	33	25.2%
8	\$10 to \$25 Million	3,457	25.4%	233	25.7%	237	25.5%	40	39.2%	43	32.8%
9	\$0 to \$10 Million	1,018	7.5%	88	9.7%	80	8.6%	25	24.5%	22	16.8%
Totals		13,622	100.0%	906	100.0%	928	100.0%	102	100.0%	131	100.0%

regulators focus on the information filed in these Federal documents, and because the call reports have more detail than the GAAP reports. Moreover, GAAP reports are not available for a large number of separate institutions that fall under the umbrella of a single bank holding company.

The 28 candidate predictor variables relate to the following general financial features: bank size, loan exposure, capital adequacy, asset quality, operating performance, non-operating performance, and liquidity. Size is measured using the natural logarithm of total assets (LGASSETS). Loan exposure variables include the proportion of total assets represented by (1) construction loans (CONSTLNS), (2) real estate loans (RLESTLNS), and (3) agricultural loans (AGLNS). Based on the OCC's finding that insider abuse leads to bank failures, we included a fourth loan exposure variable designed to capture this condition - (4) aggregate credit to officers (loans to insiders) as a proportion of net loans (LNSINSID). Although many insider abuses go unrecorded, the OCC did observe that such abuse "include[s] situations where the transactions may be technically lawful [and therefore recorded in the financial statements] but exhibit bad judgment or self-interest above the interests of the bank" [OCC, 1988, p. 33]. The completeness assertion is one of the most troublesome aspects of an external audit, and to the extent that insider transactions go unrecorded, the ability to predict financial failure is most likely decreased.

Measures designed to capture the adequacy of bank capital include (1) primary capital to adjusted assets (PRMCAPAS), (2) total capital to total loans (TOCAPLNS), and (3) the raw measure of total equity capital (EQ-CAPTL). It is customary to add the allowance for loan losses to equity capital when measuring primary and total capital but we found that subtracting this amount yields stronger predictions. Therefore, our measures of primary and total capital are quite conservative. Capital has actually been reduced by twice the amount of the loan loss reserve - once by the bank's accrual of loan losses and again by our subtraction of the amount. So, these measures of capital assume that actual loan losses are understated.

Asset quality predictor variables include various measures of substandard loans as a proportion of either gross loans, primary capital, or total assets. The call report includes the following separate categories of substandard loans: (1) loans past due over 90 days (used in PDLNSGRL), (2) loans for which interest accrual has been suspended (used in NONACLNS), (3) total nonperforming loans, which is the sum of past due loans and nonaccrual loans (used in NPLNSPCP and NPLNSAST), and (4) loans that have been restructured (used in RESTRLNS). Two additional asset quality predictor variables are the ratio of net charge-offs to total loans (CHRGOFFS), and the ratio of provision for loan losses to total assets (PROVLOSS).

Measures designed to capture operating performance include (1) total interest income to total assets (YIELD), (2) total interest expense to total assets (RATE), (3) net interest income to total assets (SPREAD), (4) return on total assets (RETNTA), (5) return on total equity capital (RETEQ), (6) undivided profit and capital reserves to total assets (CUMPROF), and (7) income before extraordinary items (INCOME). Non-operating performance measures include (1) total non-interest income to total assets (NONINT), (2)

total overhead expense to total assets (OVRHDEXP), and (3) security gains (losses) and gross extraordinary items to total assets (SECGAINS).

Liquidity measures include (1) short-term assets less large liabilities to total assets (LIQSTAST), (2) large time deposits to total assets (TMDEPS), and net loans to total assets (NETLNS). LIQSTAST measures the gap between short-term liquid assets and large deposits and provides an indication of the bank's ability to produce cash should depositors make large withdrawals. TMDEPS measures the proportion of total assets represented by these large deposits, and NETLNS represents the proportion of total assets that is non-liquid. For brevity, we will use acronyms to represent each of the 28 predictor ratios throughout the remainder of this study. The reader is referred to APPENDIX A for detailed definitions.

Modeling Methodologies

In our effort to estimate a model for predicting bank failures, we primarily focused on two modeling methodologies: logistic regression (or the logit model), and neural network computing. Brief descriptions of each methodology are given next.

Logistic Regression

During the recent past, binary logistic regression has been applied in a number of research studies that have attempted to model specific binary decisions or the binary representation of the occurrence of an event (e.g., vote yes/vote no and bankrupt/not bankrupt). In the current study, the logistic regression model can be interpreted as follows. Suppose there exists an unobservable theoretical index, Z_i , that represents the regulators' propensity to close commercial banks. Z_i is assumed to be a continuous random variable and is determined by a linear combination of observable bank characteristics, such as asset quality, loan exposure, capital adequacy, expected future financial performance, liquidity, etc. The logit model given below allows the estimation of the weights (coefficients) for the linear combination of bank attributes, and the resultant estimation of the index Z_i :

$$P_i = \frac{1}{1 + e^{-Z_i}} \quad (1)$$

P_i represents the conditional probability that the regulator will close the bank, and e is the base of natural logarithms.

The likelihood function for use in sample estimation of the coefficients of Z_i is given by the product of all P_i s for failed banks times the product of $(1 - P_i)$ for all nonfailed banks. So, higher failure probabilities for failed banks, and lower failure probabilities for nonfailed banks, represent higher points on the likelihood function. The coefficients comprising Z_i can be estimated by finding the global maximum of the likelihood function (i.e., differentiating and setting equal to zero). Due to the nonlinearity of the partial derivatives, however, an iterative technique such as the Newton-Raphson method must be used to determine this global maximum.

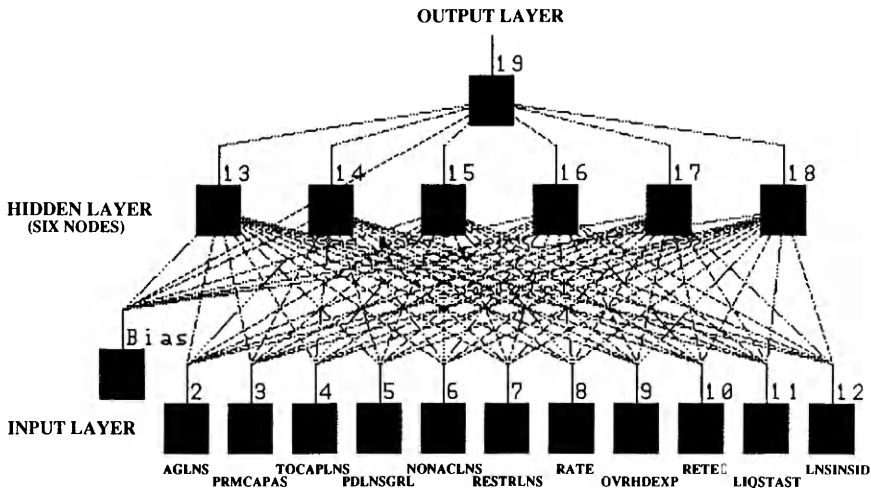
Neural Network Computing

Over the past few years a new methodology referred to as neural network computing, or connectionist modeling, has undergone rapid development. Neural nets have been applied to a variety of classification, clustering, and pattern recognition problems and in some cases have significantly outperformed standard statistical techniques such as the logit model.

Neural network architecture is biologically inspired, involving the intricate interconnection of many nodes (also referred to as processing elements) through which inputs are transformed into outputs. Once a particular network architecture is defined, the network is repeatedly presented with training cases from an estimation sample, and the connection weights between nodes are modified to bring the network outputs closer to the actual target output values. This training process is referred to as network learning. One of the potential advantages of neural network modeling is the ability to capture inherent process nonlinearities through the specification of an intricate network architecture. Interactions can also be modeled by specifying multiple connections to individual nodes.

The basic elements of a neural network are (1) nodes, (2) layers (of nodes), (3) connections (between nodes), and (4) connection weights. FIGURE 1 contains an illustration of the specific network architecture used in the current study. The first layer found at the bottom of the illustration is comprised of a bias node (similar to a constant in a regression model, and always

FIGURE 1: NEURAL NETWORK ARCHITECTURE FOR KNOWLEDGE ACQUISITION OF REGULATORS' DECISIONS TO CLOSE COMMERCIAL BANKS



Network Attributes:

1. Hyperbolic Tangent Transfer Function
2. Normalized Cumulative Backpropagation - Error Backpropogated Using Overall Error Function Instead Of Each Individual Error Function
3. Training Set = 102 Banks Closed During 1985 (1984 Year-End Data) and 102 Nonfailed Banks
4. Approximately 300,000 Epoch Iterations Performed During Learning
5. Input Variables Chosen Based On Exploratory Data Analysis, Analysis Of All Possible Regressions, And Logistic Regression Results

given a value of 1), and one input node for each predictor variable. This layer serves as an input buffer where the input nodes simply pass the given predictor-variable values for the current training case (sample observation) up the connections toward the hidden (middle) layer. The input nodes are fully connected to the six nodes in the hidden layer. Each connection path has an associated weight (similar to a regression model coefficient) that is multiplied by the input value being passed through the connection.

Each node contained in the hidden layer receives a combined signal from each connection below it. This signal is simply the sum of the products of connection weights and input values. Note that each sum of products is analogous to Z_j in the logit model described above, but each of the six nodes in the hidden layer has a separate sum of products. Upon entering the six hidden layer nodes, these sums of products are individually transformed into output signals via application of a specified transfer function. Customarily, a sigmoidal growth function is used as the network transfer function for nodes in the hidden and output layers. Two commonly used transfer functions are the sigmoid (or logistic) function given in equation (1) above, and the hyperbolic tangent function, given by:

$$\tanh x = \sinh x / \cosh x = (e^x - e^{-x}) / (e^x + e^{-x}) \quad (2)$$

FIGURE 2 contains a comparative illustration of the behavior of these two growth functions.

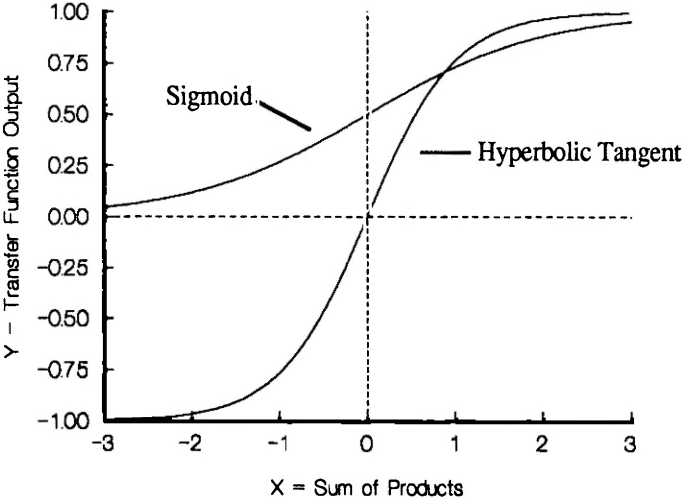
Once the specified transfer function is applied to each of the six sums of products entering the hidden layer nodes, the six transformed signals are passed up through the connection paths to the output node. The bias node also passes a signal to the output node. As in the layer below, the seven signals are multiplied by connection weights and summed to form another sum of products. The transfer function is again applied to this sum of products to generate the final output signal. If the sigmoid function is used as the network transfer function, the network output value will range from 0 to 1. If the hyperbolic tangent is used, the output value will range from -1 to 1.

Our final network illustrated in FIGURE 1 contains 79 connection paths. This means 79 connection weights must be specified. During training, a neural network is repeatedly presented with sample observations (also referred to as training cases) and a learning rule is required to ensure that all connection weights are modified in a manner that will improve the network's classification ability. In this study, the particular training rule applied during network training is referred to as back-propagation.

Back-propagation is an iterative gradient-descent technique that is similar in many ways to the Newton-Raphson technique used in the maximum likelihood estimation of the logit model. The basic premise underlying the back-propagation algorithm is that each of the network connection weights is, to some degree, responsible for the final output error. Once a network is presented with a new training case, the final network output error is computed using current connection weights. This error is then propagated back through the network and applied to determine how the connection weights should be modified.

FIGURE 2: TRANSFER FUNCTIONS COMMONLY USED IN BACKPROPAGATION NETWORKS

Hyperbolic Tangent and Sigmoid Transfer Functions



- Notes: Sigmoid Ranges Between 0 and 1
- Hyperbolic Tangent Ranges Between -1 and 1
- Derivative at Point of Inflection:
 - Sigmoid = .25
 - Hyperbolic Tangent = 1

The amount of output error that is back-propagated from the output node (call it back-propagated error) is computed by multiplying the derivative of the transfer function times the raw error (raw error is the actual network output value minus the desired, or target, output value). So, the rate of change in the transfer function at its current value also impacts the modification of connection weights. The amount by which the weights on connection paths between the hidden layer and the output layer are modified is determined by multiplying this back-propagated error from the output node times the current input signals that just passed through these six connections (seven connections including the bias). In addition, this amount is typically dampened by applying a learning coefficient that ranges between 0 and 1.

The amount of error to be back-propagated from a node in the hidden layer is determined by multiplying the derivative of the transfer function at its current value (different from the transfer function value at the output node) with the product of the back-propagated error coming into the hidden layer node from connection to the output node above, and the unmodified weight from

this connection path. So each node in the hidden layer is assigned a different amount of back-propagated error - an amount that is dependent on the unmodified connection weight from the connection above.

Once these hidden layer back-propagated errors are assigned to each hidden layer node, they are used to modify the connection weights to the input layer in the same manner as before. That is, the delta weight (or weight modification) for a given connection to an input node is derived by computing the product of the respective hidden node's back-propagated error times the input value just passed from the input node, and multiplying this amount times the learning coefficient.

Assuming the network does not get trapped in a local minimum, it has been proved that iterative application of the back-propagation algorithm will improve network performance to the point where the global error is minimized. However, in addition to the potential local minima problem, networks sometimes become "paralyzed", thereby preventing further modification of connection weights. Paralysis can occur when weights become very large. In this case, signals coming into a node become very large, and the derivative of the transfer function approaches zero (see FIGURE 2).

Model Estimation Results

Logistic Regression Model

In an effort to identify a powerful logit model, several exploratory procedures were applied. Initially, we tested each candidate predictor variable for significant differences between the failed and nonfailed sub-sample means and medians using the parametric t-test and the non-parametric Mann-Whitney U-Test. These tests were applied to both the 1984 estimation sample and the 1985 holdout sample. The results are presented in TABLE 2. For 19 of the 28 candidate predictors, failed and nonfailed sub-sample means and medians were significantly different in both years. We limited our consideration of predictors for the multi-ratio model to this set of 19 significant variables.

Next, we estimated numerous multi-ratio logistic regression models using the 1984 estimation sample and assessed overall model goodness-of-fit. Also, we assessed the incremental significance of the individual predictor variables for each model. Further, we compared the signs of the estimated coefficients with expected signs during this stage of the exploratory work. Expected signs of various coefficients are given in TABLE 3. Expectations were based on evidence gathered from prior studies and, in some cases, researcher intuition. Finally, we estimated all possible pair-wise correlations to aid our specification of a final model. Pearson-product-moment correlations in excess of .5 are listed in APPENDIX B.

After much trial-and-error and fine-tuning using the exploratory procedures discussed above, we settled on the final eight-variable model given in TABLE 4. This model includes two loan exposure variables - AGLNS and LNSINSID; three asset quality variables - PDLNSGRL, NONACLNS and RESTRLNS; one capital adequacy variable - PRMCAPAS; one operating performance variable - RATE; and one non-operating performance measure - OVRHDEXP. The overall model likelihood-ratio chi-square statistic was 351.46, which is significant

TABLE 2
PAIRWISE TESTS FOR DIFFERENCES IN MEANS AND MEDIANS

Variables	Data for Year Ended 12/31/84—Failures Occurred During 1985					Data for Year Ended 12/31/85—Failures Occurred During 1986				
	Mean		Difference	Parametric t-Test	Mann-Whitney U-Test	Mean		Difference	Parametric t-Test	Mann-Whitney U-Test
	Failed	Nonfailed		N/A	Failed	Nonfailed		N/A	Failed	Nonfailed
1	9.824	10.584	0.760	0.00*	10.245	10.639	0.394	0.00*	10.245	10.639
2	0.013	0.018	0.005	0.15	0.025	0.018	-0.007	0.03*	0.025	0.018
3	0.039	0.048	0.009	0.06	0.059	0.052	-0.007	0.14	0.059	0.052
4	0.216	0.084	-0.132	0.00*	0.155	0.075	-0.080	0.00*	0.155	0.075
5	0.033	0.085	0.052	0.00*	0.018	0.085	0.067	0.00*	0.018	0.085
6	0.053	7.574	7.521	0.65	0.031	15.964	15.933	0.54	0.031	15.964
7	3.945	0.230	-3.715	0.00*	-1.732	0.248	1.980	0.01*	-1.732	0.248
8	0.063	0.015	-0.048	0.00*	0.084	0.016	-0.068	0.00*	0.084	0.016
9	0.035	0.013	-0.022	0.00*	0.041	0.012	-0.029	0.00*	0.041	0.012
10	0.058	0.014	-0.044	0.00*	0.086	0.018	-0.068	0.00*	0.086	0.018
11	0.005	0.001	-0.004	0.00*	0.012	0.002	-0.010	0.00*	0.012	0.002
12	0.043	0.009	-0.034	0.00*	0.062	0.013	-0.049	0.00*	0.062	0.013
13	0.113	0.104	-0.009	0.00*	0.110	0.098	-0.012	0.00*	0.110	0.098
14	0.074	0.063	-0.011	0.00*	0.072	0.056	-0.016	0.00*	0.072	0.056
15	0.039	0.041	0.002	0.14	0.038	0.041	0.003	0.00*	0.038	0.041
16	0.009	0.008	-0.001	0.38	0.011	0.008	-0.003	0.00*	0.011	0.008
17	0.043	0.033	-0.010	0.00*	0.050	0.034	-0.016	0.00*	0.050	0.034
18	0.036	0.006	-0.030	0.00*	0.043	0.008	-0.035	0.00*	0.043	0.008
19	0.000	0.000	0.000	0.81	0.002	0.001	-0.001	0.00*	0.002	0.001
20	-0.028	0.008	0.036	0.00*	-0.039	0.006	0.045	0.00*	-0.039	0.006
21	-0.866	0.080	0.946	0.00*	-5.486	0.051	5.537	0.08	-5.486	0.051
22	-0.059	0.066	0.125	0.00*	-0.070	0.068	0.138	0.00*	-0.070	0.068
23	0.162	0.112	-0.050	0.00*	0.186	0.112	-0.074	0.00*	0.186	0.112
24	0.646	0.518	-0.128	0.00*	0.631	0.512	-0.119	0.00*	0.631	0.512
25	0.017	0.010	-0.007	0.00*	-0.022	0.011	-0.011	0.00*	-0.022	0.011
26	-0.007	0.039	0.046	0.00*	-0.028	0.037	0.065	0.00*	-0.028	0.037
27	-709.882	1451.146	2161.028	0.09	-2311.771	635.068	2946.839	0.03*	-2311.771	635.068
28	797.500	14128.488	13330.988	0.45	1083.802	13938.208	12854.406	0.34	1083.802	13938.208

Highlighted Variables Significant For Both Years Using Both Tests.

TABLE 3
EXPECTED COEFFICIENT SIGNS FOR SIGNIFICANT
PREDICTOR VARIABLES

Feature/Ratio	Expected Sign	Feature/Ratio	Expected Sign
SIZE:		PERFORMANCE RATIOS:	
LGASSETS	Minus (-)	YIELD	Plus (+)
LOAN EXPOSURE:		RATE	Plus (+)
AGLNS	Plus (+)	OVRHDEXP	Plus (+)
LNSINSID	Plus (+)	PROVLOSS	Plus (+)
CAPITAL ADEQUACY:		RETNTA	Minus (-)
PRMCAPAS	Minus (-)	CUMPROF	Minus (-)
ASSET QUALITY:		LIQUIDITY:	
NPLNSPCP	Plus (+)	LIQSTAST	Minus (-)
NPLNSAST	Plus (+)		
PDLNSGRL	Plus (+)		
NONACLNS	Plus (+)		
RESTRLNS	Plus (+)		
CHRGOFFS	Plus (+)		
NETLNS	Plus (+)		

at the .0000 level. All estimated model coefficients are incrementally significant at the .05 level, and estimated signs agreed with expected signs. The ratio with the greatest incremental explanatory power was PRMCAPAS, while the weakest ratio was NONACLNS.

In order to test for parameter stability, we estimated the same 8-variable model using the 1985 holdout sample. Estimation results for this sample are also given in TABLE 4. As with the estimation sample, the model based on the holdout sample had consistent signs, significant overall model goodness-of-fit, and incrementally significant model coefficients.

Neural Network Model

The process of specifying an appropriate neural net model is even less structured than the exploratory process related to specifying a statistical model. In addition to facing the problem of identifying the appropriate predictor variables for inclusion in the model, one must make additional ad hoc choices about network architecture and training. For example, should you include only one hidden layer? How many nodes should the hidden layer(s) contain? What should be the value of the learning coefficient? Which transfer function should be applied? Should the nodes be fully interconnected or should some connections be disabled or held constant?

TABLE 4
ESTIMATED LOGISTIC REGRESSION EQUATIONS

Variables	Signed Asymptotic t-Statistics	
	1984	1985
Constant	-3.46	-3.79
AGLNS	5.85	4.29
PRMCAPAS	-5.88	-5.55
PDLNSGRL	4.59	2.51
NONACLNS	1.85	4.19
RESTRLNS	1.91	1.49
RATE	2.03	2.07
OVRHDEXP	5.50	3.97
LNSINSID	3.30	3.68
-2 Times Log Likelihood Ratio [Chi-Sq (8 df)]	351.46	476.97
Sample Sizes		
Failed Banks	102	131
Nonfailed Banks	906	928
Total	1008	1059

Note: Both unweighted and weighted (using the WESML technique) estimations were made for each year. Only the unweighted results are reported. The weighted results were not significantly different.

Due to our lack of experience in the area of neural network modeling, we consulted with NeuralWare, Inc. of Pittsburg, PA and obtained a great deal of helpful advice about network architecture and network training. NeuralWare develops and markets neural network software, and they also provide consulting services in the area of network design, and application-oriented training. They have provided neural net consulting services to many large corporations and Federal agencies, and have established an impressive record of many successful neural net applications.

In an effort to identify an appropriate network architecture for the bank failure prediction process, additional exploratory analyses were undertaken. An all-possible-regressions routine was applied to the estimation sample as a means of identifying additional candidate predictors from our set of 28 ratios. Scatter diagrams were generated for each variable, and outliers were identified. A search was undertaken to identify sample observations with more than one outlier ratio value, but none were found. After exhaustive exploratory data analysis, we decided to include 11 predictor variables in the input layer

of the neural network. These ratios included the eight predictors from the final logit model, and TOCAPLNS, RETEQ, and LIQSTAST.

Initially, eight nodes were included in the network's one hidden layer. The network was fully interconnected, and the hyperbolic tangent transfer function was chosen for the purpose of generating all hidden layer outputs and the output layer output. In an effort to avoid network paralysis, the target outputs for failed and nonfailed banks were .9 and -.9 respectively. Mapping sums of products to values inside of the transfer function extremes has resulted in successful avoidance of network paralysis in other applications.

The network training set was comprised of the 102 failed banks from the 1984 estimation sample, and a randomly drawn sample of 102 of the 1984 nonfailed banks. Normalized cumulative back-propagation was chosen as the method for updating network weights. Approximately 300,000 epoch iterations were carried out during the network training phase, and the network root mean square error was monitored throughout the training period. Adjustments were made to the learning coefficient at times when the network error increased significantly.

About halfway through the training process, we decided to disable two nodes within the hidden layer. This decision was made after viewing a Hinton [1987] diagram of the network. The Hinton diagram pictorially portrays the significance of inputs and hidden layer outputs, and at this time it became clear that two of the hidden layer nodes were not making significant contributions to the output layer. At the completion of the training period, the network mean square error was approximately .45.

Prediction Results

Once the final logit and network models were identified, we performed a comparative analysis of the predictive abilities of both models when applied to the full holdout sample of 131 failed and 928 nonfailed banks. Prediction results from applying the logit model are given in TABLE 5. Both the upper and lower tails of the distribution of predicted values contain accurate predictions. For example, at a cutoff value of .01, the model accurately predicts almost 50 percent of the nonfailed sample, and over 99 percent of the failed sample. At a cutoff of .05, the model accurately predicts 95 percent (124 of 131) of the failed banks and 81 percent of the nonfailed banks. Moving to a cutoff of .1, the model accurately predicts over 90 percent of both sub-samples.

The model's predictive ability is also impressive at the top of the distribution. For example, at a cutoff value of .8, the model accurately predicts 99 percent of the nonfailed banks and 52 percent of the failed banks. The predictive strength of the model at the tails indicates that a multi-cutoff decision approach may be beneficial.

After assessing the logit model's predictive ability on the holdout sample, the final step in the research project was to assess whether the neural network could achieve equal or superior predictive performance. To the best of our knowledge, no unambiguous method exists for comparing alternative model predictions. Measuring and comparing both models' "hit rates" at a

TABLE 5
LOGISTIC REGRESSION MODEL HIT RATES AT VARIOUS CUTOFFS
Model Estimated on 1984 Data

	Column Headings = Probability Cutoffs											
	.01	.05	.10	.20	.30	.40	.50	.60	.70	.80	.90	.95
1984 Classifications												
Failed Banks	0.990	0.912	0.863	0.775	0.686	0.618	0.559	0.520	0.490	0.412	0.324	0.225
Nonfailed Banks	0.392	0.804	0.896	0.946	0.967	0.977	0.982	0.989	0.993	0.996	0.998	0.999
Totals	0.452	0.814	0.893	0.929	0.938	0.940	0.939	0.941	0.942	0.937	0.930	0.921
1985 Predictions												
Failed Banks	0.992	0.947	0.908	0.863	0.779	0.740	0.695	0.649	0.595	0.519	0.466	0.374
Nonfailed Banks	0.488	0.805	0.900	0.941	0.961	0.968	0.973	0.976	0.983	0.988	0.991	0.996
Totals	0.551	0.822	0.901	0.931	0.939	0.940	0.939	0.936	0.935	0.930	0.926	0.919

Descriptive Statistics for Predicted Probabilities:

	1984 Classification Results		1985 Prediction Results	
	Failed	Non-Failed	Failed	Non-Failed
Minimum Probability	.008	.000	.010	.000
Median Probability	.673	.014	.825	.010
Mean Probability	.578	.048	.684	.052
Maximum Probability	1.000	.966	1.000	.987

particular cutoff value would not be appropriate unless the distributions of predicted values from applying both models are identical. Obviously, this is not true for our models since the logit model maps a single sum of products to a point on the sigmoid function, and the neural net model maps its output-node sum of products to a point on the hyperbolic tangent function. Even if the sigmoid function was used in the neural network, generating a distribution of predictions identical to the logit model is highly unlikely.

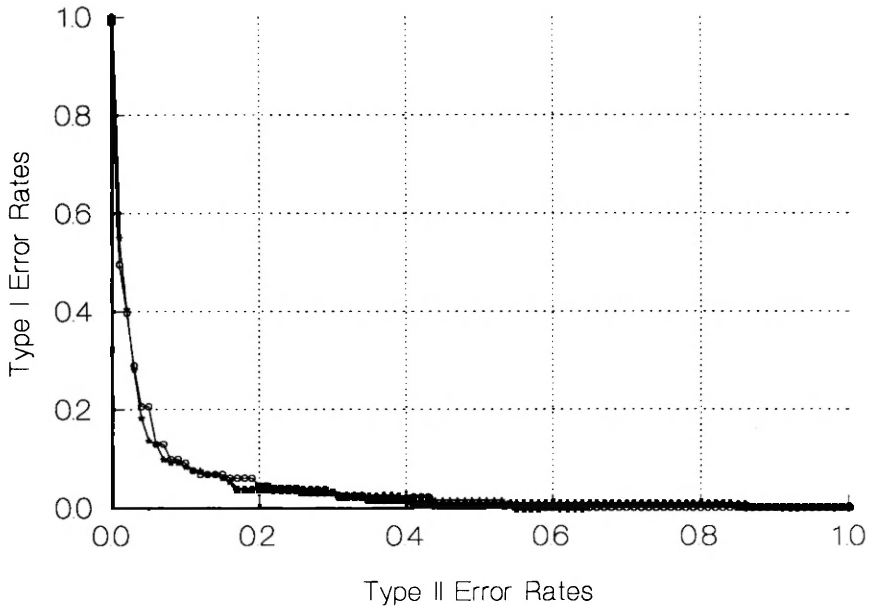
One approach that would allow for comparability across models involves estimating the relative costs of Type I and Type II errors, and then determining the optimal cutoff associated with each model's minimum misclassification costs. Due to the high degree of uncertainty involved in the identification of relative misclassification costs of Type I and Type II errors, researchers typically assume several alternative relative cost ratios, and identify the optimal cutoffs under each assumption. The idea is to determine if either model dominates the other in terms of minimum misclassification costs across a frontier of optimal cutoffs associated with assumed cost ratios.

We decided to measure the entire range of tradeoffs between the failed and nonfailed sub-sample error rates for both models and then visually inspect the relative positions of both tradeoff functions using graphical analysis. By using tradeoff functions we avoid the inappropriate use of specific cutoff values. Instead, we can compare the predictive abilities of both models across the entire frontier of all possible cutoffs. If one model produces a tradeoff function that falls below the second model's tradeoff function in at least one spot, and does not fall above the second model's function at any point, the first model can be judged superior to the second.

FIGURE 3 contains overlaid graphs of the logit and neural net models' tradeoff functions. Visual inspection of FIGURE 3 reveals that neither the logit model nor the neural net model dominates in terms of predictive ability. The tradeoff functions for both models cross one another at several points. It should be noted that one additional Type I error shifts the Type I error rate upward by .0076 (1/131), or approximately .01. Therefore, most of the differences between the logit model and the neural network are not greater than two hold-out sample failed banks.

Specific portions of the graph in FIGURE 3 were magnified and are presented in FIGURES 4 through 6. FIGURE 4 focuses on the top tail of the tradeoff functions where high failed and low nonfailed errors rate are found. Model cutoffs related to these error rates would be appropriate if the cost of misclassifying a nonfailed bank is greater than the cost of misclassifying a failed bank. The logit tradeoff function remains slightly below the neural net function over this region of the frontier where misclassifications of nonfailed banks remain below two percent. FIGURE 5 focuses on the central portion of the tradeoff functions where Type II error rates range between two percent and ten percent. The neural network's tradeoff function is below the logit model's over most of this region. FIGURE 6 focuses on the bottom portion of the tradeoff functions where high TYPE II and low Type I error rates are given. The neural net continues to outperform the logit model up to the point where the Type II error rate is 20 percent, and then the models' performances reverse.

FIGURE 3: TRADEOFFS BETWEEN TYPE I AND TYPE II ERROR RATES
(Circles Denote the Logit Model; Stars Denote the Neural Network)



The largest difference between the two models is found at the point where the Type II error rate is .05 (see FIGURE 5). At this point, the neural net correctly predicts nine more bank failures than the logit model. Across the entire tradeoff frontier, only three points are found where the difference between the two models is greater than 3 mispredictions.

Summary

The preliminary results indicate that neither modeling approach dominates the other in terms of predictive ability across the entire frontier of all possible model cutoffs. On average, the neural network model does appear to perform equally as well as the logistic regression model. According to the neural network literature, the back-propagation network may be desirable when a decision process is inherently nonlinear, with many interactions among the input cues, and/or when a cascaded approach to data processing is used by the decision maker. In the case of regulators' decisions to close commercial banks, the preliminary evidence implies that these process attributes do not exist.

FIGURE 4: TRADEOFF FUNCTIONS AT LOW TYPE II ERROR RATES (LESS THAN .02)
 (Circles Denote the Logit Model; Stars Denote the Neural Network)

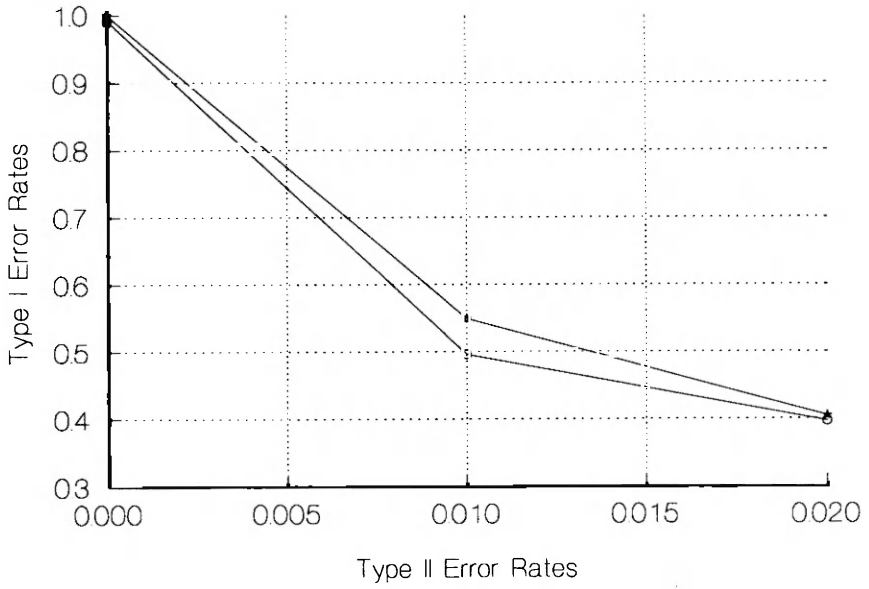


FIGURE 5: TRADEOFF FUNCTIONS AT MID TYPE II ERROR RATES (BETWEEN .02 AND .1)
 (Circles Denote the Logit Model; Stars Denote the Neural Network)

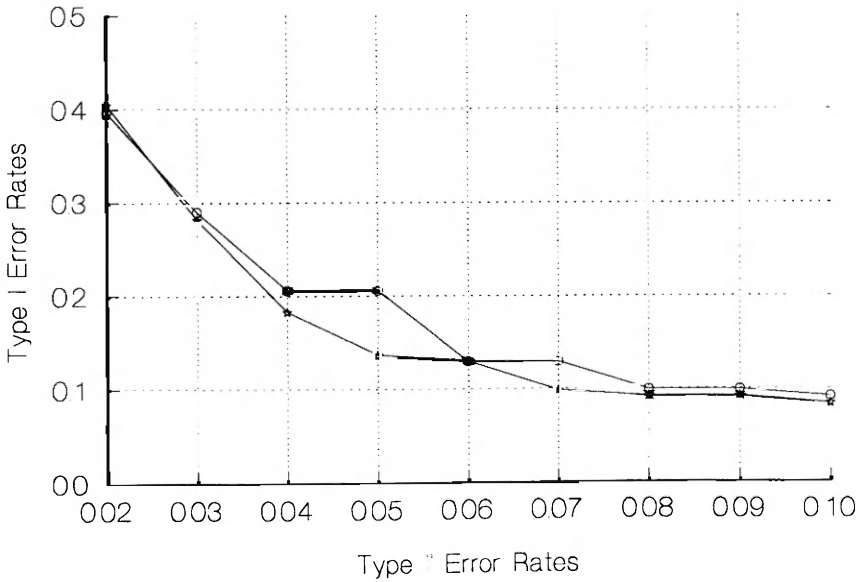
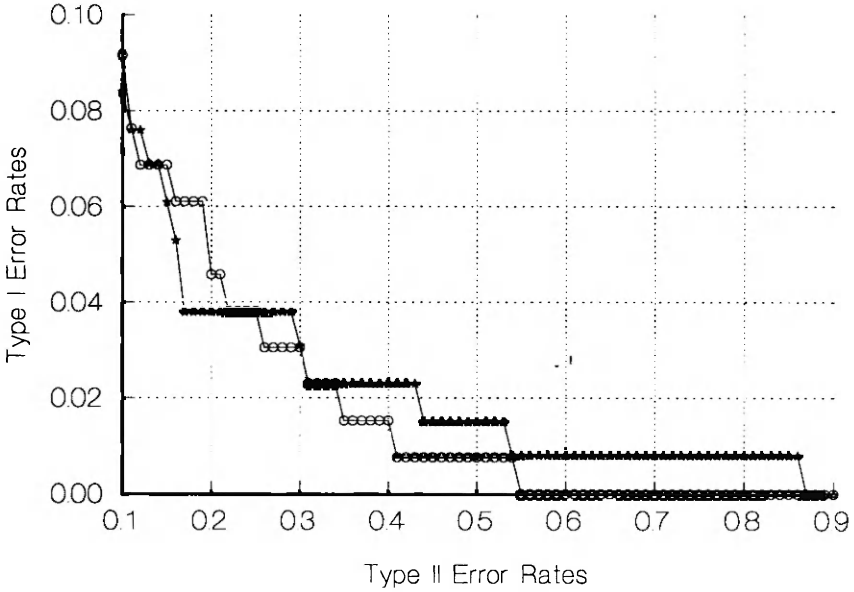


FIGURE 6: TRADEOFF FUNCTIONS AT HIGH TYPE II ERROR RATES (GREATER THAN .1)
 (Circles Denote the Logit Model; Stars Denote the Neural Network)



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APPENDIX A
CANDIDATE PREDICTOR VARIABLE DEFINITIONS

<u>Variable Acronym</u>	<u>Variable Name and Formula</u>
1. LGASSETS	<p style="text-align: center;"><u>Natural Logarithm of Total Assets</u></p> <p style="text-align: center;">Natural Logarithm of Total Assets</p>
2. CONSTLNS	<p style="text-align: center;"><u>Construction Loans to Total Assets</u></p> <p>Numerator: Construction & Land Development Loans</p> <p>Denominator: Total Assets</p>
3. RLESTLNS	<p style="text-align: center;"><u>Commercial Real Estate Loans to Total Assets</u></p> <p>Numerator: Loans Sec: Nonfarm + Loans Secured by 5+Res</p> <p>Denominator: Total Assets</p>
4. AGLNS	<p style="text-align: center;"><u>Agricultural Loans to Total Assets</u></p> <p>Numerator: Ag Prod & Farm Loans + Loans Secured by Farm</p> <p>Denominator: Total Assets</p>
5. PRMCAPAS	<p style="text-align: center;"><u>Primary Capital to Adjusted Assets</u></p> <p>Numerator: Total Equity Capital + Minority Interest + Total Mand Conv. in Cap - Allowance for Losses</p> <p>Denominator: Total Assets - Allowance for Losses</p>
6. TOCAPLNS	<p style="text-align: center;"><u>Total Capital to Total Loans</u></p> <p>Numerator: Total Equity Capital + Minority Interest + Total Man Conv. in Cap + Subordinated Notes & Deb + Ltd Life Pref Stock - Allowance for Losses</p> <p>Denominator: Loans, Net: Unearn Inc.</p>

APPENDIX A (CONTINUED)
CANDIDATE PREDICTOR VARIABLE DEFINITIONS

<u>Variable Acronym</u>	<u>Variable Name and Formula</u>
7. NPLNSPCP	<p><i><u>Nonperforming Loans to Primary Capital</u></i></p> <p>Numerator: Total Past Due Loans + Total Nonaccrual Loans</p> <p>Denominator: Total Equity Capital + Minority Interest + Total Man Conv. in Cap - Allowance for Losses</p>
8. NPLNSAST	<p><i><u>Nonperforming Loans to Total Assets</u></i></p> <p>Numerator: Total Past Due Loans + Total Nonaccrual Loans</p> <p>Denominator: Total Assets</p>
9. PDLNSGRL	<p><i><u>Past Due Loans to Gross Loans</u></i></p> <p>Numerator: Total Past Due Loans</p> <p>Denominator: Loans & Leases + Unearned Income</p>
10. NONACLNS	<p><i><u>Nonaccrual Loans to Gross Loans</u></i></p> <p>Numerator: Total Nonaccrual Loans</p> <p>Denominator: Loans & Leases + Unearned Income</p>
11. RESTRLNS	<p><i><u>Restructured Loans to Gross Loans</u></i></p> <p>Numerator: Total Restructured Loans</p> <p>Denominator: Loans & Leases + Unearned Income</p>
12. CHRGOFFS	<p><i><u>Net Chargeoffs to Total Loans</u></i></p> <p>Numerator: Total Chargeoffs - Total Recoveries</p> <p>Denominator: Loans & Leases</p>

APPENDIX A (CONTINUED)
CANDIDATE PREDICTOR VARIABLE DEFINITIONS

<u>Variable Acronym</u>	<u>Variable Name and Formula</u>
13. YIELD	<p><u>Yield on Total Assets</u></p> <p>Numerator: Total Interest Income</p> <p>Denominator: Total Assets</p>
14. RATE	<p><u>Rate Paid on Total Assets</u></p> <p>Numerator: Total Interest Income</p> <p>Denominator: Total Assets</p>
15. SPREAD	<p><u>Net Interest Income to Total Assets</u></p> <p>Numerator: Total Interest Income - Total Interest Expense</p> <p>Denominator: Total Assets</p>
16. NONINT	<p><u>Noninterest Income to Total Assets</u></p> <p>Numerator: Total Noninterest Income</p> <p>Denominator: Total Assets</p>
17. OVRHDEXP	<p><u>Total Overhead Expense to Total Assets</u></p> <p>Numerator: Total Noninterest Expense + Interest on Mtge Indebtedness</p> <p>Denominator: Total Assets</p>
18. PROVLOSS	<p><u>Provision for Loan Loss to Total Assets</u></p> <p>Numerator: Prov: Loan & Lease Loss + Prov: All Transfer Risk</p> <p>Denominator: Total Assets</p>
19. SECGAINS	<p><u>Security Gains (Losses) & Extra. Items to Total Assets</u></p> <p>Numerator: Gains (Losses) on Sec + Extra Items, Gross</p> <p>Denominator: Total Assets</p>

**APPENDIX A (CONTINUED)
CANDIDATE PREDICTOR VARIABLE DEFINITIONS**

<u>Variable Acronym</u>	<u>Variable Name and Formula</u>
20. RETNTA	<p style="text-align: center;"><u>Return on Total Assets</u></p> <p>Numerator: Inc. before Extra. Items</p> <p>Denominator: Total Assets</p>
21. RETEQ	<p style="text-align: center;"><u>Return on Equity</u></p> <p>Numerator: Inc. before Extra. Items</p> <p>Denominator: Total Equity Capital</p>
22. LIQSTAST	<p style="text-align: center;"><u>Short-Term Assets Less Large Liabs. to Total Assets</u></p> <p>Numerator: Due: Int. Bearing + Federal Funds Sold + Assets in Trading Accts. + Debt Sec. Reprc <1 Yr. - Time CDs >\$100M - Open Acct. Time >\$100M - Dep: For Nonint. Bearing - Dep: For Int. Bearing - Federal Funds Purchased - Notes Issued to U.S. Treas. - Liab. for Borrowed \$</p> <p>Denominator: Total Assets</p>
23. TMDEPS	<p style="text-align: center;"><u>Large Time Deposits to Total Assets</u></p> <p>Numerator: Time CDs >\$100M + Open Acct. Time >\$100 M</p> <p>Denominator: Total Assets</p>
24. NETLNS	<p style="text-align: center;"><u>Net Loans to Total Assets</u></p> <p>Numerator: Loans & Leases - Allowance for Losses</p> <p>Denominator: Total Assets</p>

**APPENDIX A (CONTINUED)
CANDIDATE PREDICTOR VARIABLE DEFINITIONS**

<u>Variable Acronym</u>	<u>Variable Name and Formula</u>
25. LNSINSID	<p><u>Loans to Insiders over Net Loans</u></p> <p>Numerator: Credit to Officers Agg. Amt.</p> <p>Denominator: Loans & Leases - Allowance for Losses</p>
26. CUMPROF	<p><u>Undivided Profit & Cap. Reserve to Total Assets</u></p> <p>Numerator: Undivided Profit & Cap. Reserve</p> <p>Denominator: Total Assets</p>
27. INCOME	<p><u>Income before Extra. Items</u></p>
28. EQCAPTL	<p><u>Total Equity Capital</u></p> <p>Numerator from TOCAPLNS</p>

**APPENDIX B
SIGNIFICANT PAIRWISE CORRELATIONS**

CORRELATIONS OVER .5 - 1984 DATA

	NPLNSAST	CHRGOFFS	PROVLOSS	LIQSTAST	YIELD	RETNTA	PRMCAPAS	NONACLNS	TOCAPLNS	OVRHDEXP
PDLNSGRL	.641									
NONACLNS	.838					-.575				
CHRGOFFS	.603							.591		
PROVLOSS	.662	.858						.595		
RETNTA	-.633	-.741	-.858							
NETLNS				-.648						
TMDEFS				-.730						
RATE					.699		-.547			
CUMPROF						.616				
NONINT									.593	.713
SPREAD										.500

**APPENDIX B (CONTINUED)
SIGNIFICANT PAIRWISE CORRELATIONS**

CORRELATIONS OVER .5 - 1985 DATA

	NPLNSAST	CHRGOFFS	PROVLOSS	LIQSTAST	YIELD	RETNTA	PRMCAPAS	NONACLNS	OVRHDEXP	TOCAPLNS	INCOME
PDLNSGRL	.702										
NONACLNS	.840										
CHRGOFFS	.518		.888					.579			
PROVLOSS	.578							.582			
RETNTA	-.596	-.768	-.874					-.576			
NETLNS				-.648							
TMDEPS				-.717							
RATE					.730		-.557				
CUMPROF			-.545			.752			-.524		
NONINT									.648	.530	
SPREAD					.606						
EQCAPTL											-.788

Discussant's Response to "Neural Nets Versus Logistic Regression: A Comparison of Each Model's Ability to Predict Commercial Bank Failures"

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Bell, Ribar and Verchio [1990] apply two alternative methodologies in the prediction of commercial bank failure. This discussion first examines the nature of the work; second, explores issues in neural network methodology; and third, concludes with the discussion of other relevant issues such as alternative approaches and paths for future work.

On the Nature of the Work

The bank failure problem has been extensively explored in the literature of accounting and finance. Consequently, there is a wide body of knowledge about the problem and substantial insight on analytical methods that help in the prediction of failure. This makes it an ideal arena for competitive methodological testing allowing for comparison, not only among the methodologies in question but also with an external body of literature.

The study uses an extensive sample from the 1983-1988 period for drawing failed banks and chooses through a sample estimation procedure. Part of the sample is held out for model testing purposes. The method is quite standard and has been used in many similar studies. Some more recent studies have used the jackknife/bootstrap method in order to avoid having to hold a large part of the data as a holdout sample. This approach could be adopted in this study leading to a different set of basic assertions. Nonfailed banks were chosen through a stratified sampling procedure for group pairing.

The authors used 28 prediction variables for failure prediction, very much in line with the literature. In these types of studies, you should always be concerned with two issues: over-fitting and missing variables. This study presents a relatively large sample, thereby decreasing some concerns with the first issue. The variables used are the standard financial variables that appear in most studies. These do not include any potential "soft" causes for failure (e.g. poor management, fraud) and/or macro variables.

In summary, the problem context and approach relate to a large set of studies in the literature and are an ideal setting for evaluating competing statistical methodologies. It might have been desirable that the authors further discuss the literature and the main results. The logit approach has been used extensively in research during the recent years while neural networks are a new and forthcoming area. Consequently, they are to be discussed next.

On Neural Nets

Much of the effort that started the neural network field, stems from the desire of scientists and researchers to understand the way the brain functions and to emulate its behavior. With a desire to obtain human-like capabilities (e.g. speech understanding, learning, vision), researchers have used computers as an alternative to the human being. A family of these devices is classified as neural computers and are based on what is called neural networks as noted by the following excerpt from Russo and Lewy [1989].

Generally speaking, neural networks are an alternative, parallel computing architecture. Instead of being programmed like conventional algorithm computers, neural nets are trained and it is therefore arguable that they learn from and/or adapt to the nature of their input.

In essence, neural net software present a series of desirable characteristics:

- they are adaptive in nature,
- they can be retrained for improved performance,
- they are fault-tolerant due to their massive parallelism,
- their algorithms are typically non-parametric and therefore, they are more robust.

TABLE 1 drawn from Miller [1990] compares neural versus digital computers.

TABLE 1	
NEURAL COMPUTERS VS. DIGITAL COMPUTERS	
DIGITAL DATA PROCESSING	ANALOG DATA PROCESSING
YES & NO DECISIONS BASED ON MATHEMATICAL AND LOGICAL FUNCTIONS	WEIGHTED DECISIONS ON THE BASIS OF FUZZY, INCOMPLETE, AND, CONTRADICTORY DATA
DATA HANDLED IN A RIGID STRUCTURED SEQUENCE	INDEPENDENTLY FORMULATE METHODS OF PROCESSING DATA
FIND PRECISE ANSWERS TO ANY PROBLEM, GIVEN ENOUGH TIME	FIND GOOD, QUICK, BUT APPROXIMATE ANSWERS TO HIGHLY COMPLEX PROBLEMS
SORT THROUGH LARGE DATABASES TO FIND EXACT MATCHES	SORT THROUGH LARGE DATABASES TO FIND CLOSE MATCHES
STORE INFORMATION TO RETRIEVE SPECIFIC INFORMATION	STORE INFORMATION TO ALSO RETRIEVE RELATED FACTS

Nevertheless, in spite of the promise and potential of this technology, there are many myths and hype that surround its usage. TABLE 2 represents a partial list of hypes and realities in neural nets.

**TABLE 2
HYPER AND REALITY IN NEURAL NETS***

HYPE (H):	MANY SUCCESSFUL NN APPLICATIONS EXIST
REALITY (R):	HARDWARE HAS NOT YET CAUGHT UP WITH THE APPROACH AND IS HOLDING THINGS BACK
H:	NEURAL NETS PERFORM BETTER THAN BAYESIAN CLASSIFIERS
R:	BAYESIAN CLASSIFIERS ARE OPTIMAL BUT CANNOT BE CONSTRUCTED WITH MANY VARIABLES
H:	VERY FAST PROTOTYPING
R:	ONLY FOR SMALL NETWORKS TRAINING AND DATA GATHERING TAKES TIME
H:	PARALLEL, THEREFORE FAST
R:	SERIAL IMPLEMENTATION, PRACTICAL VLSI 3-7 YEARS AWAY
H:	PATTERN RECOGNITION AND DETECTION IS EXTREMELY POWERFUL, ROBUST AND TOLERANT TO NOISE
R:	TRUE— > BUT MUST BE DESIGNED AND TRAINED

* Adapted from Russo and Lewy [1989], Miller [1990], and Widrow [1988].

A simple neural network will have three layers: 1) the input layer, 2) the hidden layer and 3) the output layer. The second layer has some form of internal representation that can be known or unknown.

There are two major types of neural networks: feedback and feed-forward. Feedback nets or associative memories can store many template patterns by presetting the network weights. A feed-forward multi-layer network is composed of rules (not templates) that are learned and stored as the weighted connections of the network.

Neural nets have been discussed as a family of technologies and/or implementations of similar nature. Among the types of neural network approaches to learning and/or propagation and conflict resolution, we find: A) Grandmothering [Caudill, 1990], B) delta or least mean square rules (LMS) [Widrow and Hoff, 1960], C) Back-propagation [Rumelhart, McClelland et al., 1986], D) Kohonen self-organizing network [Kohonen, 1984], E) Outstar learning [Grossberg, 1982], F) The avalanche model [Caudill, 1990], and G) Adaptive resonance theory [Grossberg, 1982].

The Bell and Ribar paper used NeuralWare's software (back-propagation) using 11 predictor variables in the input layer, and eight nodes in the hidden layer. It was trained using 102 banks from the 1984 estimation sample and 102 of the non-failed banks drawn randomly. The network was trained with about 300,000 iterations and after the examination of a Hinton diagram it was decided that two nodes were to be dropped. This model was compared with a rather different logit model.

A point to ponder, in this type of comparison is that both the neural model and the logit model are the product of substantial tinkering in the attempt to improve failure predictability but there is no assurance that they provide any form of best predictor. Second, considering the model structure and data differences, it is not clear if there is any information superiority in one of the approaches. The countervailing approach would attempt to keep parity between the approaches at the cost of not "best" utilizing its features.

Some Further Issues

Researchers differ in approach and taste when dealing with particular problems. The authors should be encouraged to continue this line of investigation. It is seldom that a commercial firm endeavors in the examination of emerging technologies with the seriousness and methodological quality that is found in this study. A few suggestions however are of relevance.

This study lacks somewhat in the examination and comparison of its results with the extant literature. Substantial insights may be acquired by better positioning this methodological study in relation to the bank failure literature. Furthermore, the quality and nature of predictions by the neural net model should be compared not only with the logistic model but also with the nature of the findings in the literature. Secondly, as discussed in the introduction of this paper, considerable insights of a methodological nature can be acquired from an examination of better and worse performing models and the nature of the predictions obtained.

The authors may also consider, after some preliminary variable selection work, performing their comparison on the same set of variables as opposed to varying the basic variables set. The approach adopted by the authors may be confused as a methodological improvement while the variance may have been explained due to the inclusion of additional variables.

The most important issue is that this study is a comparison of the logit technology with a particular type of neural net approach and algorithm, specifically, the back-propagation method. Neural net, more than many other technologies, is a generic name for many, often non-similar approaches, and within each, dissimilar families of more similar types of approaches are found. Consequently, this work tested a particular type of neural net implementation versus the logit model. This study has not answered the question of what type of neural net approach or what type of structure would be the most promising for the bank failure problem.

In conclusion, the study found neural net technology to have some promise in a bankruptcy prediction context. From the nature of the findings and of the approach, many fascinating ideas for extension and application to other

areas may follow. For example, can a model be developed and trained to evaluate a sample taken in an audit, based on some of its context variables, to increase the probability of finding values in error? Can the same model be extended, not only to predict failure but to rate and point out different levels of financial distress?

This paper deals with a very rich area and much was clearly learned just by manipulating the neural model to improve predictability of bank failure. An interesting extension would be to compare different neural algorithms among themselves and in relation to the logit model.

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4

Expert Systems and AI-Based Decision Support in Auditing: Progress and Perspectives[†]

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When all the AI rhetoric is boiled away, expert systems are simply computer programs much like general ledger packages or even like video games. Writing a new payroll program in COBOL is not research, and neither is building another auditing expert system.

1. Introduction

Since the development of AUDITOR at Illinois, there have been a number of auditing expert systems designed and built by both academics and accounting professionals. For surveys of this work, see Messier and Hansen [1987], Gal and Steinbart [1987], Bailey, Hackenbrack, De, and Dillard [1987], and Bailey, Graham, and Hansen [1988]. However, as encapsulated by the statement above, a continuing criticism of this work (indeed, a criticism of any knowledge-based work in accounting) is that it constitutes more development than research. In this paper, we contend that such blanket criticisms are unfounded and are in fact more attributable to a critic's lack of schooling in computer science than to any conceptual shortcomings in the actual systems research methods. More specifically, we will look at several auditing expert systems and evaluate them in terms of some informally developed differentiation heuristics, heuristics whose rationale depends heavily on the work of March [1988] and Cohen and Howe [1988]. We will also try to chart new directions for research in knowledge-based auditing systems. Our central purpose throughout this paper is to try to develop a framework of analysis so that when someone proposes a new audit expert system or enhancements to an existing audit expert system, we can type its contribution as either primarily research or primarily development or both.

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The organization of the paper is as follows. Section two will explore the cognitive modeling rationale for AI-based research in auditing. This reasoning is critical to our analysis framework, but it has been explicated in detail elsewhere. It will only be reviewed and summarized here. Section three will explore the software engineering legitimacy of knowledge-based audit systems, i.e., a rationale that is quite a bit different from the cognitive modeling approach of most accounting researchers. This section will explore that rationale as adapted from a framework developed by March [1988] and augmented by other considerations gleaned from the work of researchers such as Cohen and Howe [1988]. The three subsections of this software engineering segment will address in order: (a) the March framework, (b) a set of arguments concerning domain specificity and maturity of the research field, and (c) some considerations involved in deciding whether to build an entire system or to prototype just a part of it. Section four will explore time-lined development of four academic audit expert systems and contrast their research content with that of three bogus projects. The rationale developed previously in both sections two and three will be used in the comparison of these four real systems and three straw men. Section five will explore the perspective of the audit practitioners in AI tool development, and it will examine briefly areas where academics and practitioners can work together. Section six will finish the paper with a summary of our arguments.

2. Cognitive Modeling Rationale

A central theme which underlies the discipline of accounting is the belief that accounting information influences decision making processes. This orientation has led both academicians and practitioners to be concerned with improving decisions that fall within the accounting domain. There are basically three different approaches that can be used to improve a decision. The first is to provide better information. A second is to train the decision maker to use the current information set more effectively. Finally, the decision maker can be replaced with a device that produces a consistent decision according to some prescribed model [Libby, 1981]. An initial issue that must be resolved prior to taking any of these actions is to understand the current approach used to make the decision in question so that deficiencies, if they exist, can be evaluated. As a group, the decisions made by auditors have been used as the primary focus of a number of projects as accounting researchers seek to understand the auditing decision process. In recent years, the information-processing paradigm has been used in an increasing number of these projects as researchers seek to uncover different aspects of the auditing decision process.

When auditors make a decision concerning the state of internal controls or the importance of a particular account balance to the completed financial statements, they must collect information, combine it using some process, and then finally produce a decision. The information-processing paradigm offers a number of different approaches to investigate these activities. A researcher can ask auditors to verbalize what they are doing as they make decisions. These verbal reports [Ericsson and Simon, 1980] provide a trace

of the steps that the auditor goes through and thus give insights into the information used, the combination processes employed, and the decisions produced. This verbal trace of problem solving activities becomes a model of the underlying cognitive process. A difficulty with this approach is that it is hard to verify the model. This deficiency has led certain accounting researchers to use tools and methods borrowed from computer science in an attempt to implement the model of the auditor on a computer in the form of a program that simulates the auditor's decision process. The rationale for building these systems is that the researcher now has a program which contains a cognitive model of the decision maker and can proceed with an assessment of which of the three approaches mentioned above would be appropriate to improve the decision. That is, should we change the information or should we train auditors to use a different process or finally should we use the expert system to replace the auditor?

As noted by Bailey et al. [1987], cognitive modeling has certainly provided the dominant justification for most expert systems work in auditing, and it is the rationale most easily accepted by mainstream accounting researchers. We turn now to a less well-known (in accounting) justification for construction and use of AI tools in this area: the software engineering rationale.

3. Software Engineering Rationale

In describing the scope of *empirical AI* (as opposed to *applied AI*) endeavors and in contrasting its methodological differences with those of traditional behavioral science, Cohen and Howe observe that: "Whereas ... much research in the behavioral sciences is concerned with teasing apart the components of behavior and their causal interrelationships, empirical AI is concerned with putting those components together in one box to produce behavior" [1988, p.18]. These researchers go on to say that the task of empirical AI researchers "is not to find out [by statistical induction] how the average human organism (or organization) works ; but rather to build artificial systems that work in particular ways" [p.19]. By building such systems in carefully delineated ways, they contend that we can produce useful generalizations deducible from explanations of AI theory. Cohen and Howe's thoughts in this regard echo sentiments expressed a number of years earlier by Newell and Simon [1976, p.126] who contended that the purpose of AI research was to enrich our collective store of concrete experiences with specific classes of symbolic processing systems and to use that collective store to reason across domains about the general characteristics of intelligence and its methods of implementation.

Justifications such as these form the basis for what we call the software engineering rationale for AI research in accounting and auditing. Stated differently, we believe that efforts aimed at building knowledge-based systems in new and innovative ways in previously unexplored task areas can quite legitimately be viewed as research even if the results of such efforts do not strongly mimic the behavior of a human expert in that particular domain. In the subsections that follow, we explore different heuristic frameworks that can be used to classify endeavors in this vein as either research or development.

The March Framework

In a speech given at ICIS-88, Sal March (the present editor of *Computing Surveys*) outlined his framework for identifying information technology issues for information systems researchers. That framework is reproduced in Figure 1, and his explanation is given below [March, 1988]:

My general framework for research in information technology is two dimensional. The first dimension is an engineering paradigm: *build* an artifact to perform a particular task, *evaluate* the performance of that artifact (develop performance measures and collect data to evaluate those measures), and *prove* the performance of the artifact (superior to another tool or optimal in some sense). The second dimension is a problem solving (methodological) paradigm: *representation* of the problem within its domain, development of *methods* utilizing the representation to solve the problem, and *tools* to instantiate the method.

In order to build a tool to solve a problem, a representation of the problem must be developed along with a solution method to instantiate. The building of tools based on given problem representations and methods typically does not qualify as research unless it is the *first* tool to be developed, in which case the research question is feasibility: can the representation and method be instantiated into a viable tool?

Similarly, for building representations and methods, the research issues involve building *new* or *substantially* different representations and methods. Simply being “different” or “novel” *may* classify work as “research” (depending on how novel it is), however, the burden is normally on the researcher to demonstrate that the new representation or method is “better” than existing ones. The evaluate and prove columns of the framework addresses this issue.

To adequately evaluate representations, methods, or tools, the researcher must develop measures of performance. These must address the key issues of the problem domain and the solution approach. The researcher then evaluates these measures for various representations, methods, and tools to provide a performance comparison. This type of work is typically empirical. It develops case by case comparisons until the discipline has decided upon a standard set of measures.

Given a standard set of evaluation criteria, research can then proceed to prove the quality of representations, methods, and tools. Proofs may be in the form of “optimality” of the solution or superiority of the representation, method, or tool (where the evaluation measures define the optimization or comparison criteria) .

If we apply the March framework and explanation to proposed new work in knowledge-based audit systems, they give us strong guidelines for differentiating research from development or empirical AI from applied AI. As he infers, building a new tool for a task isn't really research unless the methods or representations change substantially or unless the researcher can demonstrate performance on well-developed evaluation metrics. For an audit researcher today, novel representations might include new structures (such as

	BUILD	EVALUATE	PROVE
REPRESENT			
METHOD			
TOOL			

FIGURE 1

**THE MARCH FRAMEWORK
SOURCE: MARCH (1988)**

advanced forms of semantic networks [Winston, 1984]) and new problem-solving architectures (such as heuristic classification [Clancey, 1985]). Novel methods might encompass the use of new learning algorithms or the discovery of innovative knowledge acquisition techniques. Moving across to the evaluate and prove columns would mean building new systems that are demonstrably better on tasks such as causal explanations or default reasoning.

Domain Specificity and Maturity of the Research Field

According to the March framework, building a new tool with established representations and methods teeters on the research-development fence unless one is clearly the first person to do something in the area. We believe that judgments of novelty in this arena can be clarified by considering both the domain specificity of the new effort and the maturity of the particular research field (or sub-field) in which that effort's exposition is to take place. These considerations are discussed below.

Specificity and maturity considerations are illustrated with hierarchies in Figure 2 whose roots are very general and whose leaves are audit procedures specialized down to the task and firm level. As with all research, the more

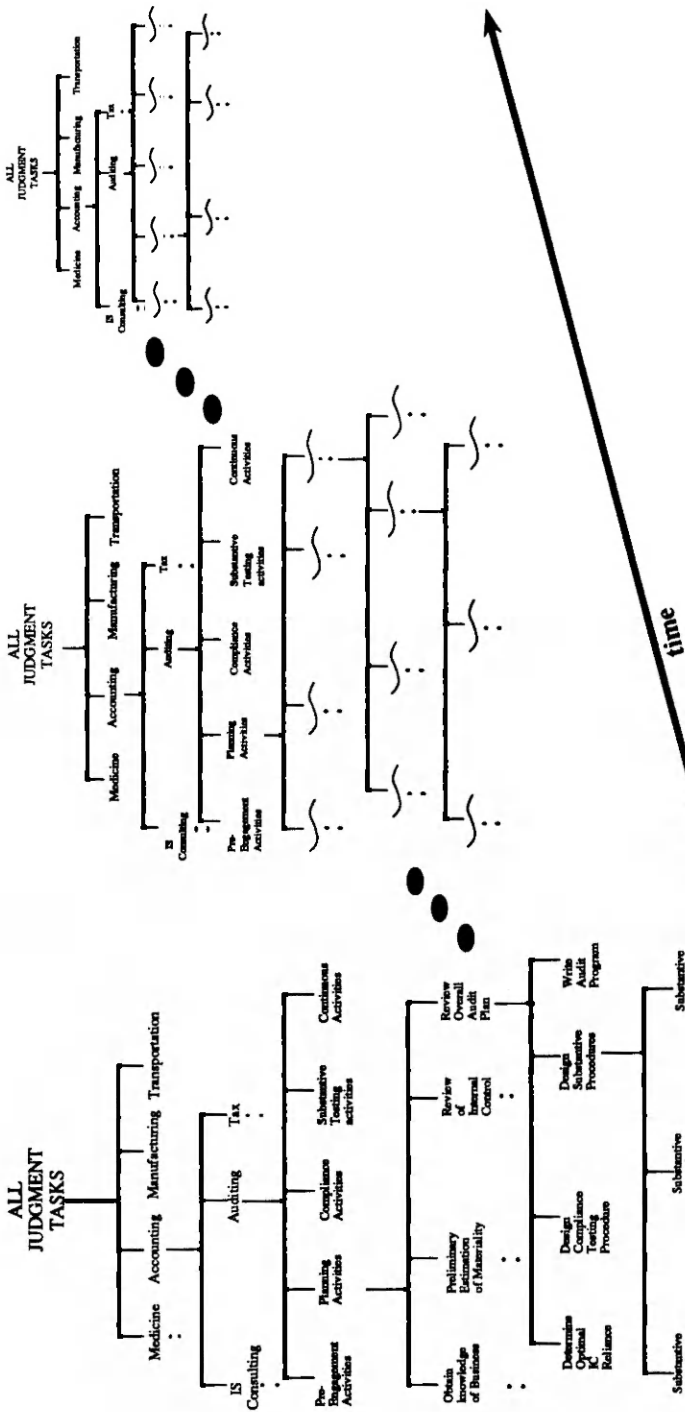


FIGURE 2 -- DOMAIN SPECIFICITY AND MATURITY

SOURCE: ADAPTED FROM AKRESH ET AL.(1988)

general one's conclusions are, the better; so staying up in the tree is desirable. In the three-dimensional plane of this figure, we have illustrated the age of the research sub-field. Our point in accounting for time variability is that we believe that the proper set of research activities changes as a field matures. What is acceptable in an emerging area as exploratory research will often be deemed far less noteworthy as cumulative results dictate new directions.

For the proposer of a new audit expert system today, these time sequenced hierarchies carry some important considerations. For instance, just finding an unexplored node and building a tool which uses established representations and methods is clearly not innovative enough unless the task is at a sufficiently high level of generality to warrant reassessment of the lessons learned from building entire classes of previous systems. In a like manner, exploratory programming of a new niche or sub-tree becomes less innovative as time goes on because March's research question of feasibility has been resolved. In both of these cases, the systems efforts being proposed would fall under the headings of development or applied AI.

Research and Development Delineation in Prototype Systems

A fully functional expert system involves considerably more development effort than research effort, and designers will find that the new knowledge gained from building system components will decrease dramatically as the project progresses. Actually, prototyping to a proof of feasibility is the essence of research in AI tools, a fact illustrated by McCarthy, Rockwell, and Wallingford [1989] in their task complexity hierarchy of Figure 3.

When a new AI system is proposed, assessing its ultimate feasibility involves the following:

- a. breaking the operation of the entire new system into its component procedures and arranging those components into a structured hierarchy like Figure 3,
- b. assessing the relative implementation difficulty of the top level components and choosing the most complex module for further investigation,
- c. implementing a prototype of that chosen module down to its full depth of complexity, and
- d. assessing overall feasibility by combining estimates of both width and depth of effort from the preliminary structuring of the overall task and from the results of the prototyping efforts.

Empirical AI (research) would stop at this proof of feasibility unless there was clear evidence that further overall complexity (unrelated to individual module complexity/simplicity) might be introduced by full implementation of factors such as scaling problems. Applied AI (development) on the other hand would continue with implementation of the other components. Little new knowledge would be revealed by the development efforts, but the entire project would move closer to actual practical use in a cost-beneficial way.

[Source: Adapted from McCarthy, Rockwell, and Wallingford (1989)]

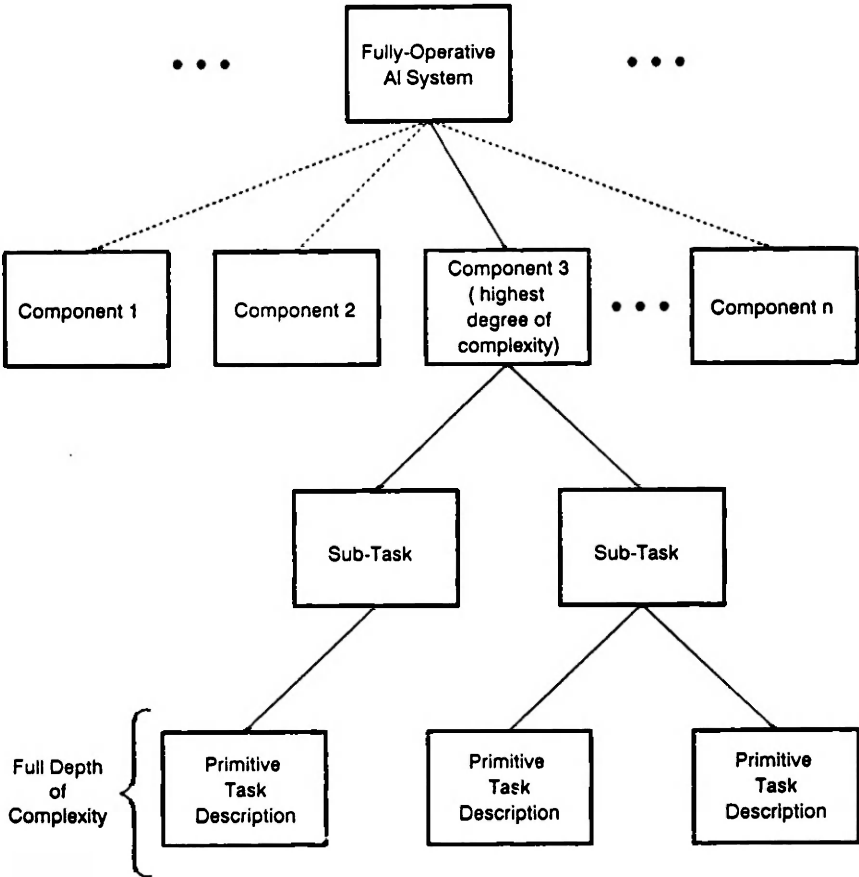


FIGURE 3

PROTOTYPE MODULE STRUCTURE

Summary of Software Engineering Rationale

In their famous Turing Award Lecture of 1975, Newell and Simon [1976, p.114] spoke of the confusion surrounding the scope of basic research in computer science:

Computer science is an empirical discipline.... Each new program that is built is an experiment. It poses a question to nature, and its behavior offers clues to an answer. Neither machines nor programs are black boxes: they are artifacts that have been designed, both hardware

and software, and we can open them up and look inside. We can relate their structure to their behavior and draw many lessons from a single experiment.... We build computers and programs for many reasons. We build them to serve society and as tools for carrying out the economic tasks of society. But as basic scientists, we build machines and programs as a way of discovering new phenomena and analyzing phenomena we already know about. Society often becomes confused about this, believing that computers and programs are to be constructed only for the economic use that can be made of them (or as intermediate items in a developmental sequence leading to such use). It needs to understand that the phenomena surrounding computers are deep and obscure, requiring much experimentation to assess their nature. It needs to understand that, as in any science, the gains that accrue from such experimentation and understanding pay off in the permanent acquisition of new techniques; and that it is these techniques that will create the instruments to help society in achieving its goals.

Newell and Simon summarize well our viewpoint about AI research in accounting from a software engineering perspective. Building new software systems that operate in innovative ways and that provide new insight constitutes significant research activity as does the process of creating or applying new methodologies, representations, and methods that facilitate the construction of such novel software systems. Computer software in general and, AI programming in particular, can legitimately be defended as the end goal of accounting research, not just as a means to some other end such as the test of a certain behavioral or economic theory.

4. Some Research/Development Examples

In the previous two sections of the paper, we have outlined in preliminary fashion some heuristic frameworks which can be used to assess the research content of a proposed AI-based audit tool. In this section, we will demonstrate the use of those frameworks in exploring the time-lined development of four academic audit expert systems. We intend also to highlight their evaluation by contrasting their research content with three bogus expert systems. We have tentatively designated these bogus systems as YAK-BATs (Yet Another Knowledge-Based Auditing Tool), and they serve as prime straw men for our research/development differentiation arguments.

Our example audit systems are displayed in the box in Figure 4 that portrays *empirical* AI systems as bubbling up and above the dotted line separating research and development and *applied* AI systems as gravitating down. The four real systems are AUDITOR [Dungan and Chandler, 1985], AUDIT-PLANNER [Steinbart, 1987], GC-X [Selfridge and Biggs, 1988], and IRE [Peters, 1989]. The three bogus systems are YAK-BAT-1, YAK-BAT-2, and YAK-BAT-3; and we have positioned these straw men at particular time intervals purposely to highlight the types of proposed work properly classified as development. General features of each system are given in order below.

AUDITOR: This was a simple rule-based system that used a linear weighting system to assess the adequacy of a client's allowance for bad debts. It was

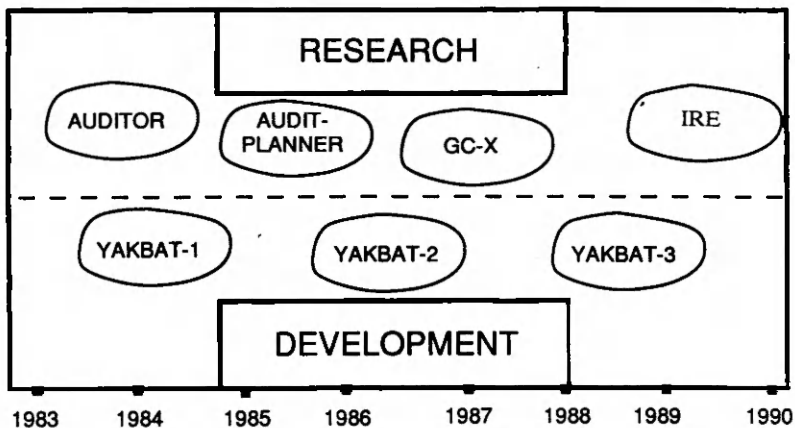


FIGURE 4
ACADEMIC SYSTEMS: RESEARCH AND DEVELOPMENT

the first publicized application of knowledge-based methods and representations to the domain of auditing, and it was certainly a pioneering research effort. The system was developed and validated with a set of working auditors.

YAKBAT-1: At the nascent stage of the audit expert system field in 1984-85, it would be hard to think of a proposed project which would not have shed some new light of knowledge on the area. However, if someone had proposed to use a known development shell on a fairly low level task using well-understood methods of knowledge acquisition, we would consider that as sinking below the R&D surface. This would be especially true if there was no attempt made at emulation of an acknowledged expert and/or validation. In those cases, the developer would simply have been using the technology for automation of ad hoc decision-making heuristics.

AUDIT-PLANNER: This was a rule-based system with a much more complex control structure than AUDITOR. AUDIT-PLANNER was truly a cognitive model of one individual's expertise in the area of materiality judgments, so its research contribution is unquestioned. It was validated with subordinate auditors of the same firm. The representations and methods used in building the system were well known, but the task was fairly high on the domain hierarchy.

YAKBAT-2: Steinbart's system circumscribed the entire materiality decision very well, and it was essentially self-contained in the sense that a consultation with AUDIT-PLANNER elicited a set of environmental cues from a user and used those cues in its goal of producing a materiality judgment. A tool developed later that would have concentrated heavily on the less complex development branches (such as tuning the user interface) or that would

have used the same rule-oriented representations to emulate a lower level audit task would fall into the development or applied AI compartment.

GC-X: The Selfridge and Biggs going concern expert system introduced the complex representations of semantic networks. They also demonstrated the complicated interactions between audit task knowledge and client domain knowledge that had long been thought to be an important ingredient of audit expertise.

YAK-BAT-3: This might be a frame-based or rule-based expert system which would lack the domain richness of GC-X. Certainly at this point in time, simple implementations of somewhat specific judgment tasks would lend little new insight to the field, unless the tool could be moved over to the evaluation or prove columns of the March framework.

IRE: The Inherent Risk Evaluator used complex representations of both firm specific and general business knowledge along with specific predictions derived from analytical review rules to assess risk for audit planning. The system was validated carefully on three sets of case data, and its cognitive modeling intent is quite clear.

The research viability of each real system discussed above is widely (but not universally) acknowledged in the auditing community. Their developers undoubtedly would cast them first as cognitive models, but they all display innovation in a software development sense also. Certainly, researchers would be wise to concentrate on the more widely accepted behavioral science rationale in their development of proposed new projects. We remain convinced however that the technology-oriented rationale of the prior section constitutes an additional basis on which to plan new work.

5. The Accounting Firm Perspective

As has been explained, research efforts concentrate on pursuing more accurate representations or models of cognitive processes while improving the methods for evaluating the representation methods themselves. Therefore, academic efforts focusing on the particular use of previously explored frameworks are best characterized as development rather than research given our discussion to this point.

Unlike academic researchers, professional firms tend not to be concerned about whether a particular project is characterized as research or development. Rather, firms focus primarily on enhancing the efficiency and effectiveness of audit practice instead of understanding low level cognitive processes, exploring complex instances of judgement, or developing formal methods of evaluating concepts. This interest typically results in accounting firms applying artificial intelligence technology along two fronts: (1) automating clerical or low level audit judgement tasks and (2) leveraging firm or individual expertise.

Notwithstanding the profession's disinterest in distinguishing between research and development, these projects often result in significant contributions to academic research efforts. Graphically, the results of AI work amongst the firms might be characterized as shown in Figure 5. Although the major portion of a particular firm project will likely be characterized as

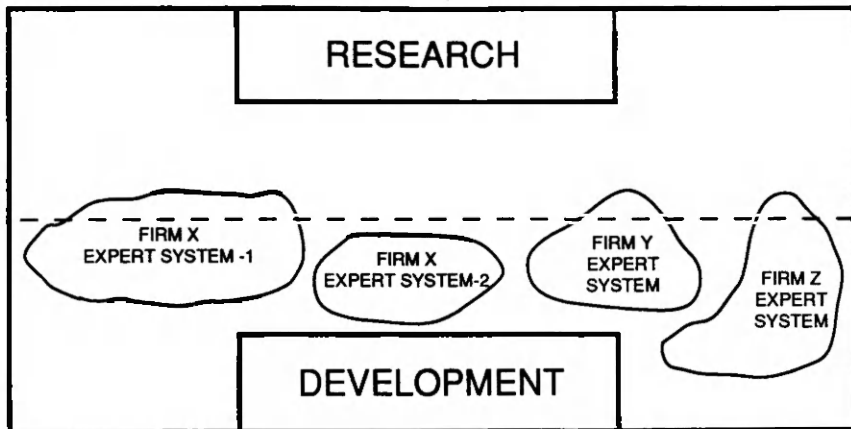


FIGURE 5
ACCOUNTING FIRM SYSTEMS;
RESEARCH AND DEVELOPMENT

development, a portion of the effort could legitimately be considered a research contribution.

The Contribution of Practice to AI Research

In a nutshell, we see practice efforts providing two contributions to AI research. First, the firms may propose and utilize novel methods and representations as well as provide well-developed metrics for evaluation of those methods and representations; and second, they expose the weaknesses of scalability of academic theories and ideas.

During the past few years, a number of firms have released various expert systems which are in use today. To a limited extent, some of these systems have provided a contribution to AI research by providing improved representation and evaluation methods. For illustrative purposes, we will briefly review the contribution of Coopers & Lybrand's new audit tool Risk AdvisorSM.

As Graham, Damens, and Van Ness [1990] explain, "Risk AdvisorSM is an expert system based on the knowledge and experience of senior audit and consulting professionals. It is used by auditors to enhance the risk assessment process through the systematic capture and analysis of a wide range of financial information and other data to allow the timely identification of audit and business issues." The system captures, analyzes, and reports information ranging from standard client, industry, and economy-wide financial information to qualitative information captured through dialogue with the system. The system is utilized during audit planning to identify and document potential audit risks and management issues which are important to the audit. Additionally, the system assists in analyzing whether appropriate action is taken in response to the issues raised by the system during the planning process.

Risk AdvisorSM certainly provides useful contributions to the issues of knowledge acquisition from more than one expert, knowledge representa-

tion, and human/computer interaction. However, we believe the larger contribution of projects such as these lie more in their ability to address the “toy world” problems which have plagued academic efforts for years.

Although execution of a computational model serves a “proof of concept or feasibility” which academics have used as their primary evaluation tool, the proof is still susceptible to weaknesses of scalability such as those often revealed by the overly simplistic application of exhaustive search methods. Upon being tested in realistic decision support scenarios, the solutions offered by auditing academics sometimes prove insufficient for addressing problems in the real world. As Waterman [1986, p. 27] states, “When gross simplifying assumptions are made about a complex problem, and its data, the resulting solution may not scale up to the point where it’s applicable to the real problem.” Projects such as those by Coopers & Lybrand certainly provide a test of the scalability of academic theories and thereby result in feedback to the academic community as to the adequacy of academic research.

Practitioners and Academics Working Together - The Optimal Solution

The primary contribution of academic researchers in any field is the low cost application of analytical skills to problem solving. However, when academic efforts are isolated from the real world problems faced by practitioners, the usefulness of the research wanes. Conversely, practitioners face real, complex, and important problems daily which can prove costly if not objectively studied in a timely fashion.

The logical conclusion to an analysis of academic and practice efforts in the use of AI is that the two should work together. Such a consortium could possibly result in significant enhancements to audit practice by providing sound solutions to real problems which have been carefully scrutinized without the pressure of the practice environment. To the extent that academics and practitioners can enhance audit practice while also increasing our understanding of audit judgement, significant contributions can be expected.

The reality of the situation however, highlights significant challenges to developing working relationships between practitioners and academics. The strategic nature of AI projects tends to encourage confidentiality of project results at least in the short run while the firm realizes the rewards of being the “first-mover” with a new idea. Such a practice is diametrically opposite to the nature of the academic environment which attempts to distribute project results in a much more timely fashion in order to encourage additional research.

Although differences are obvious, they are no greater than those faced in many of the physical and engineering sciences in which universities and organizations work together on more sensitive issues of national security as opposed to simpler marketing or operational advantages. We believe that any challenges can be overcome once practitioners and academics recognize the mutual benefit of working together.

6. Summary

This paper has reviewed the progress of knowledge-based research projects in auditing, primarily in the academic section of the field. We outlined

some heuristic rules and frameworks against which a proposed new audit tool could be evaluated and classified as either fundamental research or practical development. We readily admit that certain types of expert systems are like COBOL payroll programs in the sense that they are simple computational exercises that add little to fundamental knowledge. Building software systems which make *marginal* improvements with *known* approaches in *established* domains is definitely development activity, while building software systems which make *significant* improvements with *novel* approaches in *unexplored* domains is most certainly research. The difficulty of classification lies in the middle which is where we have concentrated our discussion. Academic researchers can follow our guidelines in trying to stay above the research-development surface.

We remain very optimistic that work in this particular field will continue to grow, along with knowledge-based research in other areas of accounting as well. Expertise in professional judgment will always be a scarce commodity on both public and corporate accounting staffs, and AI research methods continue to offer promising avenues for both explanation and leveraging of that expertise. The problems are interesting, the cognate field (AI) set of solutions and research methods continue to grow, and the auditing practice imperative for efficiency and effectiveness remains high.

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Discussant's Response to “Expert Systems and AI-Based Decision Support in Auditing: Progress and Perspectives”

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Frederick W. Rook
Price Waterhouse

1. Introduction

A critical issue affecting progress in the development of AI-based decision support systems for auditing is the relationship between *research* and application *development*. In order to present our view of the relationship between these two concepts, it is useful to first discuss our perspective and background in both AI technology research and expert system development.

As AI technology researchers, we have conducted research in knowledge acquisition, knowledge representation, natural language analysis and understanding, planning and design, and computational theory. For example, we have examined and advanced the use of constraint satisfaction problem formulations as a method of inferencing. We recognize the extent to which the state of AI technology is driven by research in the areas of computer science, computer engineering, cognitive psychology, decision sciences, operations research, human factors engineering, and mathematical logic. To ensure the most effective use of these technical developments to the applied realm, we have worked closely with a number of leading AI researchers. These include Dr. Robert Wilensky at the University of California Berkeley AI Research Center, Drs. Judea Pearl and Rina Dechter at the Cognitive Systems Laboratory of the University of California Los Angeles, Dr. Drew McDermott at the Yale University AI Project, Drs. B. Chandrasekaran and John Josephson at the Ohio State University Laboratory for Artificial Intelligence Research, and Dr. Andrew Sage at the George Mason University School of Information Technology and Engineering.

As expert system developers, we have designed, developed, and implemented over thirty prototype and operational expert systems in a variety of application areas. Our expert systems have addressed such problem types as monitoring, diagnosis, assessment, risk analysis, resource allocation, scheduling, and planning. While we have successfully fielded operational expert systems, we have also met technological hurdles too great to be overcome with today's technology. The foundation of our success in building expert system applications is the ability to leverage existing AI technology, i.e., technology that in many cases has been effectively transferred from university settings.

One of the greatest challenges facing both academia and industry is the effective *utilization* of AI research results. Too often research results fail to be incorporated into the mainstream of application development. This paper briefly identifies some of the reasons why. The overall goal of the paper is to provide an industry perspective on several issues identified in the paper by McCarthy, Denna, and Gal [1990]. In Section II, we discuss our view of the difference between research and development. In Section III, we discuss the issue of bringing research results to bear on real-world problems. In Section IV we present a view of how academia and industry should work together. Finally, we briefly summarize our view of the future of AI in accounting in Section V.

2. Relationship of Research to Development

The McCarthy et al. paper focuses considerable attention on the relationship between research and development. The central issue in examining research and development is defining the relationship *between* the two processes. Research in AI provides a technological foundation upon which real-world applications can be developed. This relationship is depicted in Figure 1.

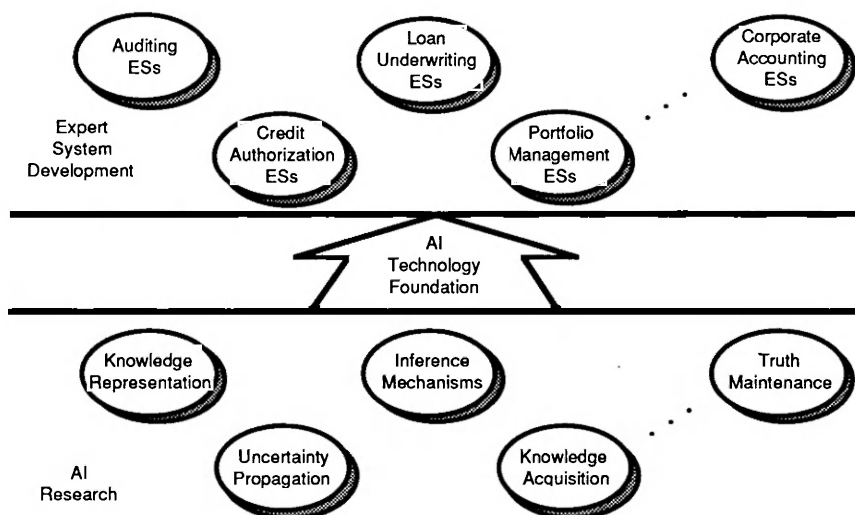


Figure 1. The Relationship of Research to Development

The task of classifying a program into either research or development is not a difficult one. Research advances the technology by yielding techniques, methods, models, or approaches that may be applied to a variety of information processing requirements. For example, AI research in knowledge representation has yielded such concepts/paradigms as production rules, frames, scripts, and so forth; research in inference techniques has yielded pattern

matching algorithms, diverse search strategies, control mechanisms, etc.; research in truth maintenance has yielded methods of hypothetical reasoning, multiple hypothesis management, and parallel planning approaches. It is important to note that while a research program may in fact be conducted under the umbrella of a specific problem area, e.g., inherent risk analysis, nonetheless its results have application to a variety of domains. Two examples will illustrate this point.

One example of relevant research, due largely to Chandrasekaran [1985] revolves around the theory that there is a small number of information processing tasks undertaken by humans while solving problems. The richness of problem solving activity is due not to a large number of problem classes, but to both the variety of instances of a particular class of problems as well as the synthesis of two or more problem types in a complex manner. Chandrasekaran and his colleagues have identified six such generic tasks:

- Hierarchical classification,
- State abstraction,
- Knowledge-directed information passing,
- Object synthesis by design,
- Hypothesis matching, and
- Abductive assembly of explanatory hypotheses.

The implication for application is in representing, in an expert system for *any* domain, problem solving at the appropriate level of abstraction, and these generic information processing tasks serve this end. For example, object synthesis is defined as the process of designing an object (selecting and organizing components) to satisfy a set of specifications. Object is defined in a very broad sense; it can be a physical entity such as a circuit board, or software, or more abstractly, a concept such as an audit plan. Similarly, components can be wires, circuitry, subroutines, or more abstractly, concepts, actions or sub-plans.

Another area in which this research can be extended is in developing techniques that permit efficient extraction of the type of knowledge that these generic tasks entail. If knowledge elicitation methods are developed that are specific to these generic tasks, then a range of human problem solving could be efficiently elicited and represented, regardless of domain. For example, research in the psychology of problem solving has focused on the modeling of the associated cognitive processes as explicit information processes. Protocol analysis [Ericsson and Simon, 1984; Waterman and Newell, 1971] is a form of data analysis that has been used to infer underlying information processes from a person's verbal utterances while solving a problem. In thinking aloud protocols (the form of interest to most AI researchers) the subject verbally solves a problem, saying everything that is on his mind, however slight or insignificant it may seem to him. The verbalizations are transcribed and then analyzed.

There are several steps to a rigorous protocol analysis [Ericsson and Simon, 1984]:

- Create a tape of the subject verbally solving a problem.
- Transcribe the tape into segmentations of individual topics or ideas.

- Create a key-word dictionary to represent the individual thought.
- Transform the topic segments, via the dictionary, into semantic elements, consisting of knowledge elements and operator elements.
- Combine semantic elements into operator groups, each consisting of an operator and the knowledge it uses (input) and any new knowledge it creates (output).
- Create a problem behavior graph which portrays the problem solving process; arcs into nodes represent knowledge currently possessed, nodes represent operators, and arcs emanating from nodes represent newly generated knowledge.

The final output of protocol analysis, the problem behavior graph (PBG), reflects the problem solving process at the lowest level of abstraction, that of primitive concepts and operators. These primitives can be written generically so that task-related meanings for a particular domain can easily be substituted. Furthermore, *if the reasoning process is similar, the primitives for an entirely different domain may be substituted.*

Having discussed the role of AI research as establishing the technical foundation for all application development, we now turn our attention to the interaction of research and development activities. A critical issue in examining research and development is appropriate recognition of the role that each process plays in application or system creation. Both research and development in artificial intelligence are largely driven by a domain problem as depicted in Figure 2. The domain problem generates 1) *technology issues* that act as the driver of *research* activities, and 2) *requirements* that drive the *application development* process. Research activities are concerned with developing approaches, techniques, and methods that satisfy the *technology* issues of the problem, while development activities focus on the application of existing technical approaches to the system requirements. The ultimate output of the research and development process is a completed *system*. This is not to say that every problem has issues associated with it that require research before a system can be developed. In fact, most systems are built to solve problems whose technological issues have already been studied and solved with existing methods. Also, all research does not have to be driven by a specific problem. However, research is not an aimless endeavor, but rather an activity whose goal is the contribution to the advancement of a discipline. In the case of artificial intelligence that translates into technological advancements that lead to the enhanced efficacy and usefulness of computer systems that solve real-world problems.

Since the focus of research is on technological advances, results can contribute to any number of application areas. This concept is illustrated in Figure 3 and contrasts with the view presented in McCarthy et al. For example, advancements made in uncertainty propagation that result from a requirement that emerged while developing an expert system for auditing could potentially enhance the effectiveness of an expert system for portfolio management. Furthermore, systems previously developed with mature technology may benefit from ongoing research. Our perspective on research and development differs significantly from McCarthy et al.'s with respect to the

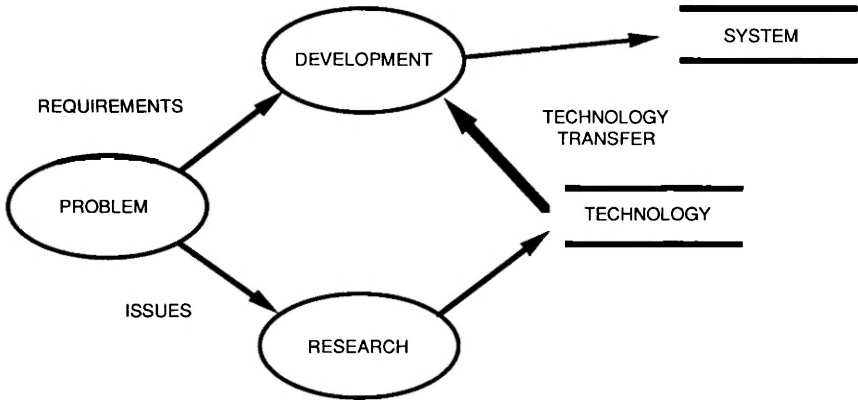


Figure 2. System Development as a Problem-Solving Process

byproducts of an application development process. McCarthy et al. appear to indicate that many expert system application development projects have an associated research component. Our experience in expert system development is in sharp contrast. Our opinion is that most expert system application developments involve *no* AI research, but rather consist of the application of *existing* AI technology. In fact, we maintain that few expert system development projects should be undertaken once critical technology gaps have been identified.

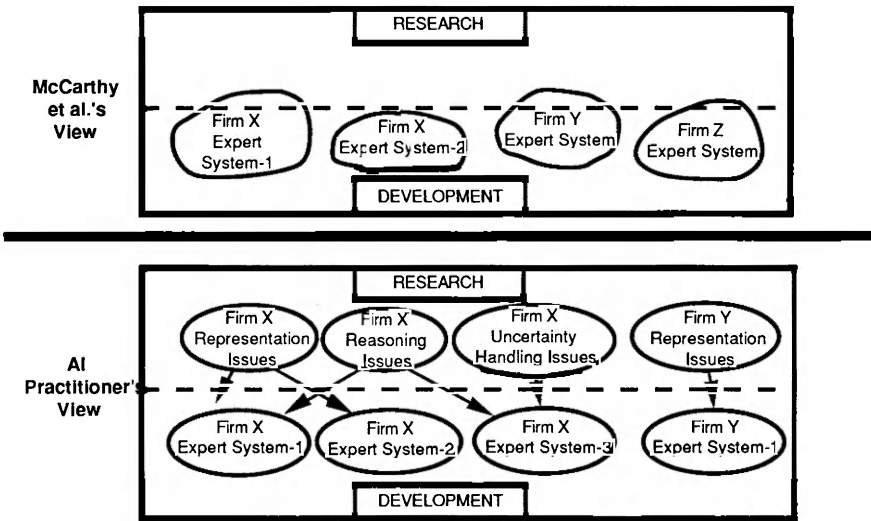


Figure 3. "Accounting Firm" System Research and Development Perspective

The process by which the technological advances are infused into the system development process is called *technology transfer* (depicted in Figure 2). This process is the single most difficult aspect of relating research to expert system development and is discussed in the next section.

3. Issues In Technology Transfer

Technology transfer, i.e., bringing research results to bear on the real-world problems of industry, remains the critical, and most difficult aspect of relating research to expert system development. There are several reasons for this difficulty. Two major ones, scalability and personnel, are addressed below.

The utility of research findings is strongly correlated to the accuracy of assessing and modeling the characteristics of the problem domain. Thus, one of the most critical issues in technology transfer is what has been termed the *scalability problem*. Waterman [1986] states “When gross simplifying assumptions are made about a complex problem, and its data, the resulting solution may not scale up to the point where it is applicable to the real problem.” We have observed, on several occasions, research activities based on a domain subset that assumed away critical problem characteristics such as incomplete or conflicting data, real-time processing requirements, and needs for distributed, cooperative processing. The scalability problem involves the inability to transfer technology approaches to the often more complex, real-world problem.

Another source of difficulty with technology transfer rests with the system developers themselves. The most successful expert system development efforts are those that are undertaken by bona fide expert system developers, i.e., persons who are well-grounded in the underlying theoretical concepts of artificial intelligence and are educated in and experienced in expert system design and implementation. This foundation enables:

- Proper assessment up-front of system development feasibility.
- Knowledge of appropriate technologies to employ, e.g., what knowledge elicitation techniques would be most effective, what knowledge representation formalisms best correspond to the problem at hand.
- Appropriate system design.
- Identification of areas in which research may prove useful and in what time-frame results may be expected.
- Efficient system implementation.

In general, domain experts do not make good system developers. First, effective knowledge acquisition requires a level of abstraction that an expert is unable to achieve by virtue of his “expertness.” In other words, since an expert thinks at a highly compiled level, it is difficult for him to effectively retrieve the details of his problem-solving process stored in long-term memory—a necessary step in transferring knowledge to a computer. Second, domain experts are not usually educated in both their own field and that of system design.

4. Academia And Industry Working Together

We have outlined a framework for the process of academia and industry working together. As depicted in Figure 4, in order to effectively build and field operational expert systems, it is necessary to employ both researchers and practitioners throughout the entire cycle. It is incumbent upon practitioners to remain abreast of current research which will facilitate knowledge of methods, tools, approaches, etc. that emerge. Similarly, it is necessary for the research community to keep abreast of the needs of industry in order to most effectively guide the tenor of research activity. Understanding what problems are faced by industry helps guide research towards such issues as knowledge representation, inferencing, uncertainty handling, algorithms, etc. that eventually may help solve problems faster and better. An example of this cooperation between academia and industry is given below; it is followed by an example of research in identifying the nature of expertise that has implications for future development efforts.

The problems of auditing and audit planning have been the focus of a considerable amount of research and development activity. The Peat Marwick Foundation and the Graduate School of Business of the University of Pittsburgh recently completed a 2-year research effort to develop systematic methods of risk assessment by trying to understand and model the risk assessment process within auditing [Dhar, Lewis, and Peters, 1988]. The longer range goal was to provide a foundation upon which an operational intelligent knowledge-based decision support system (expert system) to support audit planning could be designed and built.

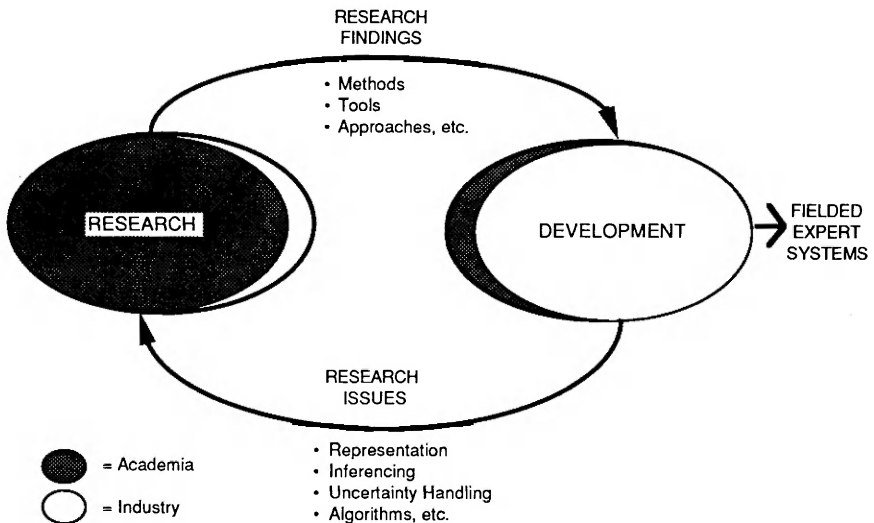


Figure 4. Academia and Industry Working Together

The results of this effort included:

- There is a difference between descriptions in the literature and what actually occurs in practice.
- Auditors do not consider it appropriate to generate numeric estimates of risk on an account-by-account basis.
- Auditors prefer to analyze a client's financial statement using knowledge about changes.

Additionally, the development of the prototype model contributed significantly to the understanding of the process of inherent risk assessment which in turn helped fine-tune the knowledge acquisition process to elicit otherwise unobtainable knowledge from the experts.

In a recent experiment, Ettenson, Shanteau, and Krogstad [1987] demonstrate that it is the way information is used, rather than the amount, that is a better indicator of expertise. In their experiment, 10 audit partners and 11 accounting seniors from 5 Big-Eight accounting firms and 11 upper-level accounting students who had completed at least one but not two formal classes in auditing and had no formal experience, were asked to evaluate accounting-related information in making judgments of materiality.

The results demonstrated that while the strategies of the students varied widely, the judgment of the professional auditor tended to reflect one primary source of information. The professionals also showed a high degree of consensus while the students did not. From an expertise standpoint, implications include:

- Simplification strategies may be an important characteristic of expert decision makers.
- Elimination of moves that are search intensive may increase performance, i.e., further research is needed in "information search" strategies of experts.
- Non-use of information by experts may reflect "skilled omission" rather than a cognitive limitation.
- Sheer amount of information is not a prerequisite to an experienced decision, rather it is the intelligent use of available information.

Implications for developmental efforts are obvious: if a better understanding of what makes an expert an "expert" is attained, then better knowledge elicitation methods can be employed, better knowledge representation schemes can be developed, and expertise can be better replicated in a computer.

5. Future of AI in Accounting

The future of AI in accounting is a bright one. While there are several examples of success in applying AI technology to develop expert systems that solve real-world problems, the field is still in its infancy. An assessment of AI activity in the Big Six accounting firms reveals that all firms are actively engaged in AI projects, ranging from strategic systems for internal use to the

establishment of AI consulting groups. In addition, many universities are actively conducting AI research that has significant implications for accounting expert systems.

It is important to realize that the very nature of the fields of accounting and artificial intelligence contributes to the current and future state of accounting expert systems. Auditing is a mature discipline, with methods, approaches, and qualified experts prevalent throughout the industry. In contrast, AI continues to rapidly evolve as the result of research. Techniques and tools that are several years old are often out-of-date. A situation arises in which we are constantly applying a rapidly changing technical field, AI, to a more stable, mature discipline, e.g., auditing. Therefore, the application of AI to auditing is still very much in its infancy. The last several years have yielded more questions than answers about how best to develop auditing AI systems. Nevertheless, current research activities and application development efforts will produce the foundation for further infusion of AI into the auditing domain. The key to this foundation development is the successful integration of research and development.

Most AI research will be conducted by universities. Most operational expert systems will be implemented by industry. Understanding the relationship between research and development, the respective roles of each community, and, most important, how the two can effectively work together, will facilitate the process through which accounting AI successes will evolve.

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5

Analytical Procedure Results as Substantive Evidence*

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Generally Accepted Auditing Standards (GAAS) allow two basic types of evidence to satisfy the third standard of fieldwork. These are analytical procedure results and tests of details of transactions and balances. GAAS is clear that the third standard can be met with any combination of the two that the auditor deems to be appropriate and GAAS makes no qualitative or “competency” distinction between them. Yet, analytical procedure results are routinely subject to several biases not present in tests of details. In this paper we clarify conceptual differences that may lead to an overassessment of the competency or validity of evidence provided by analytical procedures.

Clarification of the biases inherent in analytical procedures is important given the increased emphasis on analytical procedures in professional standards (e.g., SAS No. 39, 47, and 56 and SAARS No. 1), and its increased use in practice [Tabor and Willis, 1985]. Auditors may be substituting inferior evidence for tests of details with an attendant increase in achieved audit risk.

Below we review the history of analytical procedures and their regulation, analyze the essential features and risks of analytical procedures, and demonstrate several sources of bias in their use as substantive evidence. Finally, we provide some suggestions for research on analytical procedures and a suggestion for a change in standards.

1. History of Analytical Procedures in Auditing

Essentially, analytical procedure results as substantive evidence are evaluations of the reasonableness of the assumption of no material misstatement in aggregate recorded amounts, given the auditor’s other knowledge. Analytical procedures do not encompass examination of details supporting the validity of particular items comprising a recorded population. Thus, the substantive validity of any item or group of items is not determined directly.

The origin of analytical procedure results as substantive evidence is unclear. Stringer and Stewart [1986, p. 15] cite a Deloitte Haskins & Sells audit

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manual describing the use of analytical procedures in the 1930s and they had reason to believe that the manual merely codified existing practices. Deloitte & Touche provided us with a copy of Bulletin 302-1 from the 1939 edition of DH&S Technical Procedures Manual. It is reproduced in Figure 1. The Bulletin was a revision of the original 1935 version and was intended to eliminate any confusion about the use of analytical procedures. While the Bulletin may have fallen short of that goal, it provided a number of interesting points. For example, analytical procedures were regarded as “fundamental and indispensable” in audits involving an income statement “regardless of the existence or absence of internal control.” Analytical procedures were intended as a substantive test since they were an “effort to prove its substantial correctness as far as is practicable without systematic audit of the transactions.” Finally, in contrast to current professional standards, there is no mention of inquiry of management as an important source of an explanation for an unexpected material difference.

Figure 1

Technical Procedures Manual
Haskins & Sells
(1939 edition)
Bulletin 302-1

ANALYTIC REVIEW OF OPERATING ACCOUNTS

This is written with a view to clearing up any misunderstanding there may be regarding the reasons for and procedure of reviewing the accounts comprehended in and culminating in the net income or loss for a period, and as to when such procedure should be applied.

In a general audit we go no farther in systematic auditing than to test the original records, so that there is a considerable part of the period that is not covered by the systematic audit of transactions. It is therefore necessary to supplement the audit tests by review of the transactions for the entire period. As a matter of fact, it is more logical to regard the systematic audit tests as superimposed upon the general analytic review than to regard the review as supplementing the audit tests. At all events, the analytic review of operating accounts should be regarded as fundamental and indispensable, in any engagement where the report is to include, and the certificate to cover, a statement of income and surplus--or any of its variants--regardless of the existence or absence of internal control.

The procedure in making an analytic review of operating accounts can be outlined only generally. It involves subjecting each detail operating, income, profit and loss, and surplus account to rigid scrutiny, and to some extent to detailed analysis, in an effort to prove its substantial correctness as far as practicable without systematic audit of the transactions. Such review and analysis calls for the exercise of a high degree of judgment and discrimination. The remarks to follow should be regarded as only suggestive of the general course to be followed, subject to such amplification and adaptation as may be necessary to meet the peculiar needs of individual situations. It should be understood also that these remarks pertain only to the analytic review and do not purport to cover all the work to be done on the operating accounts in a general audit.

Each operating account (using the term in its generic sense) as it appears in the ledger or other record should be scrutinized in order to determine whether or not the entries have varied materially from month to month during the year under review, and any material variation should be investigated. In some cases, especially where businesses are seasonal, such monthly comparisons should be made with the corresponding months of the preceding year or two. A detailed statement of the operating accounts should be prepared for the year and for at least one preceding year (preferably two or three) in parallel columns, and the respective items for the respective years should be compared. If there are divisions or branches of the

business, the accounts for each should be considered separately and in relation to one another. All significant ratios and averages should be computed for the purpose of making comparisons. The ratios would include, for an industrial business, the ratio of returns, allowances, etc. to gross sales and the ratios to net sale of cost of goods sold and of each item, or appropriate group of items, of selling, administrative, and general expenses. For certain expenses such as purchasing and receiving (if kept separate), the ratio of purchases is a better standard of comparison than the ratio to sales. Every material difference as indicated by all these comparisons should be investigated to the point of determining, as nearly as practicable, that it is proper or improper. The working papers should show all matters investigated and the results of the investigations.

The cost of sales should be examined, and considered in relation to the sales, inventory, and accounts payable. The account for cost of sales, and its principal tributary accounts, such as cost of production, should be analyzed, as to essential features and important amounts, so that the composition of the accounts will be thoroughly understood. The method of determining charges for material, labor, and overhead should be critically investigated. The gross-profit ratios for the current and preceding periods should be computed. The inventory turnover rate should be computed, if practicable as to classes of goods (i.e., finished product, raw materials, etc.), for the current period and at least one preceding period, by dividing the cost of goods sold or used by the average inventory. If there is any indication that the cost does not bear the proper relationship to sales, or is otherwise incorrect, the various elements entering into the cost should be examined as exhaustively as may be necessary in order to determine the cause of the difference.

Among the other accounts which should be examined with respect to operations from month to month and period to period, and with respect to their relation to other accounts, such as sales or gross earnings, or in some cases, assets or liabilities, specific mention may be made of the following:

Sales and wages

Income from interest and dividends

Interest expense

Taxes

Income or expense for rents, royalties, and commissions

Depreciation, depletion, and amortization

Repairs and maintenance

Direct charges and credits to surplus

It is thought that the foregoing explains the analytic review of operating accounts sufficiently so that the underlying purpose of the review and the method of procedure will be understood, as applying not only to the accounts that have been mentioned specifically, but also to any other operating, income, profit or loss, and surplus accounts that may be encountered in practice.

December 1935 - Revised September 1939

We scanned the *Accountant's Index* and were unable to locate any specific references to analytical review in the practice or scholarly literature prior to 1961. Mautz and Sharaf [1961] discuss what might be called analytical procedures including the terms "analytical and comparative review," "interrelationships" and "correlations" among "related data" [Mautz and Sharaf, 1961, pp. 28, 86, 93, 100-101]. According to Mautz, these ideas were not new but reflected existing practices, at least at DH&S. Mautz was employed by DH&S for a time during the 1940s and was later a consultant on an analytical review project [private correspondence from Mautz, December 23, 1989].

The first official recognition of analytical (review) procedures in professional standards appeared in November 1972 with the issuance of Statement on Auditing Procedures No. 54 [AICPA, 1972]. This statement, entitled *The*

Auditor's Study and Evaluation of Internal Control, established that the evidential matter required by the third standard could be met through "analytical review of significant ratios and trends and resulting investigation of unusual fluctuations and questionable items" [para. 70]. Further, "Regardless of the extent of reliance on internal accounting control, the auditor's reliance on substantive tests may be derived from tests of details, from analytical review procedures, or from any combination of both that he considers appropriate in the circumstances" [para. 73]. This official guidance as to allowable proportions of substantive evidence has remained unchanged over two major revisions of analytical procedure guidance.

SAS No. 23 [AICPA, 1978], entitled *Analytical Review Procedures*, officially established guidance on the identification and investigation of significant "unusual fluctuations." It defined analytical procedures as "substantive tests of financial information made by a study and comparison of relationships among data" [para. 2]. SAS No. 56 [AICPA, 1988], entitled simply *Analytical Procedures*, provides a more precise definition as to what constitutes analytical procedures. Specifically, analytical procedures "consist of evaluations of financial information made by a study of plausible relationships among both financial and non-financial data." It continues the basic premise underlying the application of analytical procedures stated in SAS No. 23 that: "relationships among data may reasonably be expected by the auditor to exist and continue in the absence of known conditions to the contrary" [para. 2].

This basic premise is reasonable—if a prior relation observed, under conditions apparently free from material misstatement, continues in the audit period, then the current values are, probably, also free from material misstatement. The caveat "absence of known conditions to the contrary" provides for updating the auditor's model but doesn't establish a standard for how the auditor is to "know" about conditions to the contrary. Must the auditor search for or test for changes in prior relations or just be aware of known or possible changes that are more or less obvious to the casual observer? Is positive, rather than negative, assurance required for assessing possible changes?

SAS No. 56 focuses on unexpected differences (rather than fluctuations) and is explicit as to the role of expectations. It states:

Analytical procedures involve comparisons of recorded amounts, or ratios developed from recorded amounts, to expectations developed by the auditor. The auditor develops such expectations by identifying and using plausible relationships that are reasonably expected to exist based on the auditor's understanding of the client and of the industry in which the client operates [para. 5].

In identifying differences that may require analytical investigation, SAS No. 56 [para. 11-12] lists three factors related to the diagnosticity of the procedures. These are: 1) the plausibility and predictability of the relations, 2) the availability and reliability of data on which the expectations are developed, and 3) the precision of the expectation. The first suggests a causal model rather than merely a "casual" association while the second requires that the auditor base expectations on data other than the recorded values themselves. Finally, the third makes it clear that the auditor should consider whether a

procedure could find an intolerably-in-error “needle” in a haystack [Kinney, 1987; Loebbecke and Steinbart, 1987].

As to investigation and evaluation of significant differences, SAS No. 56 allows a range of differences that can be accepted without further investigation and a range that should be investigated. In regard to investigation it states:

The auditor should evaluate significant unexpected differences. *Reconsidering* the methods and factors used in developing the expectation and *inquiry of management* may assist the auditor in this regard. Management responses, however, *should ordinarily* be corroborated with other evidential matter. In those cases when an explanation for the difference *cannot* be obtained, the auditor should obtain sufficient evidence about the assertion by performing other audit procedures to satisfy himself as to whether the difference is a likely misstatement. In designing such other procedures, the auditor should consider that unexplained differences *may* indicate an increased risk of material misstatement [para. 21] (emphasis added).

This paragraph, especially the highlighted terms, provides much of the basis for our concerns about the comparative competence of analytical procedures and their tendency to understate achieved risk. We will return to it in the next section.

Passage of SAP No. 54 and SAS No. 23 was followed by practitioner and scholarly discussion of the reliability of analytical review. For example, *Montgomery's Auditing* (9th ed.) [Defliese, Johnson, and Macleod 1975, p. 145] championed the use of analytical review over tests of details under conditions of *weak* internal control while Cushing and Loebbecke [1983] took the opposite position. The latter view seems to have prevailed in that *Montgomery's Auditing* (10th edition) [Defliese, Jaenicke, Sullivan, and Gnospelius 1987, p. 341-42] discusses 100 percent reliance on analytical procedure results when controls are strong.

Even though SAP No. 54, SAS No. 23 and SAS No. 56 did not indicate that analytical evidence was in any way inferior to tests of details, there was such an indication from practitioners. Ernst and Whinney placed restrictions on the reliance that can be placed on analytical procedures [Grobstein and Craig, 1984, p. 14]. *Montgomery's Auditing* stated that analytical procedures produced a “subjective, deductive type of audit evidence” rather than the “objective type of evidence showing ‘it is there or not there’ which results from the other auditing procedures” [Defliese et al., 1975, p. 145].¹ The tenth edition of *Montgomery's Auditing* stated that, relative to analytical procedures, tests of details are less efficient, but tests of details “commonly provide a *higher* level of assurance with respect to an audit objective” [Defliese 1987, p. 340] (emphasis added). Blocher and Willingham [1985] were even more explicit about the relative assurance. They stated:

To evaluate the strength of the evidence from analytical review, we must consider that analytical review provides a *negative-type* as-

¹The same source later defines evidence as “objective if it requires little judgment to evaluate its accuracy” [Defliese et al. 1987, p. 158].

surance rather than a positive one. That is, though analytical review can be a useful technique for detecting a material misstatement, it cannot be relied upon to confirm with positive assurance that a misstatement is not present. *Positive assurance* comes only from the proper application of the appropriate detail tests procedures. Thus, the auditor can never rely exclusively on analytical review when risk or materiality is high [p. 10]² (emphasis added).

Two recent behavioral studies of practicing auditors are consistent with this view. Both Biggs, et al. [1989] and Cohen and Kida [1989] found that auditors are reluctant to reduce tests of details even when analytical procedure results seem to support a reduction.

The large CPA firms have different histories and different degrees of reliance on analytical procedures. As mentioned above, the first reference to analytical procedures as evidence came from DH&S. SAP No. 54 was chaired by Kenneth Stringer of DH&S and his firm was an early champion of statistical analytical procedures as substantive evidence. Stringer [1975], and Stringer and Stewart [1986] described a system entitled *Statistical Techniques for Analytical Review in Auditing*. It used time series and cross sectional regression models to identify likely-to-be-in-error segments of an account or transaction class. Stringer [1975] also discussed the importance of the auditor's "analytical investigation" to determine the likely cause of a deviation. Some other firms have also used regression analysis (e.g., Price Waterhouse, [Akresh and Wallace, 1982, and Walker and Pierce, 1988] and Arthur Andersen [Koster, 1981]).

Statistical analytical procedures have had less usage in most firms, even including one (Peat Marwick) that is highly structured [Wright and Ashton, 1989, p. 722-723 and Elliott, 1984]. Also, analytical procedures of various types are used for different purposes. For example, Ernst & Whinney uses different analytical procedures for understanding the client's business, for inherent risk assessment and as substantive evidence [Grobstein and Craig, 1984]. Finally, in contrast to the DH&S regression-based approach to analyzing an account, *Montgomery's Auditing* (Coopers & Lybrand) seems to define the focus of analytical procedures to be on "ratio and trend analysis" [Defliese, et al. 1987 p. 156] and is unclear about the extent to which the results provide substantive evidence.

Thus, a variety of analytical procedures have been used to meet various objectives. Because of these differences, we will try to be very specific as to procedures and their usage in the comparative competency assessment that follows.

²SAARS No. 1 [AICPA, 1978] and other AICPA-sanctioned review reports seem to provide at least implicit support for this view. These reports are characterized as providing only "limited" assurance that is expressed in negative form. The distinction is relevant since the review reports are based on only analytical procedures and inquiry of management.

2. Comparative Competency of Analytical Procedures vs. Tests of Details

For the purpose of comparing reliability (or competency or validity) of tests of details and analytical procedures results as substantive evidence, assume that audit sampling is used for tests of details, that a single account regression analysis is used to identify differences for analytical procedures, and that both tests are for overstatement. Figure 2 shows the aggregate audited account balance Y (say, sales) expressed as (1) the sum of N error free y's or sales amounts per sales invoices, and as (2) a function of the true relation between Y and an independently obtained explanatory variable X (say, industry sales), and a random unexplained portion, e.³

Figure 2

Example Upper Confidence Limit Formulations

	<u>Analytical Procedures</u> ¹⁾	<u>Tests of Details</u>
Actual (error free) balance	$Y = \alpha + \beta X + e$	$Y = \sum y$
Estimated Audited balance	$\hat{Y} = \hat{\alpha} + \hat{\beta} X$	$\hat{Y} = N\bar{y}$
Estimated error	$\hat{E} = Y_b - \hat{Y}$	$\hat{E} = Y_b - \hat{Y}$
Upper Confidence Limit:	$UCL = \hat{E} + Z_{APR} se (pred)$	$UCL = \hat{E} + Z_{TDR} s/\sqrt{n}$

-
- 1) Y = audited balance for the year t
 - y = audited balance of account or transaction class element in year t
 - \bar{y} = average y for a random sample of n < N items
 - X = "causal" variable value for year t
 - E = error for year t
 - ^ = estimated
 - Y_b = recorded or "book" amount
 - APR = risk of incorrect acceptance using analytical procedures
 - TDR = risk of incorrect acceptance using tests of details

³Although in practice there would likely be a partitioning of Y by plant, by product line or by subperiod of time, we will use a single estimate for simplicity. Also, for simplicity we will assume that simple random sampling is used and that a single causal variable X is considered in the auditor's model.

Figure 2 also shows the estimate of Y (\hat{Y}) given audited values of a randomly selected sample of n items and an independent estimate of Y given X and the auditor's estimates of α and β . Again, for the purpose of comparison, imagine a case in which the two techniques yield the same point estimate of error and that the standard error of the estimate in tests of details (s/\sqrt{n}) is equal to the standard error of the regression prediction ($se(pred)$). Thus, the two procedures yield the same upper confidence level (UCL) on error. If the UCL is just under the minimum intolerable error (MIE), which procedure do you think yields more reliable or more competent evidence?

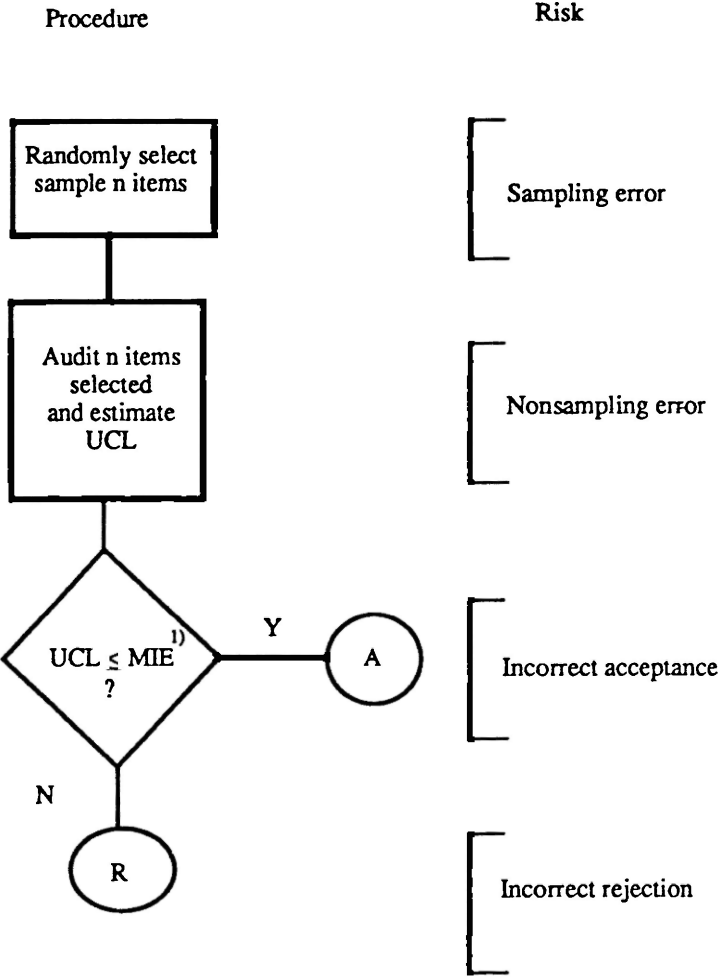
Figures 3 (tests of details) and 4 (analytical procedures) show that each of the procedures has two general failure points; that is, points at which the auditor can be led incorrectly to accept a balance that is "intolerably" in error. For tests of details (audit sampling), the points are: (1) the selection of a sample which has smaller book values and/or contains proportionately less error than what exists in the population as a whole (sampling error), and (2) error in selecting or applying the auditing procedure such as selections from recorded amounts to test the completeness assertion or failing to note an error in a sampled item (non-sampling error). The first risk can be measured within the limits of sampling error, and auditing standards assume that the second can be made negligible by quality control procedures [SAS No. 39, para. 11 and SAS No. 47, para. 20].

For analytical procedures, the two points of potential failure are (1) the identification, estimation and refinement of the expectations model, and (2) the analytical investigation of differences from the resulting expectations. For the first, the auditor may incorrectly specify the causal relations between independent variables and the account under audit, may misestimate the coefficients or the allowable range of deviation, or may fail to note changes in the relations or may incorrectly revise the model based on management's suggested explanation. For the second, the auditor may incorrectly accept a non-error explanation and revise the expectation sufficiently to yield $UCL < MIE$ when the account is intolerably overstated. Figure 5 presents a numerical example of how the second step can inflate the achieved audit risk. The first stage is based on achieving a risk of incorrect acceptance of .05. In the example, the second stage adds .15 to that amount for an achieved audit risk of .20 over a number of audits (see Kinney, [1989] for an elaboration of the need for sequential analysis in auditing).

In the paragraphs to follow, we discuss a series of potential and likely biases that lead us to conclude that the application of analytical procedures is likely to understate the risk of incorrect acceptance. The basic causes of the biases are both statistical and behavioral, and are, in part, induced by professional standards themselves.

A fundamental competency advantage of tests of details is that for sampled items (and absent non-sampling error), misstatement is ruled out or conversely, "correctness" or validity of each recorded y is *positively* established. The test can lead to incorrect acceptance only through sampling variation or sampling error. For analytical procedures, the correctness of an item or group of items is *not* positively established, by definition. Thus, a second in-

Figure 3
Risks of Failure Using Test of Details



1) MIE = minimum intolerable error for the assertions being tested for overstatement
 A = accept recorded value as not intolerably overstated.
 R = reject recorded values as possibly intolerably overstated.

Figure 4

Risks of Failure Using Analytical Procedures

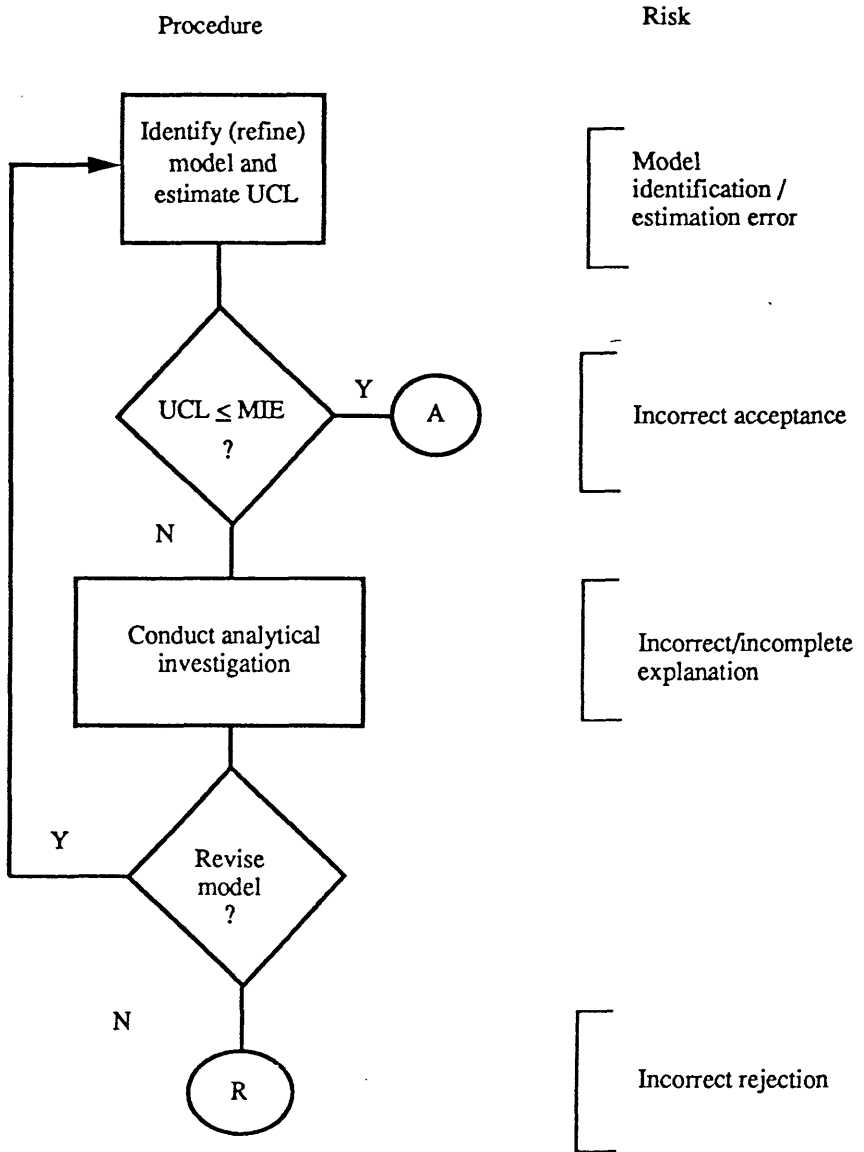


Figure 4
Risks of Failure Using Analytical Procedures

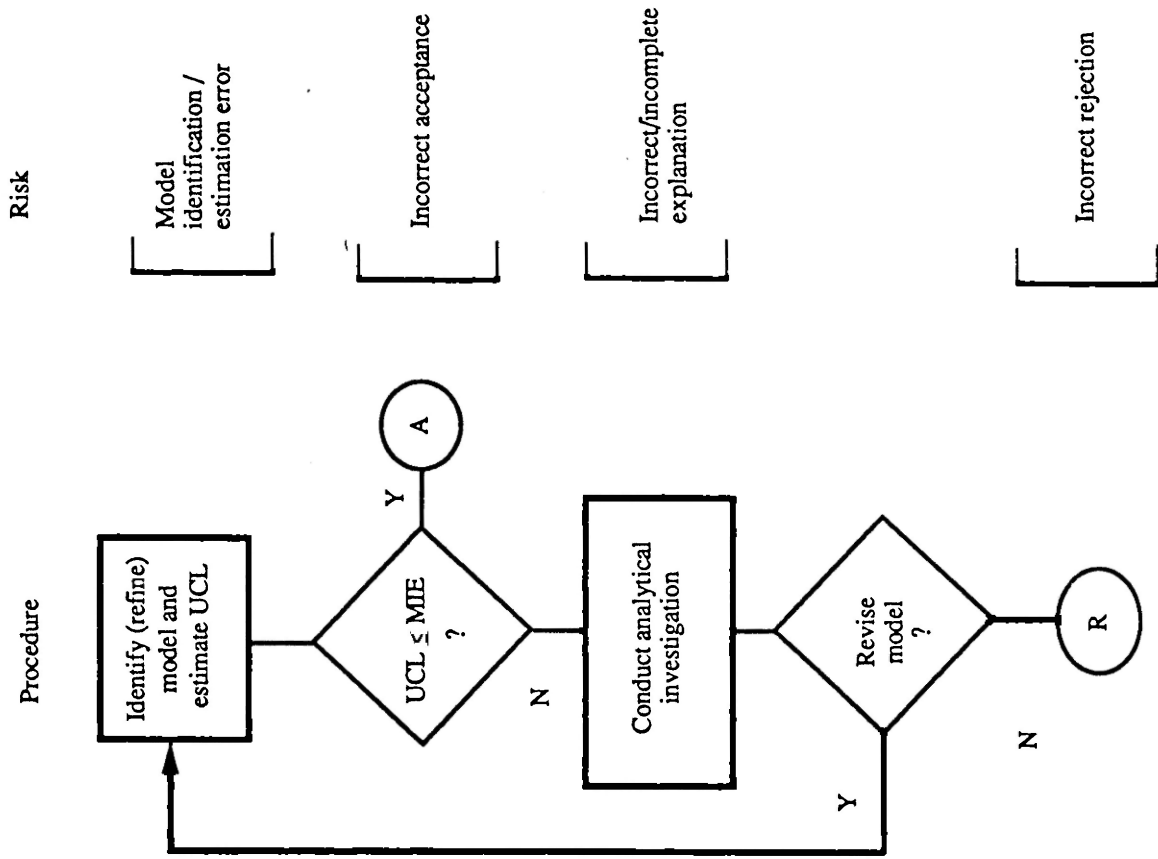
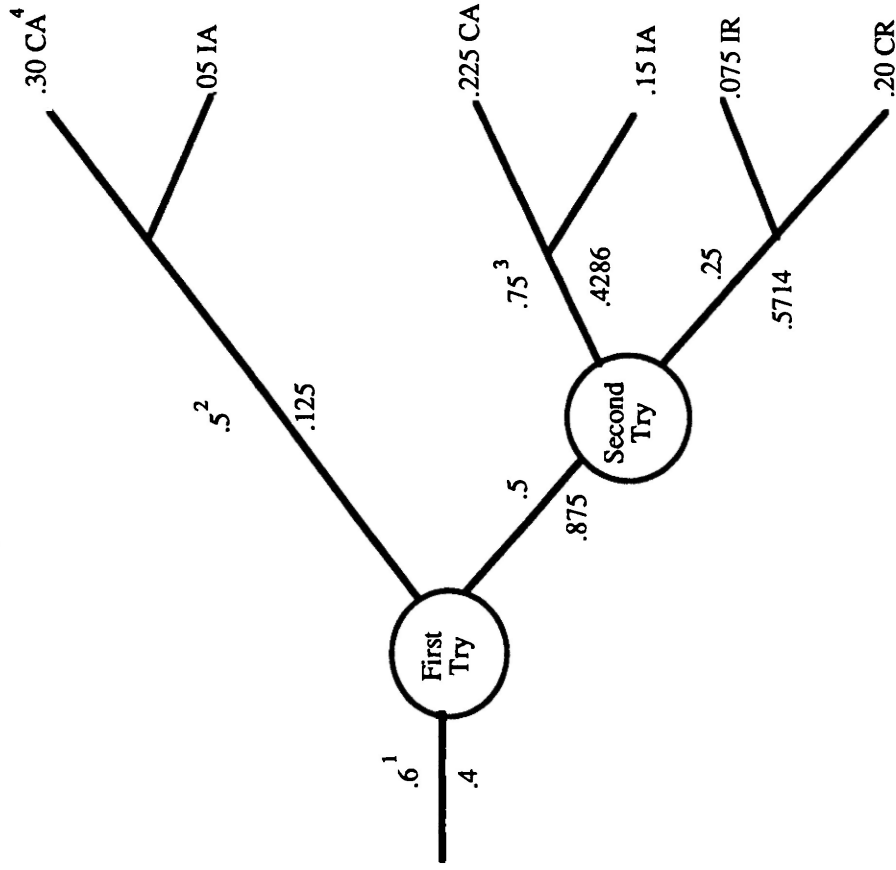


Figure 5
Example Calculation of Achieved Analytical Procedure Risk



- 1 Assessed prior probability that E = 0 is .6
Assessed prior probability that E = MIE is .4.
- 2 Based on the assumption that:
MIE = 1.15 se(pred) and
Decision rule is to accept if $\hat{E} < 0$
- 3 Based on the assumption that P(accept/state) is proportional to the area between 0 and MIE.
- 4 CA = correct acceptance
IR = incorrect rejection, etc.

ference is *always* required for analytical procedures. Specifically, if the unexplained differences are small, then intolerable error in the overall account balance is inferred to be negligible.

Statistical Biases

At the model identification, estimation and refinement stage, the auditor is developing a basis for expected audited values. The auditor faces several risks that increase the variance of outcomes and some that bias results toward incorrect acceptance. They relate to the model used and the data to which it is applied. Many of these difficulties are well known.

First, the auditor may fail to include variables that are causal. This risk can be reduced by auditor expertise in the client's industry. The auditor may also include Xs that are not causally related to Y. Here, the risk is over-identifying the model or including variables that are spuriously correlated with Y in the base period but are uncorrelated in the prediction period. Thus, variables which by chance have high correlation in the base period are inappropriately included for the prediction period. Finally, the auditor may fail to notice that the parameters of included variables have changed between the base and the prediction periods.

While these phenomena may lead to incorrect acceptance, they may also lead to incorrect rejection. There is no reason to expect a statistical bias. However, as described in the next subsection, the analytical investigation stage of the process can lead to a model building bias toward incorrect acceptance. Specifically, the identification of an unexpected difference can lead the auditor to search in a *biased* fashion for omitted non-error causal variables. That is, the auditor's search for omitted variables is caused by the identification of an unacceptable difference ($UCL \geq MIE$) and the ensuing search for an explanation naturally leads to a higher probability of including a *non-error* cause that reduces the UCL. For example, suppose that the audit year cost of sales contains an unexpected increase in labor costs of \$10, an unexpected decrease in materials cost of \$10 and an inventory counting error of \$10 that understates the expense. As a result, cost of sales is \$10 less than expected and the auditor searching for an explanation would be more likely to detect the decrease in materials cost than to detect the increase in labor cost or the accounting error.⁴ Thus, the biased search for an omitted causal explanation can lead to failure to detect misstatements.

Second, erroneous or irrelevant data also have both positive and negative aspects with respect to incorrect acceptance of accounts with intolerable total error. Bad data in the base period may prevent reliance on statistical analytical procedures. For example, random measurement error in the X variable for the base period will lead to estimates of β biased toward zero, and an inflation of the standard error of the regression (se) will cause the auditor not to rely on regression since the UCL will tend to be high. Thus, ran-

⁴SAS No. 56 [para. 18] warns that "offsetting factors may obscure misstatements," e.g., an unexpected nonerror understatement could hide an error-caused overstatement. Yet the auditor trying to explain a $UCL \geq MIE$ would have no reason to look for a non-error factor that would increase the UCL!

dom measurement error in the base period X values leads to an incorrect rejection or efficiency bias. Nonrandom measurement error leads to less predictable results. However, since the base period has been audited, there is reduced risk of bad data in the base period. The potential problem of intentionally misstated X data for the prediction period is one reason that Cushing and Loebbecke [1983] argued for strong internal controls as a requisite for reliance on analytical tests.

We have labeled this subsection “statistical” biases. However, the risks and biases apply to a non-statistically-based procedure as well as to statistically-based procedures. Subjectively or judgmentally failing to consider an important causal variable can bias one’s judgment about the results to be expected. Also, a lack of quantification of estimates may lead to unrealistic assessments of effects and to systematic underestimates of the normal variation in expected values [Tversky and Kahneman, 1971]. The latter behavioral tendency will cause the UCL to be too low and lead to increased risk of incorrect acceptance. This inability to signal or “flag” intolerable (or even material) misstatements seems to be especially probable when considering ratios based on aggregate values.⁵

Behavioral Biases

At the stage of evaluating analytical procedure results, SAS No. 56 suggests several practices that are almost sure to lead to an increase in the risk of incorrect acceptance. For accounts for which the UCL equals or exceeds MIE, paragraph 21 of SAS No. 56 (reproduced earlier) provides guidance for follow-up. Specifically, it lists five ways in which the process is biased *toward* incorrect acceptance when an unexpected difference is noted. Rather than considering possible misstatement, the first suggestion in paragraph 21 is that the auditor “reconsider” the model used to develop the expectation (\hat{Y}) and, second, it indicates that “inquiry of management” may assist in this regard (is management likely to suggest fraud or error as the cause?). Third, as to corroborating management’s suggested explanations, paragraph 21 states that they “should ordinarily be” corroborated (but not always?). Fourth, apparently only in those cases in which “an explanation for the difference cannot be obtained” the auditor should apply other procedures to rule out misstatement. Finally, in designing other procedures, the auditor should consider that “unexplained differences may indicate an increased risk of material misstatement.” It seems clear that the risk of such misstatement *is* increased if, indeed, no non-misstatement explanation can be found for the difference. That is, if all other factors have been ruled out, then all that is left is chance or misstatement. Thus, paragraph 21 of SAS No. 56 focuses attention on non-error causes that may bias the auditor toward incorrect acceptance.

In addition to the possible bias due to the official guidance, the psychology literature has identified several biases that decision makers often exhibit when making probabilistic judgments. Auditing is characterized by complex probabilistic judgments and much of behavioral auditing research has focused

⁵For further caveats about the problem of weak diagnosticity, see Grobstein and Craig [1984, p. 14], Loebbecke and Steinbart [1987] and Kinney [1987].

on auditors' biases in making such judgments. The research discussed below is a sample of the studies indicating possible behavioral biases that may result in an understatement of achieved audit risk through the application of analytical procedures as substantive tests. The biases are grouped according to whether they apply during the audit in determining a possible explanation of an unexpected difference (hypothesis generation), or in revising assessed probabilities of possible causes, or after the audit is completed and results are evaluated by others.

Hypothesis Generation

The availability bias refers to the tendency of a decision maker to judge the frequency of an event by the ease with which similar events come to mind [Tversky and Kahneman, 1973]. Events may be salient because they are sensational or vivid or because they have been experienced frequently. Libby [1985] asked auditors to hypothesize up to six errors that might explain unusual analytical review results and to rate the likelihood that each error caused the fluctuation. Results indicated that the likelihood of each error was affected by its perceived frequency, its actual frequency and the recency with which the error had been encountered by the auditors. These results for error causes are disturbing if analytical review is to be used as substantive evidence. We know of no archival data on non-error explanations of unexpected differences. However, if the auditor has frequently or recently encountered *non-error* causes when evaluating significant fluctuations in other clients' financial statements, he or she may be too easily persuaded that a currently observed fluctuation is also due to a *non-error* cause. As a result, achieved audit risk may be understated.

Output interference occurs when knowledge already retrieved from memory hinders the retrieval of additional items (see Nickerson [1984]). Frederick [1988] found experienced auditors to be affected by output interference. Auditors studied lists of internal controls and then were asked to recall the controls. Half of the auditors were presented with a partial list of previously learned internal controls; the other half received no cues. Auditors without the cues recalled more controls on the recall task than did those provided with the partial list.

Output interference may cause auditors to misdiagnose significant fluctuations in analytical review results. If the auditor asks client management to explain a deviation, the non-error reasons provided may interfere with retrieval of the auditor's own knowledge of possible error causes. If the auditor relies on his or her own experience, output interference combined with the availability heuristic may cause the auditor to focus on the causes most accessible in memory to the exclusion of an important error cause.⁶

Heiman [1990] studied auditors' spontaneous generation of explanations for unexpected differences. She found that auditors did not spontaneously generate as many alternative explanations for ratio fluctuations as they did

⁶Hock [1984] and Moser [1989] link output interference with availability to provide a mechanism by which judgments are biased.

when prompted to do so. Failure to generate or consider counter-explanations, together with belief perseverance (see next subsection) may cause the auditor to accept a non-error cause of analytical review deviations despite evidence to the contrary. If auditors receive from management a *non-error* cause for an unexpected difference and don't spontaneously generate possible error causes, the chances of incorrect acceptance are increased.

The anchoring and adjustment heuristic represents the decision maker's tendency to focus on an initial value (an anchor) and to subsequently update (adjust) inadequately the initial belief as new information is received. Behavioral research has shown that anchoring and adjustment can result in a judgmental bias since decision makers may rely on an irrelevant initial anchor, or may make insufficient adjustments with respect to the informativeness of the new data [Libby, 1981, pp. 162-163]. Kinney and Uecker [1982] reported results consistent with anchoring in an attention directing analytical review task. Auditors tended to anchor on book value to develop point estimates beyond which an analytical investigation of the book value was appropriate. Biggs and Wild [1985], and Heintz and White [1989] obtained similar results in extensions. This bias applies only to non-statistical procedures but is disturbing since it violates independence of expectations and book values.

Probability Revision

Revision of initially formed probability or risk assessments may also be biased. In some situations, decision makers may continue belief in an initial hypothesis even in light of subsequently received evidence to the contrary. That is, the initial belief "perseveres." Koonce [1990] investigated auditors' tendency to focus on initial beliefs in an analytical review setting and found results consistent with belief perseverance. Specifically, Koonce's results indicated that auditors who developed written non-error explanations for unusual analytical review results continued to accept the explanation as the most likely unless explicitly requested to develop counter-explanations.

After forming an initial hypothesis in a judgment task, decision makers often search for and place more importance on evidence that confirms the hypothesis than on disconfirming evidence [Fischhoff and Beyth-Marom, 1983; Klayman and Ha, 1987]. This "confirmation bias" is found in a variety of settings including complex problem-solving and probabilistic-judgment tasks similar to those found in auditing (e.g., Wason [1960], Wason and Johnson-Laird [1972] and Snyder and Swann [1978]). When auditing a reputable client, the auditor may have a strong initial belief that no material misstatements are present in the financial statements. Mautz and Sharaf [1961, p. 28] indicate that the idea of an initial hypothesis of no error is one of long standing. If errors or irregularities do exist, however, a confirmation bias may influence the auditor's assessment of subsequent evidence and counter-evidence and achieved audit risk may be higher than planned.

While confirmation bias is potentially important in evaluating analytical procedure results, behavioral research in auditing has found only mixed support for it. When evaluating a going-concern issue, Kida [1984] found that, in general, auditors place more importance on the factors indicating possi-

ble failure than on the factors indicating viability. Trotman and Sng [1989] extended Kida [1984] with essentially the same results in an internal control task. Ashton and Ashton [1988] found that auditors were influenced more by disconfirming evidence than by confirming evidence in an internal control task. Butt and Campbell [1989] also tested for confirmation bias in an internal control task and found that auditors did not seek confirming evidence unless specifically requested to do so. In a study of analytical procedures, the Biggs, Mock, and Watkins [1989] protocol analyses of four audit managers and seniors in an analytical review task suggested that, while the two managers were careful to guard against confirmation bias, the two audit seniors were less likely to do so. The authors concluded that experience might affect the auditor's ability to appropriately analyze analytical review results. However, Bonner's [1990] results indicate that experience differences play an important role in analytical review cue selection and weighting but are not important in evaluating internal control risk. This suggests that task-specific knowledge may mitigate confirmation bias.

According to Bayes' rule, the order in which information is presented should not affect the decision maker's belief revision process. However, the psychological literature has documented situations in which the order of evidence presentation affects revised beliefs. Hogarth and Einhorn [1989] have developed a belief-adjustment model that can explain primacy, recency or no order effects depending on complexity, length of the evidence series, and response mode. Ashton and Ashton [1988] used the Hogarth and Einhorn [1989] model and successfully predicted recency effects in auditors' internal control evaluations. Butt and Campbell [1989] also found support for the belief-adjustment model when auditors held weak initial beliefs about internal control reliability. With the exception of Koonce [1990], we are not aware of any studies of possible order effects in use of analytical procedures. However, order may be important, especially in light of the fact that the auditor may stop the investigation before contrary evidence is received or may resist consideration of subsequently received evidence to the contrary.

Post Audit Analysis

Decisions should be evaluated in light of the information available at the time the decision was made regardless of the ultimate outcome. Hindsight bias refers to the inability to evaluate past decisions without considering currently available information [Fischhoff, 1975]. While hindsight bias has not been studied in an auditing context [Ashton et al., 1988], the bias is particularly detrimental if analytical review procedures are used as substantive evidence since decisions are based on limited, aggregated information. If, after the auditor's report is issued, subsequent information reveals material misstatement and the auditor's work is challenged, the courts may determine that the auditor should have recognized the potential for misstatement using properly applied analytical procedures. The auditor should consider the potential effects of hindsight bias before choosing to rely on analytical procedures as substantive evidence. That is, ask, "How will others judge the credibility of my evidence if, indeed, material misstatement exists?" Thus, in

addition to consideration of his or her own biases, the auditor may need to consider biases of others who will have additional information.⁷

3. Concluding Remarks

In the paragraphs above, we have outlined the history and several potential limitations of the reliability of analytical procedure results used as substantive evidence. In contrast to substantive tests of details, we find that analytical procedure results are subject to several biases that may overstate their apparent competence.

With proper selection and application of audit procedures, tests of details will fail to detect extant intolerable error only if the auditor is unlucky—that is, only if the sample is not representative of the population. For analytical procedures, the auditor may fail due to chance fluctuations in the data. However, analytical procedures may also fail to detect error due to biases related to the way in which auditor's research question is posed—trying to determine that the recorded data might be *right* rather than trying to see whether it is *wrong*.

What, if anything, can be or should be done? We have some suggestions for researchers and for standards setters.

Researchers

There are several promising areas for further research into the reliability or competency of analytical procedures. There is need for analytical work as well as for statistical and behavioral studies. Our list is based on the thoughts expressed above and should not be interpreted as comprehensive for the entire area of analytical procedures.

From an analytical perspective, what is the essential mathematical nature of analytical procedures with respect to error and how they should be combined in revising prior probabilities of error? Is Bayes' Rule adequate? How does the second inference required for analytical procedures affect probability revision? How should the second order probability be accommodated?⁸

How reliable are the analytical procedures used in practice? How does their reliability differ across procedures or across accounts or across levels of expertise? What is their achieved risk? Statements that X percent of all errors detected by auditors were detected by analytical procedures (e.g., see Wright and Ashton [1989]), are one sided. The statement is not reversible into a positive statement that absence of an indication of misstatement means an absence of material error—the auditor may have been a victim of bias or simply may not have looked hard enough.

On the behavioral side, to what extent do the biases discussed above apply and how much do they affect achieved reliability of analytical procedures? Are auditors unduly influenced by management's suggestions of non-mis-

⁷Felix and Waller [1984] refer to the probability of evidence being judged adequate as a "second order" probability.

⁸ See footnote 7.

statement explanations of unexpected differences? Or, do auditors systematically discount the results of analytical procedures as Biggs, et al. [1989] and Cohen and Kida [1989] suggest? Is the discounting a recognition of some of the inherent limitations of analytic procedure results as evidence?

Standards Setters

As indicated above, SAS No. 56 is a considerable improvement in guidance to practitioners. It provides at least a partial conceptual basis for analytical procedures and many warnings of dangers in the application of analytical procedures. However, there is one rather simple modification to its guidance that could lead to substantive reduction in the biases discussed above.

The suggestion is to change the focus of SAS No. 56 paragraph 21 from a search for *non-misstatement* causes to a consideration of *misstatement* causes. Figure 6 presents possible wording. The suggestion is similar to the “conceptually logical approach” of SAP No. 54 [para. 65] to “consider the types of errors and irregularities that could occur” and then to consider which controls would prevent them. For analytical procedures, the approach would be to consider possible misstatements and then look for data that would be consistent with the misstatement.

Figure 6

Suggested Revision to SAS No. 56¹

.21 The auditor should evaluate significant unexpected differences and evaluate possible misstatements as the cause. For example, an unusual difference between recorded and expected cost of sales might be due to omitted credit purchases or a pricing error in the ending inventory. Consideration of related payables and inventory balances may help resolve the matter. After considering possible misstatement, inquiry of management may assist the auditor in revising the auditor's expectation. Management responses, however, should ordinarily be corroborated with other evidential matter.

.21a In those cases when an explanation for the difference cannot be obtained, the auditor should obtain sufficient evidence about the assertion by performing other audit procedures to satisfy himself as to whether the difference is a likely misstatement.² In deciding such other procedures, the auditor should consider that unexplained differences may indicate an increased risk of material misstatement.

¹ Additions are in bold and deletions in the original are lined.

Given an unexpected difference, the auditor would consider what error cause might explain it. Then the auditor would consider what other readily available data would be consistent with the error and determine whether the other data is consistent. For example, when recorded cost of sales is unexpectedly low, the auditor might hypothesize that it could be due to omitted credit purchases and then look to see whether ending payables are also lower than expected. Alternatively, he or she might consider possible overpricing of the ending inventory and look for unexpectedly high ending inventory. Note that if the auditor simply asks management (as SAS No. 56 discusses), management might suggest improved inventory planning and control or improved purchasing procedures as the explanation. The auditor might search for and find some evidence of such improvements and incorrectly attribute too large a dollar effect to the improvement and stop his or her search for error.

It seems to us that auditing standards should be designed to help reduce biases to which the auditor may fall victim—especially those that lead to incorrect acceptance. We believe that a change in the focus of paragraph 21 of SAS No. 56 could help.

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Discussant's Response to "Analytical Procedure Results as Substantive Evidence"

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I generally agree with Bill Kinney and Christine Haynes' analysis of the usefulness of analytical procedure results as substantive evidence. As I told the conference organizers when I took this assignment, I won't challenge the mathematical aspects of the paper. Instead, I would like to put the paper into a real world context and discuss how we consider their suggestions and how we use analytical procedures.

Kinney and Haynes point out the dangers of using analytical procedure results as substantive evidence. One could read the paper to mean that they believe analytical procedures should never be used as substantive evidence. I am glad that this is not their view. I agree that there are dangers in analytical procedures and the auditor needs to recognize these dangers and use analytical procedures in the right time, in the right place, in the right way. I will try to explain how and when analytical procedures can be used in light of Kinney and Haynes' paper.

I have no problem with the discussion of the history of analytical procedures. It's nice, but it doesn't add much. Auditors have always performed analytical procedures. That is, they have looked at the forest and said "does it make sense?" Tests of details have gotten them into the trees; the good auditor needs to see both the forest and the trees. Analytical procedures are important, especially when testing the completeness and valuation assertions.

There are different kinds of analytical procedures and they serve different purposes. SAS 56 requires analytical procedures in planning the engagement and in wrapping up the engagement. In these, analytical procedures serve a useful purpose as attention-directing techniques. SAS 56 does not require analytical procedures to be used as substantive tests. The wording of paragraph four makes it clear – "In some cases, they can be more effective or efficient than tests of details." Obviously in some cases they are less effective.

In substantive testing, there are two different ways of using analytical procedures. The first is as the primary substantive test. Here, analytical procedures are the most important form of audit evidence. In these situations, the auditor does little or no tests of details. The second use is as a corroborative test. Here the auditor performs analytical procedures, but he or she also performs detailed substantive tests. In determining sample size, the auditor

considers the corroborative analytical procedures. For example, the auditor confirms accounts receivable using a sample calculated at the 37 percent risk of incorrect acceptance. His justification for such a high risk involves several factors. He might consider the inherent risk to be low for the particular client. The client might have an excellent control structure so that control risk is low (and the auditor has tested controls). The auditor will do analytical procedures, including review of monthly sales and receivables. The reliance on analytical procedures caused the auditor to reduce, but not eliminate, his tests of details. The question that needs to be asked is "Is this a valid approach or would the auditor be better off increasing his sample size for the tests of details, say to a 10 or 20 percent risk level?" Kinney and Haynes' paper does not address how analytical procedures work as a corroborative test. I believe corroborative uses of analytical procedures occur more often than primary tests.

As a primary test, analytical procedures are used as the only test of an area. This does not happen often in a major area. For example, it is rare for an auditor to use analytical procedures as the primary test for inventory in a manufacturing firm. However, analytical procedures are usually the only inventory tests for a restaurant or hotel, because the inventory is not very important. Typically, analytical procedures tend to be primary tests in unimportant areas: prepaid expenses, additions to productive assets when the additions are small (for example, the client bought four sewing machines during the year), sometimes miscellaneous receivables.

Another important factor to consider (especially for primary tests) is the relationship of materiality to the choice between analytical procedures and tests of details. I assume that the auditor quantifies his materiality judgment for the audit as a whole and allocates or adjusts it to determine the materiality for the particular test. If materiality is a large portion of the population, analytical procedures are probably effective. If the materiality is a small portion of the population, the auditor probably needs tests of details. For example, consider a population of additions to productive assets where the additions total \$1 million. Let's say that this is a large company and that materiality for this test is \$500,000. Clearly, it does not take much auditing to be comfortable that there is no material misstatement. Auditing could consist of comparing the additions to expectations and thinking about what would cause \$500,000 of error in this million dollar population.

As materiality declines, auditing has to increase. For example, if materiality were \$30,000 out of this million dollar population of additions, it is clear that a test of details would be needed (either alone or combined with some analytical procedures). For areas of lesser importance, high materiality percentages are not unusual.

The auditor would ordinarily compute the percentage of materiality to the population. He also might consider what the sample size for the test of details should be. Typically, if the sample size for his tests of details is higher than 20 or 30 items, analytical procedures should not be the primary test.

There is another important difference between using analytical procedures as a primary test versus a corroborative test. When analytical procedures are the only important tests of an assertion, the auditor needs more support for

that procedure. We believe the auditor needs an “anchor” to support his analytical procedures. An anchor is:

- A strong control structure that the auditor has tested.
- Data from outside the accounting department.
- Data from outside the client.
- Data that the auditor has tested in another way.

One cannot just compute a ratio or compare a number to another number. One of the numbers has to be audited or one has to have comfort with the number. Otherwise, the analytical procedure is likely to be ineffective. This is alluded to in paragraph 16 of SAS No. 56, but not spelled out clearly.

I agree with Kinney and Haynes' thoughts about the need to be careful in performing analytical procedures. Certainly, there is non-sampling risk in analytical procedures. However, we should recognize that there also might be significant non-sampling risk in substantive tests of details. Auditors have the same psychological problems (“availability bias”, “output interference”, “anchoring and adjustment”, “lack of belief revision”) when they perform substantive tests of details. Many auditors are prone to try to call misstatements “isolated” so they don't have to project them. Some auditors still don't project misstatements properly and many auditors don't properly consider the risk of further misstatements. Finally, not all auditors use statistical sampling or even sampling when they should. Also, many auditors refuse to believe the evidence. By comparing a well done substantive test of details with a poorly done analytical procedure, Kinney and Haynes compare apples and oranges and are not being fair to analytical procedures.

Kinney and Haynes identified an important weakness in analytical procedures. The weakness is the need to ask management to explain the differences from expectations. The explanation is needed, because the auditor typically doesn't know the business as well as management. However, the auditor needs to be careful who he talks to and how he asks his questions (for example, does he use open or closed questions? Does he tell the client what he is looking for?) He should rarely talk only to the person responsible for creating the data or keeping the books. Instead, the auditor needs to talk to someone who knows the business. That person can decipher what happened in the business that might explain the difference. Often, the auditor needs to talk to several people. For example, if sales increased, the auditor needs to talk to the sales manager or the owner, not the controller. The auditor recognizes that management is not one person, but many people.

The auditor also needs to make certain calculations to see whether the explanation makes sense and really explains what happened. For example, if sales increased ten percent and the explanation is “we raised prices” the auditor needs to ask, how much did you raise prices? When did you raise them? On what products did you raise them? Did volume go up or down, because you raised prices? In short, the auditor needs to understand not only the explanation, but how it makes sense when quantified. Then he needs to test the explanation, especially for a primary test, did they really raise prices when they said they did? Show me the price change sheet.

The auditor needs to be satisfied as to both the direction and amount of the change. Too often auditors understand why sales went up, but have little satisfaction about whether the increase should be two percent or ten percent.

Kinney and Haynes correctly note that analytical procedures have a higher non-sampling risk component than tests of details. To minimize this non-sampling risk, analytical procedures need to be done by auditors with enough training and business sense. While lower level people can compute the ratios and make the comparisons, the higher level people need to interview the client to obtain the explanations and decide whether the conclusion makes sense. Analytical procedures are tougher to supervise. They require more judgment.

There are two problems with analytical procedures that I see in some of our workpapers. The first is the syndrome of “the controller said.” For every difference the staff accountant writes “the controller told me that.” The second situation is where the auditor asks the client “why did payroll go down”? The client describes the cost cutting and the labor saving machinery, and the auditor is happy. Then the auditor does the audit; the manager reviews the workpapers and finds out the client omitted a major payroll accrual. Payroll increased significantly. The auditor goes back to the client and asks, “why did payroll go up”? The client has a logical explanation that the auditor dutifully records. What’s happening is that the auditor is not skeptical and is worried about the difference rather than whether the total makes sense.

Much of the problem with analytical procedures relates to unsophisticated auditors, using unsophisticated methods, with poor corroboration of the answers. Ratios are often used on an annual (not monthly) basis, and include comparisons to last year. When the auditor becomes more sophisticated (and involves higher level people) and uses methods like regression and forces himself to recalculate the model for new explanations and consider how materiality affects the model, he is much more likely to get analytical procedures that work.

It is important to recognize the benefits of analytical procedures.

- They are usually quick and easy methods to identify problems. Auditors should first do the analytical procedures, then decide if they need more.
- They help the auditor avoid overauditing non-problem areas, especially small areas like prepayments and productive asset additions.
- They provide a basis for reducing sample sizes where the auditor performs corroborative analytical procedures.
- They get the auditor to see the forest, to understand the business and not be down in the trees. This is important in testing completeness, where auditors need to figure out what is missing.
- They get the higher level people involved in the engagement.

All of this holds if they are done right. If they are done wrong, you have problems.

I believe SAS 56 has caused us to improve documentation of planning analytical procedures and wrapping up analytical procedures. However, it has not greatly changed substantive analytical procedures.

I agree with Kinney and Haynes' call for more research and guidance. I agree that SAS 56 is an improvement over previous literature. Analytical procedures are important (maybe even more important than audit sampling). Five pages of general guidance just doesn't do it. A good audit procedure manual would be helpful for the practitioner. I agree with Kinney and Haynes' suggestions to change the SAS. In addition, the SAS could be improved by:

- Describing the two types of substantive analytical procedures - primary and corroborative.
- Requiring the auditor to interview people outside the accounting function when corroborating the results of analytical procedures.
- Showing the relationship of materiality to analytical procedures.
- Requiring recalculations of explanations.
- Requiring adequate supervision of analytical procedures.
- Stressing professional skepticism in using analytical procedures.

6

Assessing Control Risk: Effects of Procedural Differences on Auditor Consensus*

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ABSTRACT

In 1988, Statement on Auditing Standards Number 55, "Consideration of the Internal Control Structure in a Financial Statement Audit", was issued by the AICPA as a replacement standard for AU Section 320, "The Auditor's Study and Evaluation of Internal Control", in an attempt to improve auditors' control risk assessments. This paper describes the conceptual differences between the old and new standards with respect to control risk assessment. In addition, results are presented for an experiment in which practicing auditors are asked to assess control risk following one of two risk assessment procedures based on the two approaches suggested by the old and new standards. These tentative results, based on small sample sizes, do not indicate a clear "winner" in terms of consensus, however it appears that a procedural effect is present.

1. Introduction

Early in 1990, the auditor's responsibility for the evaluation and testing of a client's internal control structure was altered when Statement on Auditing Standards No. 55 (SAS 55), "Consideration of the Internal Control Structure in a Financial Statement Audit", became effective. According to Temkin and Winters [1988, pp. 98], "It's objective is to enhance audit effectiveness by improving audit planning and sharpening the auditor's assessments of control risk."

The new standard however, is not simply an attempt at integration of the old AU Section 320, "The Auditor's Study and Evaluation of Internal Control", and Statement on Auditing Standards No. 47 (SAS 47), "Audit Risk and Materiality in Conducting an Audit." Significant changes also appear to have been made in the basic concepts underlying the old standards.¹ Consequently, a

*The authors would like to acknowledge the helpful comments of Bill Waller.

¹The conceptual changes in SAS 55, described in the next section of this paper, resulted in a number of changes to other professional standards (including SAS 47.) Throughout the paper, we use AICPA *Professional Standards*, Volume 1 (June, 1987) to reflect pre-SAS 55 standards. We refer to these as the "old standards".

primary focus of the new standard is the introduction and discussion of the procedure for assessing control risk within the context of these changes.

Presumably, following the SAS 55 procedure for assessing control risk should result in "better" control risk assessments than those made under the old standards. Unfortunately, precise measurement of the extent of improvement that such a procedure might provide is problematic. The development of a reasonably specific normative model which could be applied across all firms to determine what the control risk assessment SHOULD be would be difficult due to the complexity of the internal control structure and differences in this structure across audit clients. Furthermore, ex-post determination that the control risk assessment was appropriate is not often feasible due to the lack of any clear link between control risk assessments and observable outcomes. However, if the purpose of professional standards is to provide uniform guidance to auditors, then we should expect that application of the SAS 55 procedure for assessing control risk by many auditors in the SAME audit situation would result in a greater degree of consensus among auditors than there would be in the absence of such a procedure, for reasons discussed below.

Einhorn [1974] points out that agreement (i.e., consensus) can be thought of in two ways: (a) agreement "in fact" and (b) agreement "in principle." In the context of assessing control risk, agreement in principle implies that auditors have a common understanding of the control risk assessment process, including the type of evidence to be collected, how that evidence should be weighted and combined to arrive at an assessed level of control risk, and the role of the control risk assessment in planning the audit. Agreement in fact, on the other hand, refers to agreement on the actual control risk assessments.

One goal of professional standards for auditors, implicitly, is to achieve a higher degree of agreement in principle than would be achieved in the absence of standards. Consequently, if this goal is achieved for a given standard then, *ceteris paribus*, we should expect to see greater agreement in fact among auditors than there would be in the absence of such a standard.² The term "consensus", as used in this paper, refers to the degree of agreement in fact.

The use of consensus as a measure for decision quality has received support in auditing research [see, for example, R. Ashton, 1983, and A. Ashton, 1985]. It is important to recognize that a high degree of consensus does not necessarily imply accuracy. The "correct" decision at each stage in an audit is not generally known. Indeed, the identification of "incorrect" decisions can often only be made well after the fact in the event of an audit failure, if at all. However, the successful defense of auditor decisions in the event of litigation often involves establishing a consensus, via expert witnesses, that the auditor acted in a prudent manner [Joyce and Libby, 1982]. This argument seems a particularly appropriate reason for using consensus to measure and compare the "quality" of control risk assessments made using the SAS 55 procedure with other procedures since SAS 55 is one of eight new standards is-

²It should be noted that auditors at large firms see the professional standards through the filter of the firm audit manual, workpapers, etc. This filter affects consensus to the extent that there are differences in this filter across firms.

sued by the AICPA in response to SEC and congressional criticism stemming largely from recent cases of auditor litigation.³

The purpose of this paper is to describe the conceptual differences between the SAS 55 procedure for assessing control risk and the procedure suggested by the old standards.⁴ In addition, we provide preliminary evidence on the effects that such procedural differences might have on the degree of auditor consensus. The results of this study are intended to provide insights for future, more refined experiments. We conduct an experiment in which practicing auditors are given information relating to a hypothetical client's internal control structure elements and are asked to assess control risk on a qualitative scale (ranging from "lowest" to "highest"). Half of the subjects receive a description of a control risk assessment procedure based on our interpretation of SAS 55 and are asked to follow this procedure in making their assessment. The remaining subjects receive a description of an alternative procedure based on concepts implicit in the old standards (described in the next section of this paper). Consensus is measured by converting qualitative responses into a simple quantitative scale and computing the standard deviation of each group's responses.

A potential confounding factor which may limit the usefulness of our results is the inability to completely control for differences in firm policy with regard to control risk assessments and/or the extent to which different firms have already adopted methods which are congruent with SAS 55. For example, although auditor subjects are asked to follow the specific procedure for assessing control risk that is described in their questionnaire, their responses may nevertheless be unintentionally biased toward control risk assessments which reflect elements of their firms' policies. We attempt to control for these effects by stressing to subjects the importance of following the described control risk assessment procedure regardless of how it may differ from their firm's policy. However, even if we are successful in our attempt to motivate (conscious) unbiased responses, it is unlikely that (unconscious) firm bias can be completely eliminated.

The results of this experiment have implications for auditors' assessments of control risk in practice. If the procedure used to assess control risk has a significant effect on auditors' control risk assessments, then great care should be taken in recognizing and considering these effects in order to determine the most appropriate procedure to follow. In particular, if a prescribed procedure contains equivocalities with respect to the role of evidence in assessing control risk or with respect to the meaning of the assessment itself, then low consensus may be an indication that control risk assessment is not necessarily recognized as the same task across auditors. In other words, a prescribed procedure which fails to achieve agreement in principle is likely to result in low

³See "Official Releases", *Journal of Accountancy* (July, 1988), pp. 144.

⁴While the sequence of events (i.e., obtaining an understanding of internal controls, collection of evidence, etc.) does not differ between the old and new standards, what does differ is the auditor's internal process (i.e., how the information collected is used to assess control risk). We use the term "procedure" to refer to the particular way in which judgments are made with respect to control risk.

consensus. Consequently, using a procedure which results in low consensus among auditors may result in a more difficult defense in the event of litigation where there is disagreement among expert witnesses.

The remainder of this paper is organized as follows. The next section describes the SAS 55 procedure for assessing control risk and discusses the conceptual differences between it and the procedure suggested by the old standards. The third section describes the experiment and discusses possible results. The fourth section presents the results and the final section provides concluding remarks and suggestions for further research.

2. SAS 55 Control Risk Assessment Procedure

Statement on Auditing Standards No. 55 (SAS 55), "Consideration of the Internal Control Structure in a Financial Statement Audit", alters the auditor's responsibility for the evaluation and testing of a client's internal control structure. In particular, SAS 55 expands the scope of the evaluation and specifically identifies the type of knowledge needed to obtain a sufficient understanding of a client's internal control structure and the degree of knowledge needed to plan the audit. The bulk of the new standard, however, focuses on the auditor's responsibility for assessing control risk and describes the procedure to be followed in making this assessment. A brief description of this procedure follows.

Prior to assessing control risk, the auditor is required to obtain a sufficient understanding of the client's internal control structure to plan the audit. The internal control structure consists of the following elements [Paragraph 8]: 1) The control environment, 2) The accounting system, and 3) Control procedures.

After obtaining an understanding of the internal control structure, the auditor begins the process of assessing control risk. This process is described in SAS 55, Paragraphs 29 and 30, as follows:

29. Assessing control risk is the process of evaluating the effectiveness of an entity's internal control structure policies and procedures in preventing or detecting material misstatements in the financial statements. Control risk should be assessed in terms of financial statement assertions. After obtaining the understanding of the internal control structure, the auditor may assess control risk at the maximum level for some or all assertions because he believes policies and procedures are unlikely to pertain to an assertion, are unlikely to be effective, or because evaluating their effectiveness would be inefficient.

30. Assessing control risk at below the maximum level involves:

- Identifying specific internal control structure policies and procedures relevant to specific assertions that are likely to prevent or detect material misstatements in those assertions.
- Performing tests of controls to evaluate the effectiveness of such policies and procedures.

In effect, the assessed level of control risk is that level that is supported by evidential matter obtained from evaluating the effectiveness of operating internal control structure policies and procedures. It follows then, that after obtaining an understanding of the internal control structure but prior to performing any tests of controls (assuming, for illustration purposes, that no tests of controls were performed during the course of obtaining the understanding), the control risk assessment should be at the maximum level. As tests of controls are performed and evidential matter is collected which confirms the effectiveness of internal control structure policies and procedures, the control risk assessment is reduced. Consequently, the greater the extent of testing, the greater the potential reduction in the assessed level of control risk from the maximum level.

Ultimately, after all testing has been completed, the final (evidence-supported) assessed level of control risk is used, along with the assessed level of inherent risk, to determine the acceptable level of detection risk for the purpose of determining the nature, timing, and extent of substantive tests to perform.⁵ It would seem then, that a primary motivation for the SAS 55 procedure for assessing control risk is to ensure that this necessary input to the Audit Risk Model⁶ is properly supported by evidential matter.

While SAS 55 attempts to make a positive move toward greater consistency with other standards, some significant changes in the basic concepts underlying the old standards are implicit in the control risk assessment procedure as it is described in SAS 55. In paragraph 28 of SAS 55, control risk is defined as “the risk that a material misstatement that could occur in an assertion will not be prevented or detected on a timely basis by the entity’s internal control structure policies or procedures.” However, the assessment of control risk based solely on the quantity (and quality) of evidential matter collected is inconsistent with this definition. The auditor’s control risk assessment should be, and is defined as, a representation of his beliefs regarding the risk of a material error⁷ getting through the client’s internal controls, but these beliefs are ignored under some conditions in the SAS 55 control risk assessment procedure. Consider the following examples.

Suppose that we’re conducting two audits. After obtaining an understanding of each client’s internal control structure, control risk is assessed at the maximum level for both. For the first client, control risk is assessed at the maximum level because the auditor believes there are material weaknesses in the entity’s internal control structure. For the second client, the auditor believes the internal control structure is strong but has assessed control risk at the maximum level because performing tests of controls would be ineffi-

⁵SAS 55’s expansion of factors to be considered in obtaining an understanding of a client’s internal control structure may lead to increased confounding of the inherent risk and control risk assessments. This issue (albeit critical) is beyond the scope of this paper. See Waller [1990] for an analysis of this confounding.

⁶See the Appendix of “Audit Sampling”, AICPA *Professional Standards* - Volume 1 (AICPA, 1987), AU Section 350.

⁷We use the terms “error” and “misstatement” interchangeably.

cient.⁸ In the first case, the auditor has identified areas of weakness in the client's internal control structure and should direct additional audit effort to searching for material error where he believes the risk of error is high. In the second case, however, no material weaknesses in the internal control structure have been identified by the auditor. The course of action indicated in this case may be quite different than the first, yet because the assessed level of control risk is the same for both cases, this suggests that the nature, timing, and extent of substantive testing would not differ between the two.⁹

The maximum assessed level of control risk does not have the same meaning between the two cases. In the first case, the assessed level of control risk is, as defined in SAS 47, a reflection of the auditor's beliefs regarding the risk of material error getting through the client's internal control structure. In the second case, however, the auditor's beliefs are not reflected at all. The assessed level of control risk is arbitrarily set for the purpose of planning the audit. It would seem, however, that a key factor in audit planning would be the auditor's actual expectations regarding material error, yet these expectations are not reflected in the control risk assessment in the second case.

To illustrate further, suppose that after obtaining an understanding of a client's internal control structure, the auditor believes that there is a low probability that a material error will not be prevented or detected on a timely basis by internal control policies and procedures, i.e., he believes control risk is low. The auditor's expectations regarding material error in the financial statements are developed during the course of obtaining the understanding and should be used as the basis for planning the audit.

The auditor can follow a number of alternative avenues for the collection of audit evidence. These may include performing extensive tests of controls and limited substantive tests; few, if any, formal tests of controls and expanded substantive tests; or any combination which the auditor believes will provide sufficient evidential matter to support an opinion on the financial statements. The choice among alternatives would be based in large part on the differential costs of the various avenues, but the auditor's beliefs regarding control risk should be used constructively regardless of which avenue is chosen. Consequently, if the auditor chooses not to perform tests of controls due solely to cost considerations, a control risk assessment at the maximum level incorrectly implies that he believes the risk of error is high simply because performing tests of controls would be inefficient. This reasoning is contrary to the very concept and definition of control risk.

In all fairness to the drafters of SAS 55, this criticism is really a joint criticism of the SAS 55 control risk assessment process AND the Audit Risk Model

⁸Although this option is stated in paragraph 29 of SAS 55, it seems likely that some tests of controls would have to be performed in order to obtain a sufficient understanding of a client's internal control structure.

⁹Although this issue is an empirical one, it seems likely that, at least in some circumstances, allowable detection risk and choice of audit procedures would vary between the two cases described in this scenario. This possibility is explicitly recognized in paragraph 3.5 of the audit guide for SAS 55 (AICPA, 1990). This situation may be due in part to a blurring of the distinction between inherent risk and control risk.

(ARM). The shortcomings of the ARM are well-documented [see, for example, Cushing and Loebbecke, 1983, and Kinney, 1989]. In particular, the ARM does not accommodate both the auditor's beliefs and an assessment of the sufficiency of evidence to support those beliefs. SAS 55 attempts to reconcile the two by prescribing a procedure for assessing control risk based on a sufficiency of evidence criterion, however in many cases (as illustrated above) this method will not adequately reflect the auditor's actual expectations and consequently, will, at least as described, ignore potentially valuable information. Ideally, a risk model should accommodate separate assessments of risk and evidence sufficiency [see Waller and Felix, 1984, for an example of the rudiments of such a model.] This concept has also been suggested by Loebbecke, Eining, and Willingham [1989] with respect to auditor's assessments of the likelihood of material management fraud. They state, for example; "[I]n addition to searching for information to support the assessment about each component, the auditor must make a judgment about the thoroughness and reliability of his/her procedures" [page 4].

Although professional standards do not explicitly "model" separate belief assessments and evidence sufficiency assessments, this basic concept was nevertheless reflected in the old standards,¹⁰ as illustrated below.

The first standard of reporting states: "The report shall state whether the financial statements are presented in accordance with generally accepted accounting principles." According to AU Section 312, "Audit Risk and Materiality in Conducting an Audit," paragraph 3:

The phrase 'present fairly in conformity with generally accepted accounting principles' implicitly indicates the auditor's *belief* that the financial statements taken as a whole are not materially misstated (emphasis added.)

Indeed, the opinion rendered by an auditor on a client's financial statements is a direct reflection of his beliefs regarding the risk of material error in the financial statements. Consequently, an auditor will issue an unqualified audit opinion only if he believes that the risk of undetected material error in the financial statements is sufficiently low. The risk of undetected material error in a client's financial statements at the conclusion of an audit is the familiar "Audit Risk" discussed in AU Section 312. However, an auditor's assessment of his beliefs regarding the risk of material error is an important consideration not only at the conclusion of an audit, but throughout the audit process. Clearly, the auditor's beliefs regarding the risk of material error is an important consideration in planning the audit as well. AU Section 312, paragraph 8, states:

The auditor should consider audit risk and materiality both in (a) planning the audit and designing auditing procedures and (b) evaluating whether the financial statements taken as a whole are presented fairly in conformity with generally accepted accounting principles.

¹⁰In the following analysis, we use AICPA Professional Standards, Volume 1 (June, 1987) to reflect pre-SAS 55 (old) standards.

At the individual account-balance level, this guidance suggests that if the auditor believes the risk of material error in a particular account is high, this belief should be reflected in his choice of audit procedures to perform with respect to that account. Indeed, AU Section 312, paragraph 19, makes this explicit:

The auditor needs to consider audit risk at the individual account-balance or class-of-transactions level because such consideration directly assists him in determining the scope of auditing procedures for the balance or class.

The decomposition of audit risk into three component risks (i.e., inherent risk, control risk, and detection risk) is an explicit reflection of the fact that the auditor's beliefs regarding the risk of material error are an important consideration throughout the audit process. Furthermore, these beliefs affect, and in turn are affected by, the auditing procedures performed at various stages in the audit.

For example, at the conclusion of an audit, an undetected material error in a client's financial statements indicates that (1) a material error occurred, (2) it was not detected by the client's internal control structure, and (3) it was not detected by the auditor. Consequently, the auditor's belief regarding the risk of undetected material error at the conclusion of the audit will depend on his beliefs regarding the likelihood of the occurrence of (1) through (3). These "component beliefs" are sequentially addressed at different stages in the audit process. Furthermore, because the auditor's beliefs are an integral part of the planning process, the auditor's beliefs regarding the risk of material error after, say, evaluating the client's internal control structure (i.e., after assessing inherent risk and control risk) affect the choice of audit procedures in the substantive testing stage of the audit which in turn affects the likelihood of (3).

What then is the role of audit evidence in the formation of the auditor's beliefs, that is, on his assessments of these component risks? Prior to SAS 55, the second and third standards of field work stated:

Second Standard: 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 tests to which auditing procedures are to be restricted.

Third Standard: Sufficient competent evidential matter is to be obtained through inspection, observation, inquiries, and confirmations to afford a reasonable basis for an opinion regarding the financial statements under examination.

Thus, although an unqualified opinion on a client's financial statements necessarily reflects the auditor's belief that audit risk is acceptably low, this belief alone is not enough to justify the opinion. The standards of field work require that the auditor collect sufficient competent evidential matter to support his opinion. Sufficient evidential matter may be obtained through any combination of tests of controls evidence and substantive testing evidence

that, in the auditor's professional judgment, meets this requirement. For example, AU Section 350, "Audit Sampling", paragraph 19, states:

The second standard of field work recognizes that the extent of substantive tests required to obtain sufficient evidential matter under the third standard should vary inversely with the auditor's reliance on internal accounting control. These standards taken together imply that the combination of the auditor's reliance on internal accounting control and his reliance on his substantive tests should provide a reasonable basis for his opinion, although the portion of reliance derived from the respective sources may vary.

Under the old standards, the sufficiency of evidence assessment is reflected in the degree of reliance placed on the respective sources of evidential matter. At the conclusion of the audit, then, the combination of the evidence collected should provide the auditor with the required basis for reliance on his beliefs regarding the risk of undetected error in the financial statements and in turn, on the opinion rendered. This concept of reliance is further linked explicitly to the auditor's component risk assessments. For example, AU Section 312, paragraph 24, states:

The auditor might make separate or combined assessments of inherent risk and control risk. If he considers inherent risk or control risk, separately or in combination, to be less than the maximum, he should have an appropriate basis for any *reliance* he places on his assessments (emphasis added).

This guidance implies that, although the auditor may *believe* control risk is low, in order to *rely* on his low assessment, he must have sufficient evidential matter as a basis for that reliance, and consequently, as a basis for restricting substantive tests. It does NOT imply, however, that the auditor's beliefs about control risk are *determined* only by evidential matter obtained from tests of controls. We argue that the auditor forms expectations (i.e., beliefs) about the existence of material error in the financial statements *prior* to testing. Indeed, it is these beliefs that form the basis for planning the audit, as noted above. The role of evidential matter, then, is to provide a basis for *reliance* on those beliefs. The collection of evidential matter which supports the auditor's beliefs contributes to the basis for reliance, while evidential matter which contradicts the auditor's beliefs reduces the basis for reliance. In the event of contradictory evidence, the auditor may reconsider whether his initial assessments regarding the risk of material error are still an accurate reflection of his beliefs and, in this respect, evidential matter may cause beliefs to be revised. However, it seems unreasonable to assume that an auditor either has no beliefs until competent evidential matter is collected, or that his beliefs are irrelevant unless sufficient evidential matter is collected to provide a basis for reliance thereon.

Unfortunately, the concept of reliance was eliminated from the professional standards with the issuance of SAS 55 because of perceived confusion over its meaning [Temkin and Winters, 1988] and was replaced with guidance that combines risk assessments with evidence sufficiency assessments in ways

that are sometimes inconsistent (i.e., equivalent control risk assessments may have different meanings in different circumstances.). The old standards emphasized the role of the auditor's beliefs in planning the audit and moving forward through the various stages of evidence collection in order to collect sufficient evidential matter to provide a basis for reliance on those beliefs. SAS 55, on the other hand, seems to focus on the evidence collected as a means of working backwards to "set" beliefs about control risk. Implicitly, it also eliminates the requirement to assess the sufficiency of the evidence collected since control risk is "assessed" at that level that is supported by evidential matter (regardless of the auditor's true beliefs). This new focus represents a major change in the basic concepts underlying the professional standards.

The procedure for assessing control risk suggested by the old standards does not differ from the SAS 55 procedure in terms of the sequence of events (i.e., obtaining an understanding of internal control structure elements, performing tests of controls, etc.). Under our position, the old standards suggest that the control risk assessment should be based on the auditor's beliefs and a separate assessment made regarding the sufficiency of the evidence collected to rely on those beliefs. The next section of the paper describes the use of an "evidence-based" control risk assessment procedure and a "belief-based" procedure (corresponding to our interpretation of the SAS 55 procedure and the procedure suggested by the old standards) in an experimental task setting.

3. The Experiment

This experiment represents a first attempt at examining the effects that procedural differences in assessing control risk might have on auditors' consensus. Due to the exploratory nature of this experiment and the lack of a theory which might predict the degree of agreement in fact for each procedure, we make no predictions with respect to consensus. However, the conceptual differences between the two procedures do suggest different mean responses between the groups following each procedure at various decision points. These are discussed shortly.

The subject group for this experiment consists of 64 practicing auditors from "Big Six" accounting firms. This group includes 33 seniors, 23 managers, two new partners, and four experienced staff.¹¹ We intentionally used subjects who were in at least their third busy season. It was believed that these subjects would be experienced enough to be comfortable with control evaluation and its role in the audit process. Subjects have an average of 65 months of auditing experience and have worked on an average of 24 audits in which they were directly involved in internal control work. The average total number of audits worked on is 41.

Subjects are divided into two main groups and, according to group, are provided with specific instructions for assessing control risk. Risk assessments (for both groups) are based on a qualitative scale ranging from "lowest" to "highest".

¹¹Two subjects did not indicate their experience level on their questionnaires.

One group, hereafter referred to as the “evidence-based” group, are instructed to assess control risk at that level that is sufficiently supported by the evidence presented in the questionnaire. Consistent with the SAS 55 procedure, they are told that a control risk assessment below the highest level must be supported by sufficient evidence.

The second group, hereafter referred to as the “belief-based” group, are instructed to assess control risk at that level that reflects their beliefs regarding the risk that a material error will not be prevented or detected by the client’s internal control structure elements. They are further told that their control risk assessment should reflect their beliefs regardless of whether or not they feel that sufficient evidence exists to support those beliefs.¹²

After reading their specific instructions, subjects are provided with information regarding a hypothetical client’s internal control structure. This includes a description of the company and its operations, accounting system, personnel, and results of specific tests of controls on the previous year’s audit. They are told that their focus is on the valuation assertion for gross accounts receivable. Half of the subjects receive a description which indicates that the client’s internal control structure with respect to this assertion is relatively strong, while the other half receive a description which indicates significant weaknesses in the client’s internal control structure.¹³ In addition, half of the subjects are told that, due to cost considerations, tests of controls will not be performed on this year’s audit. The other half are told that the same tests of controls performed last year will be performed on this year’s audit.

This design resulted in eight different combinations of control risk assessment procedures, strength of internal controls, and planned tests of controls (as illustrated in Figure 1).

After reading the description of the client’s internal control structure, subjects in the “NO TESTS OF CONTROLS” group are asked to assess control risk (for the valuation assertion of gross accounts receivable) according to the instructions provided in their questionnaire. Subjects in the “TESTS OF CONTROLS” group are asked to make a preliminary assessment of control risk according to their instructions. Following this preliminary assessment, subjects in this group are provided with the results of tests of controls and are asked to revise their control risk assessment to reflect this additional information, if necessary.

All subjects are then asked to make an assessment of the sufficiency of the evidence provided to support their control risk assessment. Finally, all subjects are provided with a description of planned substantive tests and are

¹²In the introductory section of the questionnaire, subjects are asked to follow the specific instructions for assessing control risk contained in their questionnaire regardless of how that procedure may differ from that used by themselves or their firm in practice. During the pre-testing phase of the experiment, however, there was considerable confusion among the belief-based subjects as to whether or not their knowledge of SAS 55 should influence their assessments. For this reason, the instructions for the belief-based group state that their risk assessments may be contrary to the SAS 55 requirement to consider evidence sufficiency in assessing control risk.

¹³Pre-testing of these descriptions was somewhat limited. Consequently, elements which were intended to reflect significant strengths or weaknesses may not necessarily be viewed as such by subjects.

Figure 1
Experiment Design

PANEL A : Evidence-Based Procedure (N = 35)

	INTERNAL CONTROL STRUCTURE	
	STRONG	WEAK
TESTS OF CONTROLS	(a) n = 8	(b) n = 9
NO TESTS OF CONTROLS	(c) n = 9	(d) n = 9

PANEL B: Belief-Based Procedure (N = 29)

	INTERNAL CONTROL STRUCTURE	
	STRONG	WEAK
TESTS OF CONTROLS	(e) n = 7	(f) n = 8
NO TESTS OF CONTROLS	(g) n = 7	(h) n = 7

asked to recommend a sample size for positive confirmations. In addition, they are asked whether or not they would consider sending confirmations prior to year-end appropriate.

Discussion of Possible Results

The first decision point at which responses can be compared is the preliminary control risk assessment made by those subjects in cells a, b, e, and f. Since subjects in the evidence-based group (cells a and b) should base their assessment on that level that is sufficiently supported by the evidence presented up to that point, their control risk assessments should be at or near the highest level. At this point, tests of controls have not yet been performed and consequently, there should be little justification to reduce the control risk assessment from the highest level for either the “STRONG” or the “WEAK” internal control structure scenarios.

The belief-based group, however, should have significantly different preliminary control risk assessments between cells e and f, corresponding to the “STRONG” and “WEAK” internal control structure scenarios. Since their assessments should be based on their beliefs, regardless of the degree of evidence to support those beliefs, the risk assessments for the “STRONG” scenario (cell e) should be significantly lower than the risk assessments for the “WEAK” scenario (cell f). The expected results for the preliminary control risk assessments are summarized in Figure 2.

The second point of comparison is the control risk assessment for subjects in the “NO TESTS OF CONTROLS” group and revised control risk assessment for subjects in the “TESTS OF CONTROLS” group. To begin, risk assessments for the “NO TESTS OF CONTROLS” group using the evidence-based procedure should exhibit the same characteristics as described above

Figure 2
Preliminary Control Risk Assessments: Expected Results

PANEL A : Evidence-Based Procedure

	<u>INTERNAL CONTROL STRUCTURE</u>	
	STRONG	WEAK
TESTS OF CONTROLS	High	High
NO TESTS OF CONTROLS	n/a	n/a

PANEL B: Belief-Based Procedure

	<u>INTERNAL CONTROL STRUCTURE</u>	
	STRONG	WEAK
TESTS OF CONTROLS	Low	High
NO TESTS OF CONTROLS	n/a	n/a

for the evidence-based preliminary control risk assessments. That is, since no tests of controls are being performed, there should be little justification for a reduction in the control risk assessment for either the “STRONG” or the “WEAK” internal control structure scenarios. Consequently, the control risk assessments for both cells c and d should be at or near the highest level.

The risk assessments for the “NO TESTS OF CONTROLS” group using the belief-based procedure should similarly correspond to the belief-based preliminary risk assessments described above. That is, even though tests of controls are not to be performed, the belief-based assessments for the “STRONG” internal control structure scenario (cell g) should be significantly lower than the risk assessments for the “WEAK” scenario (cell h).

In the cases corresponding to “TESTS OF CONTROLS” (cells a, b, e, and f), we expect to see somewhat different results. Risk assessments for the evidence-based group should now differ between the “STRONG” and “WEAK” internal control structure scenarios. Since tests of controls have been performed, the risk assessments for the evidence-based group in the “STRONG” internal control structure scenario should reflect the fact that evidence exists to justify a reduction in the control risk assessment from the highest level (cell a). However, the results of tests of controls presented in the questionnaire for the “WEAK” internal control structure scenario indicate that two of the four controls tested are not operating effectively. Consequently, we shouldn’t expect to see a significant reduction in the control risk assessment. That is, the evidence presented does little to justify a reduction in the assessment from the highest level for subjects in cell b.

The risk assessments for the “TESTS OF CONTROLS” group using the belief-based procedure (cells e and f) should exhibit little change from the preliminary risk assessments made by these subjects. The reason is that results of tests of controls presented in the questionnaire reveal few “surprises.” Tests of controls results for the “STRONG” internal control structure scenario are relatively strong and results are weak for the “WEAK” internal

control structure scenario. In other words, tests of controls results should do little to change these subjects' preliminary beliefs.

The expected results for each cell for subjects' control risk assessments are summarized in Figure 3.

Figure 3
Control Risk Assessments: Expected Results

PANEL A : Evidence-Based Procedure

	<u>INTERNAL CONTROL STRUCTURE</u>	
	STRONG	WEAK
TESTS OF CONTROLS	Low	High
NO TESTS OF CONTROLS	High	High

PANEL B: Belief-Based Procedure

	<u>INTERNAL CONTROL STRUCTURE</u>	
	STRONG	WEAK
TESTS OF CONTROLS	Low	High
NO TESTS OF CONTROLS	Low	High

All subjects are asked to make an assessment of the sufficiency of the evidence presented to support their control risk assessments. These assessments are made on a qualitative scale ranging from "COMPLETELY INSUFFICIENT" to "COMPLETELY SUFFICIENT". Since subjects in the evidence-based group are asked to assess control risk at that level that is sufficiently supported by the evidence presented, their evidence sufficiency assessments should all be at or very near the "COMPLETELY SUFFICIENT" level. The assessments made by the belief-based group, however, should vary depending upon whether or not tests of controls have been performed. For the "NO TESTS OF CONTROLS" group, we expect the evidence sufficiency assessment to be low, at or near the "COMPLETELY INSUFFICIENT" level, at least for the "STRONG" internal control structure scenario. It is not clear, *ex-ante*, what the assessment should be for the "WEAK" internal control structure scenario; i.e., how sufficient must evidence be when controls are NOT to be relied on? For this reason, we make no prediction for the "WEAK" scenario. Sufficiency assessments for the belief-based group in the "TESTS OF CONTROLS" case should be significantly higher than for the "NO TESTS OF CONTROLS" case in the "STRONG" internal control structure scenario. Again, no prediction is made for the "WEAK" case.

The final point of comparison between groups is the sample size recommendation for positive confirmations. Comparison of responses at this point should provide insight into whether using different control risk assessment procedures results in different decisions with respect to substantive testing. Since the scenarios in cells a and e, b and f, c and g, and d and h are pair-wise identical, we should not see any significant differences in recommended sample sizes between these pairs of cells. We expect the sample sizes in cells

a and e to be the lowest. Furthermore, if auditors choose higher sample sizes in cases where an evaluation of a client's internal control structure reveals significant weaknesses, we might expect the sample sizes in cells c and g to be somewhat lower than those recommended for cells b and f, and d and h. In the next section, subjects' responses are evaluated and the results are presented. In addition, some implications of these results are discussed.

4. Results

In this section, we present results of an experiment described in the previous section of this paper which is intended as a first step in the investigation of the effects of procedural differences on auditors' control risk assessments. While this first step is an admittedly crude one, the results presented here may nevertheless provide some insight into the control risk assessment process and suggest possible avenues for future, more refined experiments in this area of auditor judgment. Also, the results presented here are based on a limited number of responses and consequently, the number of responses for each of the cells shown in Figure 1 is small. For this reason, the usefulness of a statistical analysis of the data is limited. We therefore confine our analysis primarily to a qualitative comparison of responses rather than performing extensive statistical tests.

In the analysis that follows, we use the following abbreviations to denote the risk assessment procedure, strength of internal controls, and planned tests of controls:

Evidence-Based Procedure - EB
Belief-Based Procedure - BB
Strong Internal Controls - STR
Weak Internal Controls - WK
Tests of Controls - T
No Tests of Controls - NT

The responses for participants who used, for example, the belief-based risk assessment procedure and whose questionnaires contained the strong internal control scenario with no tests of controls will be denoted BB-STR-NT. This corresponds to cell g in Figure 1.

Subjects' control risk assessments are based on a qualitative scale ranging from "Lowest" to "Highest". In order to facilitate comparison of risk assessments across groups, we convert these responses to a numerical value by letting an assessment of "Lowest" equal "1" and "Highest" equal "5". (Thus a control risk assessment of "Medium" would be given a value of "3".) Similarly, subjects' assessments of evidence sufficiency are based on a qualitative scale ranging from "Completely Insufficient" to "Completely Sufficient". These are converted to a numerical value with "1" corresponding to an assessment of "Completely Insufficient" and "5" corresponding to an assessment of "Completely Sufficient".

Preliminary Control Risk Assessments

Subjects who completed questionnaires corresponding to cells a, b, e, and f in Figure 1 were asked to make a preliminary assessment of control risk

prior to reviewing the results of tests of controls. Table 1 presents a summary of the responses for these groups.

Table 1
Preliminary Control Risk Assessments

Group	Cell	Number of Responses	High	Low	Mean	St. Dev
EB-STR-T	a	8	5.00	2.00	3.07	1.371
EB-WK-T	b	9	5.00	3.00	4.22	0.813
BB-STR-T	e	7	4.00	1.00	2.42	0.975
BB-WK-T	f	8	4.00	2.00	3.03	0.750

As predicted (see Figure 2), the mean response of 3.07 for cell a is higher than the mean response of 2.42 for cell e (although a one-sided t-test of the difference was not significant; p-value = .15). This makes sense since the responses for the evidence-based group should reflect the level of control risk that is supported by evidence and at this point in the questionnaire, there is little evidential support for a risk assessment below the highest level. However, the mean risk assessment for the evidence-based group IS significantly lower than the maximum level of “5.00” (p-value = .0027). This may suggest that subjects viewed some of the information given in the description of the client’s operations as providing evidence to support a lower risk assessment. Alternatively, it may indicate that subjects let their beliefs influence their risk assessments. Since internal controls are relatively strong, we expected the belief-based group’s responses to reflect a belief that control risk is below the highest level. A one-sided t-test of the difference between the mean response of 2.42 and the maximum level was significant (p-value = .0002).

A comparison of the responses between cells b and f is somewhat more disturbing. We expected the mean responses for each to be high given the weaknesses described in the questionnaire, however the mean response of 3.03 for cell f is significantly lower than both the maximum level (p-value = .00) and the mean response of 4.22 for cell b (p-value = .0072). One possible explanation for this result is that our description of weaknesses was not salient enough to generate an overall impression of a weak internal control structure. In addition, the mean response of 4.22 for cell b is significantly less than the maximum level (p-value = .01), contrary to our expectation. The difference between the means for cells e and f is marginally significant (p-value = .10). Also, the difference between mean responses for cells a and b is marginally significant (p-value = .063).

We use the standard deviation of responses to measure consensus for each group. For the strong internal control scenario, the belief-based group’s responses exhibit a higher degree of consensus (as evidenced by a lower standard deviation) than the responses for the evidence-based group. Likewise, for the weak scenario, the belief-based group’s responses exhibit a higher degree of consensus. F-tests of the difference between the standard deviations were not significant.

Control Risk Assessments

Table 2 provides a summary of each group's control risk assessments. For the groups represented by cells a, b, e and f, these assessments represent a revision of their preliminary control risk assessments (described above) after reviewing results for tests of controls. For the remaining groups (cells c, d, g, and h), the control risk assessments are made after subjects are informed that tests of controls are not going to be performed.

Table 2
Control Risk Assessments

Group	Cell	Number of Responses	High	Low	Mean	St. Dev
EB-STR-T	a	8	4.00	1.90	2.81	0.848
EB-WK-T	b	9	5.00	2.00	3.94	1.189
EB-STR-NT	c	9	5.00	2.00	3.47	1.030
EB-WK-NT	d	9	5.00	2.00	3.95	0.947
BB-STR-T	e	7	3.45	1.25	2.43	0.885
BB-WK-T	f	8	5.00	2.00	3.68	0.946
BB-STR-NT	g	7	4.00	1.75	2.69	0.982
BB-WK-NT	h	7	5.00	3.00	4.06	0.597

Tests of Controls Groups

For the groups receiving tests of controls results (cells a, b, e, and f) we expected the responses for each scenario (strong vs. weak internal controls) to be the same across risk assessment procedures (see Figure 3). The mean response of 2.81 for cell a in Table 2 is lower than the mean response of 3.07 for the same group's preliminary risk assessments (cell a in Table 1). This is expected since after receiving the results of tests of controls, subjects in this group had a basis for a reduction in their control risk assessment. The mean response of 2.81 is significantly lower than the maximum (p -value = .00). The mean response for the belief-based group for the strong internal control scenario remained about the same. The mean preliminary assessment was 2.42 (cell e in Table 1) and the mean revised control risk is 2.43 (cell e in Table 2). This makes sense since the evidence presented for tests of controls was consistent with a strong internal control structure. Although the evidence-based group's mean response of 2.81 is higher than the belief-based group's mean response of 2.43, this difference is not significant (p -value = .41).

The mean risk assessment for the evidence-based group in the weak scenario (cell b) decreased after subjects reviewed tests of controls evidence, from 4.22 (Table 1) to 3.94 (Table 2). For this group, we expected the preliminary assessment to be high and remain high after tests of controls evidence was presented, since the evidence presented indicated that some controls were not operating effectively. However, since at least one control was operating effectively, this slight reduction in control risk is not surprising. For the belief-based group, the mean control risk assessment increased

3.03 (cell f in Table 1) to 3.68 (cell f in Table 2). This upward revision in risk assessments may provide an indication that if internal controls weaknesses were not made salient enough in our description of the client's operations, subjects would recognize that internal controls were somewhat weak after reviewing tests of controls evidence. However, the mean response of 3.68 is still significantly lower than the maximum (p -value = .0027). The mean response of 3.94 for the evidence-based group is not significantly different from the mean response of 3.68 for the belief-based group (p -value = .61), as expected.

In addition, the mean response of 2.81 for cell a is significantly lower than the mean response of 3.94 for cell b (p -value = .019). Likewise, the mean response of 2.43 for cell e is significantly lower than the mean response of 3.68 for cell f (p -value = .011). In general, the results for the "Tests of Controls" groups are consistent with our predictions. The mean responses for cells a and e are about the same and are lower than the mean responses for cells b and f, which are also approximately equal.

Finally, a comparison of the standard deviations for cells a versus e and b versus f indicates that consensus is higher for the evidence-based group in the strong internal control scenario and higher for the belief-based group in the weak internal control scenario, although F -tests indicate that none of these differences are significant.

No Tests of Controls Groups

For the strong scenario case, we expected the mean responses to differ between the evidence-based and belief-based groups (see Figure 3). As expected, the mean response of 3.47 for the evidence-based group (cell c) is higher than the mean response of 2.69 for the belief-based group (cell g), although this difference is only marginally significant (p -value = .073). We expected the mean response for the belief-based group to be fairly low given the description of a relatively strong internal control structure and, as expected, the mean response of 2.69 is significantly lower than the maximum (p -value = .0004). However, the mean response of 3.47 for the evidence-based group is somewhat surprising (it is significantly lower than the maximum; p -value = .001). This may suggest that either: 1) subjects viewed some of the information given in the description of the client's operations as tests of controls evidence, 2) subjects were not able to assess control risk based solely on evidence sufficiency without being influenced by their beliefs, or 3) subjects did not understand the instructions provided for making their control risk assessments.

We expected the mean responses for the weak scenario for both the evidence-based and belief-based groups to be high. The mean response for the evidence-based group is 3.95 (cell d) and the mean response for the belief-based group is 4.06 (cell h). The difference between these means is not significant (p -value = .79). Again, the mean response for the evidence-based group is lower than expected. Since both groups' mean responses were lower than the highest level, this may again suggest that we did not adequately emphasize weaknesses in our description of the client's operations. Notwithstanding this, the mean response for the evidence-based group is surprisingly low consid-

ering the lack of evidence provided, and is significantly lower than the maximum (p-value = .0052). The mean response of 3.47 for cell c is not significantly different from the mean response of 3.95 for cell d (p-value = .32), as expected (although both are significantly less than the maximum, contrary to our expectations). The mean response of 2.69 for cell g is significantly lower than the mean response of 4.06 for cell h (p-value = .0058), as expected.

The standard deviations presented in Table 2 for cells c, d, g, and h indicate that consensus is higher for the belief-based group for both the strong and weak internal control scenarios, although F-tests of the differences are not significant.

Evidence-Sufficiency Assessments

Table 3 provides a summary of responses for each group's evidence-sufficiency assessments.

TABLE 3
Evidence-Sufficiency Assessments

Group	Cell	Number of Responses	High	Low	Mean	St. Dev
EB-STR-T	a	8	5.00	2.90	3.99	0.776
EB-WK-T	b	9	5.00	1.00	3.29	1.510
EB-STR-NT	c	9	5.00	1.00	3.39	1.318
EB-WK-NT	d	9	4.85	1.90	3.40	0.881
BB-STR-T	e	7	5.00	2.95	4.04	0.835
BB-WK-T	f	8	4.00	2.15	3.30	0.792
BB-STR-NT	g	7	4.50	2.40	3.27	0.718
BB-STR-NT	h	7	4.00	2.00	3.43	0.787

In the instructions for the evidence-based risk assessment procedure, subjects were told that their risk assessments should correspond to that level that is completely supported by evidence. Consequently, we expected *ex-ante* that all of the sufficiency assessments for the evidence-based groups would be at or near the highest level. However, as Table 3 indicates, the mean evidence-sufficiency assessments for these groups (cells a, b, c, and d) are well below the maximum level. One may argue, however, that when control risk is assessed at the highest level, implying that controls are not to be relied upon, an evidence-sufficiency assessment is not necessary. In other words, must we have sufficient evidential matter to support a decision not to rely on controls? For the evidence-based groups which were not given tests of controls results (cells c and d), we expected control risk assessments to be at or near the highest level. To the extent, however, that the mean responses were lower than the highest level (mean responses were 3.47 for cell c and 3.95 for cell d), we should expect to see high evidence-sufficiency assessments since a reduction in control risk from the highest level should be sufficiently

supported by evidence. However, the mean evidence-sufficiency assessments corresponding to cells c and d are 3.39 and 3.40, respectively. Both are significantly lower than the maximum (p -values = .0032 and .00 for cells c and d, respectively).

For the evidence-based groups who received tests of controls evidence such that we might expect a lower-than- maximum control risk assessment (cells a and b) based on this evidence, the mean evidence-sufficiency assessments were also lower than the maximum (3.99 for cell a and 3.29 for cell b). T-tests of the differences between these cells and the maximum level resulted in p -values of .004 and .0048 for cells a and b, respectively. These results suggest that the risk assessments made by the evidence-based groups do not reflect the level that is sufficiently supported by evidential matter. Alternatively, it is possible that subjects did not understand the instructions given for assessing control risk or that the procedure itself, no matter how thoroughly explained, is confusing.

We conducted t-tests of the difference in mean responses between cells a and e, cells b and f, cells c and g, and cells d and h, all of which yielded insignificant results (the p -values were .92, .99, .41 and .53, respectively). In addition, a comparison of standard deviations between the same sets of cells indicate that in all but one case, consensus is higher for the belief-based groups. F-tests of the differences in standard deviations were marginally significant (at level .10) for cells b vs f and cells c vs g.

Sample Size Recommendations

After making their control risk assessments and evidence-sufficiency assessments, subjects in all groups were asked to recommend a sample size for positive confirmations. A summary of these responses is provided in Table 4 below.

Table 4
Sample Size Recommendations

Group	Cell	Number of Responses	High	Low	Mean	St. Dev
EB-STR-T	a	8	70	20	35	17.32
EB-WK-T	b	8	125	25	63	35.70
EB-STR-NT	c	9	70	15	38	17.47
EB-WK-NT	d	9	75	30	51	15.70
BB-STR-T	e	7	100	20	57	27.70
BB-WK-T	f	8	120	25	48	30.90
BB-STR-NT	g	7	100	20	56	28.60
BB-WK-NT	h	7	60	16	40	15.28

We included the sample size recommendation task in the experiment in an attempt to gain some insight into whether or not the use of alternative control risk assessment procedures has an effect on auditors' subsequent deci-

sions. The results in Table 4 indicate that not only are there no clear systematic differences between the evidence-based and belief-based groups, but there also appears to be no clear differences between strong and weak internal control cases and tests of controls versus no tests of controls cases. Responses for this task were highly variable and, as a result, do not provide a great deal of insight.

These results are consistent with prior studies which found subjects' planning decisions subsequent to internal control judgments highly variable [see, for example, Gaumnitz, Nunamaker, Surdick, and Thomas, 1982, and Tabor, 1983]. This variability may be due to different philosophies between audit firms with respect to substantive test planning. Consequently, these results are not surprising. However, since one might argue that differences in control risk assessment procedures would have the greatest impact on the audit process if they affected auditors' subsequent decisions, this is an area that warrants further investigation. A more refined research approach may provide the insight that our design failed to provide with respect to sample size decisions for substantive tests.

Timing of Tests

In addition to providing a sample size recommendation for positive confirmations, subjects were also asked whether they would consider sending confirmations prior to year-end appropriate. The results are presented in Table 5 below.

Table 5
Timing of Tests

Group	Cell	Number of Responses	Prior to Year-End Appropriate?	
			Yes	No
EB-STR-T	a	8	5	3
EB-WK-T	b	9	3	6
EB-STR-NT	c	9	3	6
EB-WK-NT	d	9	0	9
BB-STR-T	e	7	6	1
BB-WK-T	f	8	1	7
BB-STR-NT	g	7	2	5
BB-WK-NT	h	7	3	4

These results do not indicate any systematic differences between the evidence-based and belief-based groups with respect to the timing decision. For the most part, subjects' responses indicated that sending confirmations prior to year-end is appropriate when internal controls are strong and tests of controls have been performed. Thus, the control risk assessment procedure does not appear to affect auditors' timing decisions.

5. Conclusion

In 1988, Statement on Auditing Standards Number 55 was issued by the AICPA as a replacement standard for AU Section 320 in an attempt to improve auditors' internal control evaluations and sharpen auditors' control risk assessments. In this paper, we described what we view as significant differences in the basic concepts underlying the old and new standards.

In particular, the old standards suggested a separation of 1) a control risk assessment based on the auditor's beliefs and 2) an assessment of the sufficiency of evidence to support those beliefs. SAS 55, on the other hand, suggests combining these two assessments into one control risk assessment such that the assessed level of control risk is that level that is sufficiently supported by evidential matter.

We presented results for an experiment in which subjects were asked to assess control risk following one of two risk assessment procedures based on the two approaches described above. While the number of responses evaluated is relatively small, the results provide some interesting insights into the control risk assessment process. While there was no clear "winner" in terms of consensus for the various judgments made by subjects, responses nevertheless seem to indicate a "procedural" effect.

In particular, assessments made with respect to evidence sufficiency for subjects following the "evidence-based" control risk procedure were much lower than expected. Since this group's risk assessments should have corresponded to that level that subjects felt was sufficiently supported by evidence, we expected evidence-sufficiency assessments for this group to be high. These results may have been due to weaknesses in the questionnaire or, alternatively, may suggest that the approach of combining risk and evidence-sufficiency assessments is confusing.

This paper was intended as a rough first step in the investigation of the effects of using alternative procedures to assess control risk. Future experiments would likely add valuable insight into these effects through refinements in subject training, case descriptions, and experimental design with respect to substantive testing decisions. Other factors which may have significant impact on the control risk assessment process and subsequent audit decisions which were not addressed in this paper include making separate versus combined assessments of inherent risk and control risk [Waller, 1990] and decomposing control risk assessments into separate evaluations of internal control design effectiveness and operating effectiveness [Morton and Felix, 1990].

Results presented in this paper are admittedly preliminary in nature and consequently, no general conclusions can be drawn. However, it is clear that there is no dearth of opportunities for expanding our knowledge and insight into this most intriguing area of auditor judgment.

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Discussant's Response to "Assessing Control Risk: Effects of Procedural Differences on Auditor Consensus"

Richard W. Kreutzfeldt
Arthur Andersen

Statement on Auditing Standards No. 55 (SAS 55), "Consideration of the Internal Control Structure in a Financial Statement Audit," is one of the "Expectations Gap" standards issued in 1988 that were intended to improve the effectiveness of audits. SAS 55 broadens the concept of internal controls, expands the auditor's responsibilities with respect to internal controls, and revises and attempts to clarify a number of long-standing concepts. With such ambitious objectives, it is not surprising that questions are being raised about the meaning of the new standard, how to apply it in practice, and whether the new concepts themselves are sound. Morton and Felix [1989] express the concern in an earlier paper, "it appears that possibly confusing concepts are being replaced with concepts which we believe may be even more confusing, contradictory and ill-defined."

I too have concerns about SAS 55. But I also believe that SAS 55 adds a number of fundamental enhancements to the auditing literature. What is needed now, in my view, is not a massive overhaul of SAS 55 but a continuing dialogue among practitioners, academicians and standard-setters aimed at improving the understanding and application of SAS 55 and leading ultimately to revisions or interpretations of the standard where necessary. This paper by Morton and Felix makes a significant contribution to this continuing dialogue.

SAS 55: An "Evidence-Based" Approach?

The focal point of this paper is the procedure to be followed in making control risk assessments. SAS 55 provides the following guidance:

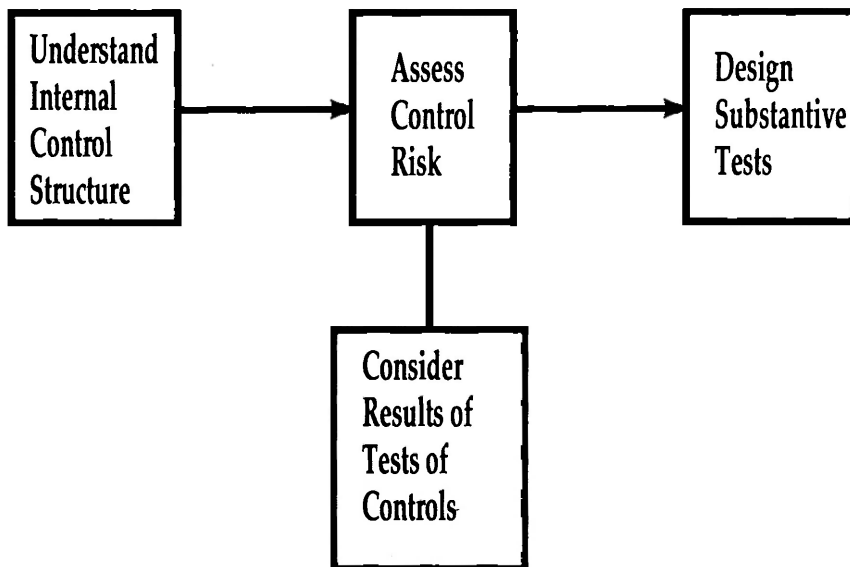
29. Assessing control risk is the process of evaluating the effectiveness of an entity's internal control structure policies and procedures in preventing or detecting material misstatements in the financial statements. Control risk should be assessed in terms of financial statement assertions. After obtaining the understanding of the internal control structure, the auditor may assess control risk at the maximum level for some or all assertions because he believes policies and procedures are unlikely to pertain to an assertion, are unlikely to be effective, or because evaluating their effectiveness would be inefficient.

30. Assessing control risk at below the maximum level involves—

- Identifying specific internal control structure policies and procedures relevant to specific assertions that are likely to prevent or detect material misstatements in those assertions.
- Performing tests of controls to evaluate the effectiveness of such policies and procedures.

Figure 1

SAS 55 FLOWCHART (Summary Version)

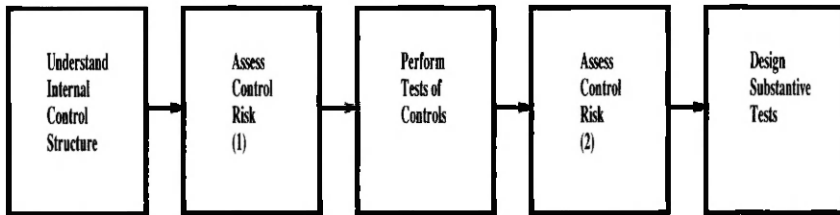


A simplified version of the SAS 55 flowchart is presented in Figure 1. This guidance is rather broad and conceptual and can lead to questions about implementation. The authors' interpretation of SAS 55 is that it requires an "evidence based" approach. An illustration of this approach is presented in Figure 2. While the authors did not actually include a flowchart of this or other models in their paper, I have attempted to represent their views in this manner for clarification and contrast with other models. The authors' principal concern with an evidence-based approach is that the "auditor's beliefs regarding the risk of a material error getting through the client's internal controls are ignored under some conditions." Ignoring these beliefs is inappropriate because they should have an effect on the design of substantive tests. While I

would share these concerns about an evidence-based approach as described by the authors, I do not believe that SAS 55 prescribes an evidence-based approach as illustrated in Figure 2. I believe the SAS 55 approach was intended to be more flexible. I will comment further on this later. But for now, let's explore the alternative control risk assessment procedure described by Morton and Felix.

Figure 2

EVIDENCE-BASED PROCEDURE FOR ASSESSING CONTROL RISK



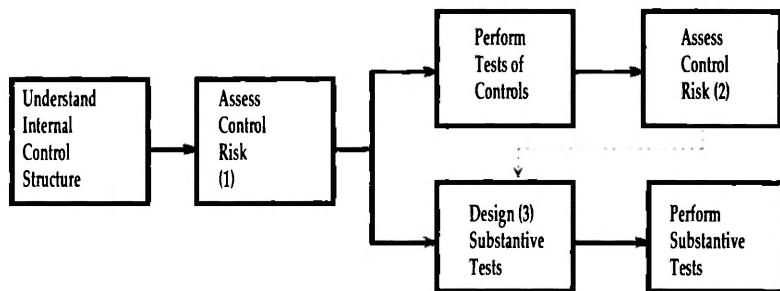
(1) This assessment should be at the maximum because no evidence has yet been obtained (assumes no tests were performed while obtaining the understanding).

(2) This assessment is lower reflecting evidence obtained through tests of controls.

An Alternative: A “Belief-Based” Approach

The authors describe a “belief-based” procedure for assessing control risk that addresses some of their concerns with an evidence-based approach. An initial depiction of a belief-based approach is presented in Figure 3. This initial depiction does not reflect all features of the belief-based approach described by the authors. These will be added later. However, it does provide a basis for contrast with the evidence-based approach. At first glance, some may question whether the differences between these two models are all that significant. After all, in both models, control risk is ultimately assessed after considering tests of controls performed. But, on closer review, there are differences in the impact on the design of substantive tests. In the evidence-based approach, the auditor cannot make an intelligent design of substantive tests until *after* the tests of controls are completed and an assessment of control risk is made. This is not logical and places undue constraints on the auditor. By contrast, in the belief-based approach, the auditor may design substantive tests based on his beliefs about control risk before any tests are performed. He may then make necessary revisions to the design after these beliefs have been confirmed. This is more logical and more reflective of what auditors do in practice.

Figure 3
BELIEF-BASED PROCEDURE FOR ASSESSING CONTROL RISK
 (Initial Depiction)



(1) This assessment is based on the auditor's beliefs, regardless of whether evidence has been (or will be) accumulated to support this belief (example: "low").

(2) This is to update the auditor's belief about control risk based on evidence obtained. Ordinarily, this would be the same as the initial assessment unless contrary evidence has been obtained. In this case, the design of substantive tests may need to be revised.

(3) This approach allows flexibility to design and perform substantive tests either simultaneously with, or subsequent to, tests of controls.

What Does SAS 55 Really Require?

Now that the rudiments of each approach have been described, let's explore what SAS 55 actually requires. Does it really prescribe an evidence-based approach and preclude a belief-based approach? Based on my experience with the Task Force that developed the Audit Guide [AICPA, 1989], "Consideration of the Internal Control Structure in a Financial Statement Audit," the answer is "no." The evidence-based approach described by the authors is a too literal and too sequential an interpretation of SAS 55. Indication of a sequential view is provided by the following comments [p. 113]:

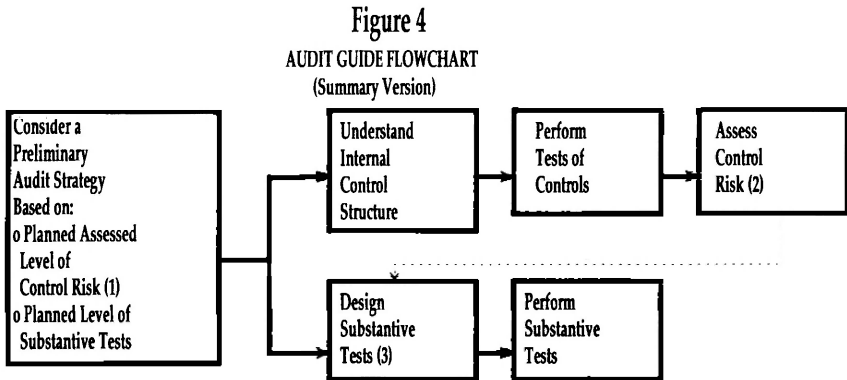
It follows, then, that AFTER obtaining an understanding of the internal control structure but PRIOR TO any tests of controls, the control risk assessment should be at the maximum level (emphasis added).

Ultimately, AFTER all testing has been completed, the final (evidence-supported) assessed level of control risk is used, along with the assessed level of inherent risk, to determine the . . . substantive tests to perform (emphasis added).

These literal descriptions of a sequential process cannot be found in SAS 55. The SAS only requires that the auditor "consider results of any tests of controls" in the design of substantive tests. It does not require that the tests of controls be completed before the design of substantive tests can begin. It does not preclude the auditor from anticipating the results of tests of controls (i.e., from considering his beliefs about the level of control risk that will be supported by the planned tests of controls) in designing substantive tests.

The Audit Guide: A Clarification of SAS 55

The above statements reflect more than just my personal view of SAS 55. They reflect the approach taken in the Audit Guide. A summarized version of the flowchart included in the Audit Guide is presented in Figure 4. As depicted here, the Audit Guide adds a useful concept not included in SAS 55 – the preliminary audit strategy.



- (1) This is the level of control risk that the auditor believes can be supported by the tests of controls he plans to perform.
- (2) This is to update the auditor's belief about control risk based on evidence obtained. Ordinarily, this would be the same as the initial assessment unless contrary evidence has been obtained. In this case, the design of substantive tests may need to be revised.
- (3) This approach allows flexibility to design and perform substantive tests either simultaneously with, or subsequent to, tests of controls.

The above concept is described in the Audit Guide as follows [AICPA, 1989, paragraphs 2.2 and 2.3]:

... the auditor often will be able to choose between several possible audit approaches ...

When considering a preliminary audit strategy ... , the auditor considers knowledge of the entity's business, the industry in which it operates, the nature and materiality of different account balances, prior experience with the industry, and other factors.

The preliminary audit strategy is not a detailed design of audit procedures. Rather, it represents preliminary judgments about an audit approach that are updated as necessary during the conduct of the audit as the auditor confirms initial judgments or obtains evidence to the contrary.

The preliminary audit strategy includes, among other things, a planned assessed level of control risk – the level of control risk that the auditor believes can be supported by tests of controls that he plans to perform. The

belief-based approach and the Audit Guide approach have many similarities. Both allow, at least in part, a belief-based control risk assessment for audit planning purposes. Both allow flexibility in the design of substantive tests. In noting the similarities of the Audit Guide approach to the belief-based approach, it is also important to note that the approach taken in the Audit Guide should not be viewed as a revision of the SAS 55 approach. The Audit Guide is intended only to provide guidance in the application of SAS 55. The Auditing Standards Board did not consider it necessary to issue a revision or interpretation of SAS 55 as a result of the issuance of the Audit Guide. Thus, the procedure covered in the Audit Guide may be viewed as representing the *intent* of SAS 55. Therefore, to conclude, as the authors do, that SAS 55 prescribes an evidence-based approach and precludes a belief-based approach is inappropriate. This is not to say that the authors' discussion of the belief-based approach is without merit. It is only to say that characterizing SAS 55 as an evidence-based approach is not appropriate.

Assessing Control Risk at the Maximum

At this point, I would like to pursue further some of the additional features of the belief-based approach. One of the most interesting questions raised by this approach is: What if the auditor does not intend to validate his beliefs about control risk through tests of controls? A related, and more troublesome, issue involves the assessment of control risk at the maximum for efficiency reasons even though the auditor believes controls are strong. The authors contrast this case with one where control risk is assessed at the maximum because of weak controls and ask whether the maximum assessed level of control risk has the same meaning in both cases. This example is illustrated in Figure 5.

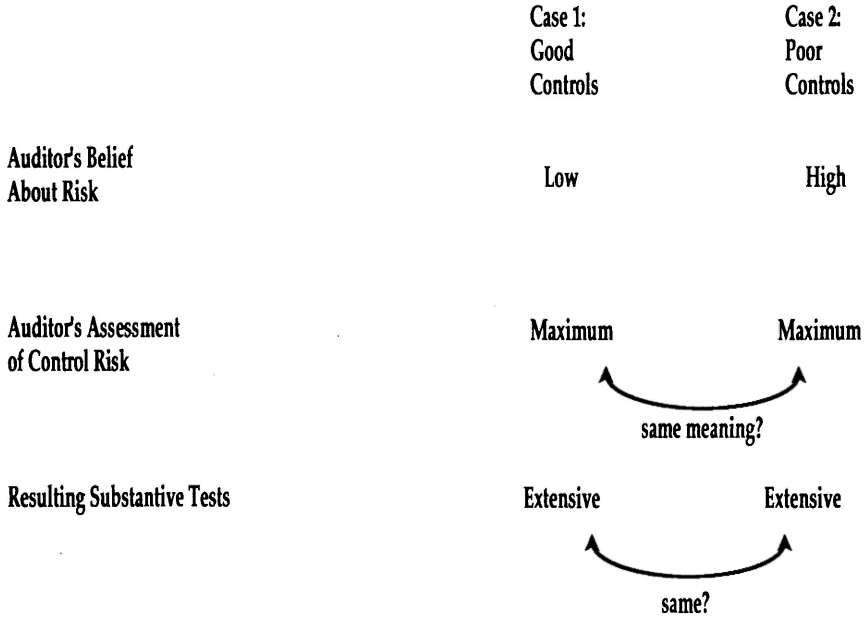
SAS 55 indicates that control risk may be assessed at the maximum in both cases. The authors argue, effectively I believe, that the assessments do not have the same meaning in both cases and that using the same assessment could be misleading [p. 114]:

In the first case [weak controls], the assessed level of control risk is . . . a reflection of the auditor's beliefs regarding the risk of material error getting through the client's internal control structure. In the second case, however, the auditor's beliefs are not reflected at all. The assessed level of control risk is arbitrarily set for the purpose of planning the audit. It would seem, however, that a key factor in audit planning would be the auditor's *actual* expectations regarding material error, yet these expectations are not reflected in the control risk assessment in the second case.

Of even greater significance is whether the substantive tests would be the same in both cases. If one believes the substantive tests should be the same, then it should not matter that the control risk assessments are the same. However, if one believes the substantive tests should be different, then having the same control risk assessment may be a greater concern. SAS 55 does not specifically address this issue, but because the control risk assessments are the

Figure 5

ASSESSING CONTROL RISK AT THE MAXIMUM



same, the implication is that the substantive tests would also be the same. The authors argue persuasively, however, that they should not be the same [p. 114]:

In the first case [weak controls], the auditor has identified areas of weakness in the client's internal control structure and should direct additional audit effort to searching for material error where he believes the risk of error is high. In the second case, however, no material weaknesses in the internal control structure have been identified by the auditor. The course of action indicated in this case may be quite different than the first, yet because the assessed level of control risk is the same for both cases, this suggests that the nature, timing, and extent of substantive testing would not differ between the two.

SAS 55 actually provides the conceptual foundation to deal more effectively with this issue through the guidance provided in paragraph 16. This paragraph indicates that knowledge about the internal control structure should be used to –

- Identify types of potential misstatements.
- Consider factors that affect the risk of material misstatement.
- Design substantive tests.

It is the first two bullet points that provide the means to differentiate between the two cases discussed above. In the case of weak controls, there may

be one or more types of potential misstatements that present a significantly greater risk than where controls are strong. There may also be a number of additional factors affecting the risk of misstatement. These conditions would probably warrant an expansion of substantive tests. For example, the auditor may make additional inquiries or perform additional substantive tests in response to these added areas of risk. These risk conditions may be inconsequential in the case of good controls and not warrant any additional response beyond the “basic” procedures. Some may assert that the procedures should be the same because the risk is assessed at maximum. While this may be true in some cases, I would not agree with it as a general assertion. This assertion would seem to suggest that the myriad of risk factors present in any given situation can be reduced to a single-word expression of risk and that the audit procedures should be driven by this singular expression. I believe such an approach would be overly mechanical, limiting, and unrealistic. Clearly there is value to an explicit assessment of risk. But I do not view it as the sole determinant of audit procedures. Auditors also consider the complexities and subtleties of the risk factors present in determining the substantive tests to be performed. Any “model” of the auditing process should accommodate such an approach. I believe SAS 55 would accommodate this if one considers its emphasis on control risk assessments together with its discussion of risk factors in paragraph 16. With such an approach, I believe auditors could draw the appropriate distinctions between the strong controls and weak controls cases described earlier.

Some effort was made in the Audit Guide to distinguish between these cases. The following discussion is included in paragraph 3.5:

The auditor should recognize that, although the level of assurance needed from substantive tests remains the same whether control risk is assessed at the maximum because of efficiency reasons or because of ineffective policies and procedures, the fact that the auditor concludes that policies or procedures are ineffective may raise concerns about auditability and other questions. Assuming that the auditor is able to overcome auditability concerns, he or she may respond by heightening the degree of professional skepticism, assigning more experienced staff, and changing the nature, timing and extent of substantive procedures.

While this is an attempt to recognize the differences, some auditors may find it confusing, particularly the apparent inconsistency between “level of assurance needed from substantive tests remains the SAME” and “CHANGING the nature, timing and extent of substantive procedures (emphasis added).” No further explanation is provided in the Audit Guide. Thus, I believe this is an area for further guidance and clarification by the Auditing Standards Boards.

How Do the Alternative Models Handle “Maximum” Control Risk Cases?

But how well do the models presented earlier address the two cases where control risk is assessed at the maximum? Let us first consider the be-

belief-based approach, the initial depiction of which is presented in Figure 3. This model would not be a logical approach for the strong controls case. Here, the auditor's "initial" control risk assessment would be "low" and this would be reflected in the initial design of substantive tests. However, this would result in under-auditing because the auditor does not plan to validate his control risk assessment belief through tests of controls. This under-auditing would be corrected later when the auditor makes his "final" control risk assessment. Such an approach is not logical or efficient.

What is needed is a model that enables the auditor to design substantive tests based on both his control risk assessment beliefs as well as his plans for validating these beliefs. The model presented in the Audit Guide – and summarized in Figure 4 – provides one approach for doing this. The "planned assessed level of control risk" combines, in a single expression, the auditor's belief about control risk and his intent to validate this belief.

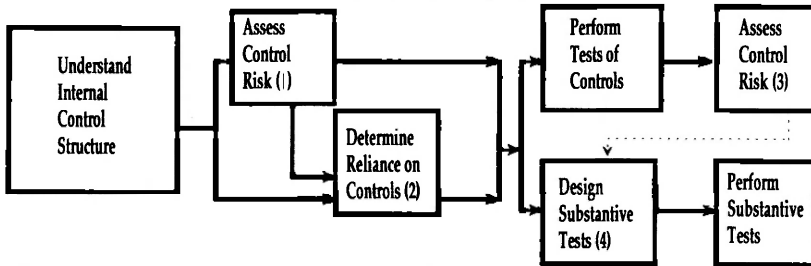
Where the auditor plans to validate his belief (or where no validation is necessary because the auditor believes risk at the maximum), the planned assessed level of control risk is the same as the auditor's belief about control risk. However, where the auditor believes risk is low but does not plan to validate this belief, the planned assessed level of control risk would be at the maximum. Thus, this is not a purely belief-based approach. It is subject to the same concerns expressed earlier about treating the two maximum control risk assessment cases in the same manner.

The authors' belief-based approach includes additional features (not reflected in Figure 3) that would enable the auditor to consider separately his plans for validating his control risk beliefs. They discuss the "reliance" concept which was dropped from the standard because of "perceived confusion over its meaning" and replaced with the control risk assessment concept. However, the authors do not agree that the control risk assessment concept should be viewed as a substitute for the reliance concept. In fact, they see complementary roles for a belief-based control risk assessment and the reliance judgment. Certainly the auditor's control risk belief is relevant for audit planning. The authors argue that the auditor should also consider whether he plans to rely on this belief (i.e., the reliance judgment). This enhancement of the belief-based approach is illustrated in Figure 6.

The belief-based approach is an appealing model because it enables the auditor to separately consider his control risk beliefs as well as his plans for validating these beliefs. This model provides a better way of dealing with the two control risk assessment cases noted earlier. Using the evidence-based or Audit Guide models, control risk would be assessed at "maximum" in both cases, which does not recognize the differences in these situations. Using the model in Figure 6, however, there are differences in the assessments made. While both would place "no reliance" on internal controls, the control risk assessment in one case would be "maximum" while in the other it would be "low." These different assessments provide a direct, explicit means to recognize the differences between these cases and to produce a design of substantive tests that recognizes these differences. In my view, this "marriage" of the control risk assessment concept with the reliance concept is the most significant contribution of this paper and warrants serious consideration by

Figure 6

BELIEF-BASED PROCEDURE FOR ASSESSING CONTROL RISK
(Including Reliance Judgement)



(1) This assessment is based on the auditor's beliefs, regardless of whether evidence has been (or will be) accumulated to support this belief (example: "low").

(2) This decision is the degree to which the auditor intends to rely on, and obtain evidence to support, his belief. Thus, while the auditor may believe control risk to be low, he may decide to obtain evidence to support only a "moderate" or "slightly below maximum" level. This decision is based on the relative effectiveness and efficiency of alternative audit procedures.

(3) This is to update the auditor's belief about control risk based on evidence obtained. Ordinarily, this would be the same as the initial assessment unless contrary evidence has been obtained. In this case, the design of substantive tests may need to be revised.

(4) This approach allows flexibility to design and perform substantive tests either simultaneously with, or subsequent to, tests of controls.

the Auditing Standards. Unlike other discussions, it does not require an "either-or" choice between the concepts, but recognizes their complementary relationship between the two.

The "Evidence Sufficiency" Judgment

The authors' belief-based approach has one additional feature not reflected in Figures 3 or 6. They believe it is also important for the auditor to evaluate the sufficiency of evidence obtained in performing tests of controls. They make the following arguments:

Ideally, a risk model should accommodate separate assessments of risk and evidence sufficiency [p. 115].

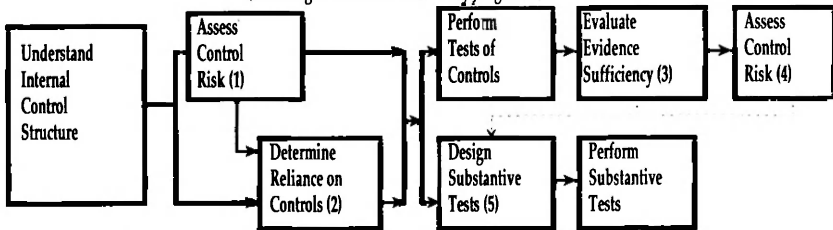
Although professional standards do not explicitly 'model' separate belief assessments and evidence sufficiency assessments, this basic concept was nevertheless reflected in the old standards [p. 115].

The control risk assessments should be based on the auditor's beliefs and a separate assessment made regarding the sufficiency of the evidence collected to rely on those beliefs [p. 118].

The addition of this "evidence sufficiency judgment" is reflected in the illustration in Figure 7. While I agree that this is a judgment that should be and is made by auditors, I do not agree with including it explicitly in the model. The reliance judgment that comes earlier in the model provides the auditor's initial assumption about the sufficiency of evidence he plans to obtain. Fur-

ther, the revised control risk assessment made later in the model would reflect what the auditor actually found with respect to the sufficiency of evidence. Thus, I do not believe an additional explicit judgment is necessary and would merely add additional complexity to the model.

Figure 7
BELIEF-BASED PROCEDURE FOR ASSESSING CONTROL RISK
 (Including Reliance and Sufficiency Judgments)



- (1) This assessment is based on the auditor's belief, regardless of whether evidence has been (or will be) accumulated to support this belief (example "low").
- (2) This decision is the degree to which the auditor intends to rely on, and obtain evidence to support, his belief. Thus, while the auditor may believe control risk to be low, he may decide to obtain evidence to support only a "moderate" or "slightly below maximum" level. This decision is based on the relative effectiveness and efficiency of alternative audit procedures.
- (3) This decision is to evaluate whether the intended degree of reliance has been supported by evidence obtained through tests of controls. If not, the auditor may need to revise his belief about control risk and revise the design of substantive tests.
- (4) This is to update the auditor's belief about control risk based on evidence obtained. Ordinarily, this would be the same as the initial assessment unless contrary evidence has been obtained.
- (5) This approach allows flexibility to design and perform substantive tests either simultaneously with, or subsequent to, tests of controls.

What About Inherent Risk?

An important area that is not addressed by the authors is the consideration of inherent risk. The authors recognize the importance of this issue but do not deal with it in this paper:

SAS 55's expansion of factors to be considered in obtaining an understanding of a client's internal control structure may lead to increased confounding of the inherent risk and control risk assessments. This issue (albeit critical) is beyond the scope of this paper [p. 113, footnote 5].

By "confounding," the authors refer to the overlap of inherent risk and control risk factors. Because the standards provide little guidance on defining inherent risk factors, SAS 55 has included a number of control risk factors which many would say are inherent risk factors. An equally serious or perhaps more serious concern is with the risk assessments. SAS 55 discusses almost exclusively the control risk assessment, as if that assessment alone is responsible for driving the scope of substantive tests. However, the control risk assessment can be very misleading if not considered together with the inherent risk assessment. To illustrate, let's review two cases where inherent risk is substantially different. See the illustration in Figure 8.

Figure 8

Consideration of Inherent Risk

	Inherent Risk Factors	Control Risk Factors	Control Risk Assessment	Extent of Substantive Tests
Receivables Valuation Case # 1	o High Level of Past-Due Accounts o Significant Writeoffs	o Limited Management Reviews o No "Reliance"	o Maximum	o Extensive
Receivables Valuation Case # 2	o Low Level of Past-Due Accounts o Limited Writeoffs	o Limited Management Reviews o No "Reliance"	o Maximum	o Moderate

In each of the illustrated cases, control risk would be assessed at the maximum using the SAS 55 procedure. But it is very evident that the design of substantive tests would not be the same because of the differences in inherent risk. These cases illustrate that the design of substantive tests should be driven not just by the assessment of control risk but by assessment of both inherent risk and control risk. SAS 55 actually refers to such an approach in paragraph 37:

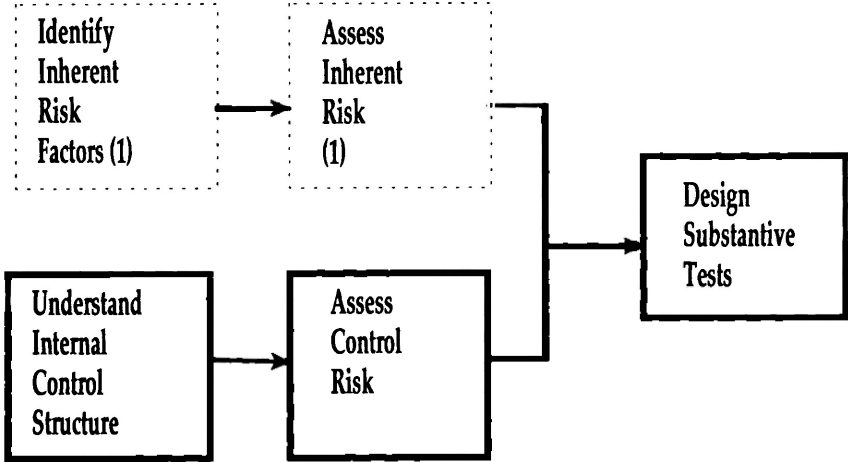
The auditor uses the assessed level of control risk (together with the assessed level of inherent risk) to determine the acceptable level of detection risk for financial statement assertions.

While this appears to provide the appropriate guidance, no further guidance or examples are provided. The SAS 55 guidance with respect to inherent risk is reflected in a simple model in Figure 9. This model reflects the limited guidance in the standards on inherent risk factors and inherent risk assessments. Any future attempts to improve upon the SAS 55 or Audit Guide models should also consider inherent risk.

One approach would be to provide additional, essentially separate, guidance on the identification of inherent risk factors and the assessment of inherent risk. However, I would propose a more integrated approach. Under this approach, rather than making separate assessments of inherent risk

Figure 9

CONSIDERATION OF INHERENT RISK (Under SAS 55)



(1) Only limited guidance is provided in the standards for identifying inherent risk factors and assessing inherent risk.

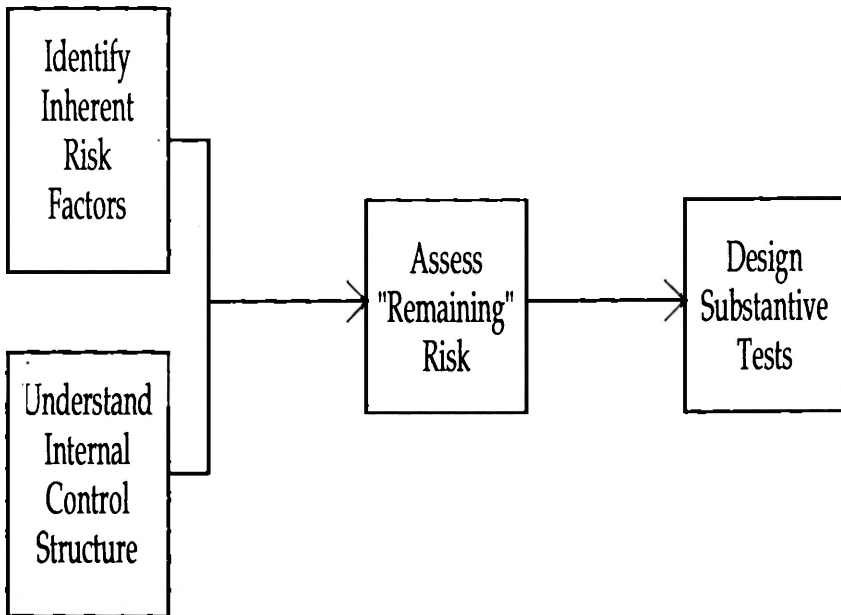
and control risk, the auditor would make a single combined risk assessment. This single assessment would represent the level of risk that remains after considering the level of risk that is created by inherent risk factors and reducing this by the effect of the internal control structure. A single model reflecting this “remaining” risk assessment is presented in Figure 10. Making a combined assessment has several advantages over separate assessments of inherent risk and control risk. In practice, it is difficult if not impossible to separate the consideration of control risk from inherent risk. These considerations are inextricably linked. Making separate assessments is more an exercise in theory than in reality. Further, a combined model would encourage direct consideration of inherent risk factors, rather than assuming the risk to be irrelevant or at the maximum.

Summary

The following is a summary of my remarks. First, SAS 55 can be difficult to understand and apply. While it makes some significant conceptual improvements in the literature, it is rather complex and it will take time before

Figure 10

Consideration of Inherent Risk (An Alternative Approach)



it is well understood. Papers such as this that contribute to understanding and improving this standard are appreciated. Second, literal interpretations of SAS 55 can be misleading. This SAS should be viewed more as a conceptual document rather than one that can be read literally. The Audit Guide is more useful for understanding the procedures to be followed. Third, the belief-based approach introduced by the authors is a very good model particularly in its separation of the control risk assessment from the reliance judgment. Finally, any effort to improve the SAS 55 model should also integrate the consideration of inherent risk.

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7

Illegal Acts: What is the Auditor's Responsibility?

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Society has always been concerned with violations of laws and regulations by all types of entities – business enterprises, nonprofit organizations, and governmental units. Highly publicized accounts of management improprieties reported over the last two decades have caused this concern to increase significantly. Several congressional committees, regulatory agencies, and others have suggested that auditors should assume more responsibility for detecting and disclosing violations of laws or regulations, commonly referred to as illegal acts.

Developing standards that articulate the auditor's responsibility for illegal acts has proven to be a very challenging task for several reasons. First, a large diversity of laws and regulations affects most entities, and identifying violations of many of those laws and regulations requires legal expertise. Second, even with this expertise, the complexity of some laws and regulations makes identifying a violation very difficult. Finally, even after an illegal act has been identified, evaluating management's assessment of its potential effects on the entity's financial statements is also very difficult.

This article analyzes the auditing standards that describe the auditor's responsibilities for detecting and reporting illegal acts. It also reviews the historical developments that have brought the profession to where it is today. Finally, we introduce some future issues and research needs in this area.

Historical Developments

The issue of the auditor's responsibility for illegal or questionable acts by clients is not new. It first made front-page news in the mid 1970's as a result of the Watergate scandal. Investigations led to initial disclosures of illegal political contributions by many large corporations. These initial disclosures opened the door to a host of other revelations involving questionable payments by corporations to domestic and foreign government officials. As a result, the profession formally addressed the issue of the auditor's responsibility to detect and report illegal acts by clients. The issue was initially studied by the Commission on Auditors' Responsibilities (the Cohen Commission). Based

on the Cohen Commission's preliminary recommendations, the AICPA Auditing Standards Executive Committee issued SAS No. 17, *Illegal Acts by Clients*, in 1977. This statement was the first professional standard that specifically addressed the auditor's responsibilities to detect and disclose illegal acts.

Many of the concepts in current professional standards were developed by the Cohen Commission. It concluded that the auditor cannot reasonably be expected to assume the responsibility to detect and disclose an entity's violations of laws in general because: (1) auditors do not possess the legal training to recognize all the complex circumstances and processes that give rise to litigation and that suggest its outcome, and (2) many illegal or questionable acts involve small amounts in relation to the financial statements. If society needs assurance on matters that are principally legal, the Cohen Commission concluded that this assurance should be provided by those most capable of doing so, management assisted by its lawyers.

In discussing the auditor's responsibility, the Cohen Commission acknowledged that certain illegal acts, such as tax evasion, have been well defined and are easily recognized by experienced auditors. It also introduced the concept of illegal acts that have a direct and material effect on the amounts in the financial statements, and stated that auditors normally consider the possibility of such acts when planning and conducting their audits.

Consistent with the recommendations of the Cohen Commission, SAS No. 17 [AICPA, 1977] begins by stating that:

An examination made in accordance with generally accepted auditing standards cannot be expected to provide assurance that illegal acts will be detected. In reporting on financial statements, an auditor holds himself out as one who is proficient in accounting and auditing. The determination of whether an act is illegal is usually beyond his professional competence [para .03].

The statement goes on to indicate that procedures performed primarily for the purpose of expressing an opinion on the financial statements may bring possible illegal acts to the auditor's attention. But the further removed an illegal act is from the events and transactions specifically reflected in the financial statements, the less likely the auditor is to become aware of the act or recognize its possible illegality.

SAS No. 17 also discusses violations of laws and regulations that have a direct effect on the amounts in the financial statements. It states that the auditor considers such laws and regulations when planning and conducting the audit, and includes as examples tax laws, and laws and regulations affecting the amount of revenue accrued under government contracts. However, SAS No. 17 does not set forth any affirmative detection responsibility.

Finally, SAS No. 17 contains guidance for the auditor when he or she believes that an illegal act has occurred. The auditor is to obtain an understanding of the nature of the potential financial statement effect by inquiry of management, by consultation with legal counsel and, if necessary, perform additional procedures to investigate the act. If an act is determined to be illegal, the auditor is required to report the circumstances to management personnel at a high enough level of authority so that appropriate action can be

taken. In some circumstances, that might be the audit committee of the board of directors.

In the mid-to-late 1980's, the issue of the auditors' responsibility for illegal acts by clients resurfaced during the development of the "expectation gap" Statements on Auditing Standards (SASs). The public and financial statement users believed that auditors should assume more responsibility for detecting errors and irregularities. This resulted in the Auditing Standards Board's reexamination of the auditor's responsibility for illegal acts, and the issuance of SAS No. 54, *Illegal Acts by Clients*, which superseded the guidance in SAS No. 17.

Detection Responsibility

In defining the auditor's responsibility for detecting illegal acts, SAS No. 54 takes the approach of dividing illegal acts into two broad categories or types. For the first type, illegal acts that have a *direct* and *material* effect on line-item amounts in the financial statements, the auditor has the same responsibility as for errors and irregularities. That is, the auditor should design the audit to provide reasonable assurance that the financial statements amounts are free from material misstatement resulting from these *direct effect illegal acts*. This responsibility is described in SAS No. 53, *The Auditor's Responsibility to Detect and Report Errors and Irregularities*. In contrast to SAS No. 17, SAS No. 54 establishes an affirmative detection responsibility for *direct effect* illegal acts that are material.

For the second type, SAS No. 54 states that an audit in accordance with generally accepted auditing standards (GAAS) normally does not include audit procedures specifically designed to detect illegal acts having an *indirect effect* on financial statements. The auditor is responsible for evaluation of such acts only when information comes to his or her attention suggesting the possibility that they have occurred. However, SAS No. 54 does note that the auditor should make inquiries of management about the entity's compliance with laws and regulations. When appropriate, the auditor should also inquire of management about (1) the entity's policies relative to the prevention of indirect effect illegal acts, and (2) the use of directives and periodic representations obtained from management about compliance with laws and regulations. If the auditor becomes aware of information that raises suspicions, the auditor is obligated to apply additional procedures to determine whether an illegal act has, in fact, occurred. SAS No. 54 reaffirms the presumption that an audit made in accordance with GAAS provides no assurance that *indirect effect* illegal acts will be disclosed.

Differentiating the Types of Illegal Acts

Although the concept of direct and material illegal acts was developed in the mid 1970's, auditors are for the first time attempting to operationalize the concept in audit engagements. SAS No. 54 provides examples of both direct effect and indirect effect illegal acts. Apart from these examples, SAS No. 54 leaves the issue of differentiating direct effect illegal acts from indirect effect illegal acts largely to auditor judgment. As the AICPA industry committees

have attempted to develop guidance about illegal acts for industry audit and accounting guides, it has become apparent that distinguishing direct effect from indirect effect illegal acts is a challenging practice problem.

The examples in SAS No. 54 of direct effect illegal acts are the same as those included in SAS No. 17 – violations of tax laws that affect the amount of expense recognized for the period and violations of laws and regulations that affect the amount of revenue accrued under government contracts. Additional examples for entities receiving federal financial assistance are provided in SAS No. 63, *Compliance Auditing Applicable to Governmental Entities and Other Recipients of Governmental Financial Assistance*. That statement identifies, in broad categories, the types of legal requirements that may have a direct effect on the entity's financial statements. Such laws and regulations generally deal with the following matters:

- The types of services that may or may not be purchased with financial assistance.
- The characteristics of individuals or groups to whom entities may give financial assistance.
- The amounts entities must contribute from their own resources towards projects for which financial assistance is provided.

Indirect effect illegal acts are characterized as being more related to the entity's operating aspects than to its financial and accounting aspects. Examples include violations of laws and regulations related to securities trading, occupational safety and health, food and drug safety, environmental protection, equal employment, and antitrust. The financial statement effect of violations of these acts is normally the contingent liability that may need to be disclosed in the financial statements. For example, securities may be purchased based on insider information. If the purchase is appropriately recorded, there is no direct effect on the financial statements. But the indirect effect – the potential contingent liability in the form of fines or penalties – may not be disclosed. This contingent tail does not make this violation a direct effect illegal act, even if it meets the criteria for accrual under Statement of Financial Accounting Standards No. 5, *Accounting for Contingencies*.

All direct effect laws and regulations have one characteristic in common – requirements that dictate the manner in which a financial statement amount should be measured or presented. They have provisions that relate to the *valuation* or *classification* of financial statement revenues or expenses and related assets or liabilities. Such requirements are akin to those in a royalty contract that specify the way in which royalty expenses and liabilities should be measured. According to SAS No. 54, the auditor's concern with compliance with these laws and regulations is derived from their effect on financial statement amounts, not from their legality per se. Thus, the auditor's responsibility runs only to the specific requirements that affect the financial statement amounts. This concept can be illustrated with tax laws and regulations. Certain provisions of the tax code affect the manner in which an entity's tax provision is measured. They have a direct effect on the financial statements. Other provisions relate to the accurate completion and timely filing of tax forms. The effect of violations of these provisions is indirect – the contingent

liability for tax penalties. The auditors' responsibility for this contingency is the same as for other illegal acts that have an indirect effect on the financial statements.

Auditing the Contingent Tail

Certain audit procedures performed for the purpose of forming an opinion on the financial statements may bring possible violations of laws and regulations to the auditor's attention. Examples of such procedures include reading minutes of meetings of stockholders and directors and correspondence from taxing or other governmental agencies, and inspecting documents supporting transactions. In auditing litigation, claims, and assessments, the auditor performs the following procedures that also might disclose illegal acts:

- Making inquiries of and discussing with management the policies and procedures adopted for identifying, evaluating, and accounting for litigation, claims, and assessments.
- Obtaining from management a description and evaluation of litigation, claims, and assessments, and assurances that all such matters have been disclosed in accordance with Statement of Financial Accounting Standards No. 5 (FASB No 5).
- Examining documents in the client's possession concerning litigation, claims, and assessments, including correspondence and invoices from lawyers.
- Obtaining assurance from management that it has disclosed all unasserted claims that the lawyer has advised them are probable of assertion and must be disclosed in accordance with FASB No. 5.
- Obtaining a response from the entity's lawyer to a letter of audit inquiry about litigations, claims, and assessments.

These procedures for litigation, claims, and assessments provide limited evidence of compliance with laws and regulations. They rely heavily upon management becoming aware of a violation and making information about the matter known to the entity's lawyer and the auditor. Other evidence might not be available until a governmental agency undertakes an investigation of the violation.

Evaluating the Results of the Procedures

If the auditor's procedures provide an indication that indirect effect illegal acts may have occurred, SAS No. 54 states that the auditor should obtain sufficient information about the nature of the act to evaluate its effect on the financial statements. Obtaining this information begins with inquiries of management at least one level above those involved. If satisfactory information is not obtained from that source, the auditor should consult with the client's legal counsel, and apply any additional procedures necessary to obtain an understanding of the nature of the acts. When the auditor concludes, based on the information, that illegal acts have or are likely to have occurred, he or she should consider their effects on the financial statements as well as the implications for other aspects of the audit.

Indirect effect illegal acts typically result in unasserted claims against the entity. In determining the appropriate financial statement presentation of an unasserted claim, management refers to FASB No. 5. That statement requires management, assisted by legal counsel, to assess the probability of a claim being asserted and the probability of an unfavorable outcome. Based on these assessments, the financial statements may include accrual of an estimated loss, or disclosure of the matter in notes to the financial statements.

The auditor's ability to evaluate the financial statement presentation of the indirect effects of an illegal act is limited. The auditor generally does not have the legal training or experience to second guess the opinion of management and legal counsel. Therefore, to a large extent the auditor acts as a broad control over the information by evaluating management's disclosure of the matter in relation to the lawyer's representations and the criteria in FASB No. 5.

Other Compliance Auditing Requirements

In performing audits of governmental units, not-for-profit organizations, and certain other regulated companies, the auditor may perform additional procedures to test compliance with laws and regulations. These additional procedures are beyond those required to comply with generally accepted auditing standards and are imposed by rule, law, or regulation. An example is the Single Audit Act of 1984 and Circular A-128, *Audits of State and Local Governments*, issued by the Office of Management and Budget (OMB), which requires certain governmental units and non-governmental entities that receive federal financial assistance to engage an auditor to test and report on compliance with certain laws and regulations. Circular A-133, *Audits of Institutions of Higher Education and Other Nonprofit Institutions*, includes similar requirements for not-for-profit organizations. These additional compliance auditing procedures are similar to agreed-upon procedures under the Statement on Standards for Attestation Engagements [AICPA, 1989]. The regulatory agency or legislative body decides which provisions of laws and regulations need to be tested and the nature and extent of the related procedures. The laws and regulations selected for testing may not even have an indirect effect on the entity's financial statements. Examples of laws and regulations that have no effect on the financial statements are contained in the Employee Retirement Income Security Act of 1974. That act includes provisions, such as bonding requirements, that govern the administration of an employee benefit plan. Violations of such provisions have no direct or contingent effect on the financial condition of the plan. Any penalties are levied against the trustees.

This agreed-upon procedures approach appears to represent the most cost-beneficial approach to developing expanded auditing requirements for compliance with laws, and regulations. Regulatory agencies or legislative bodies can contract for the level of assurance that is desired.

Reporting Responsibilities

What impact do illegal acts have on the auditor's reporting responsibilities? The answer to this question is complex and may involve a number of

reporting vehicles. The reporting vehicle typically thought of first is the audit report. Generally, there is no need for the auditor to modify the audit report for illegal acts, provided that the effects of those acts are appropriately presented or disclosed in the financial statements. On the other hand, if the auditor concludes that illegal acts have a material effect on the financial statements, and that effect is not appropriately reflected, the auditor should express a qualified or adverse opinion because of the lack of conformity with GAAP. If management refuses to accept the auditor's modified report, the auditor should withdraw from the engagement and notify the audit committee or the board of directors of the reasons for withdrawal.

One of the objectives of the expectation gap SASs was to improve the communications to boards of directors and audit committees to help them fulfill their financial reporting and oversight responsibilities. Accordingly, SAS No. 54 includes a requirement for the auditor to make sure that the audit committee of the entity is adequately informed of all but inconsequential illegal acts. Management may make the communication unless the act involves senior management in which case the matter should be communicated directly by the auditor. Communication to regulatory agencies or other parties outside the entity is ordinarily not required under U.S. auditing standards, but there are the following exceptions:

- To a funding agency or other specified agency based on audit and reporting requirements of law or regulation.
- When the auditor responds to a Form 8-K filed by the entity to report a change in auditor.
- To a successor auditor who makes inquiries in accordance with SAS No. 7, *Communications Between Predecessor and Successor Auditors*.
- In response to a subpoena.

The first two of these exceptions establish forms of direct reporting of illegal acts to regulatory agencies. The first allows regulatory agencies to directly receive information regarding an entity's compliance with laws and regulations. Regulated entities can be required by law or regulation to engage an auditor to issue compliance reports for filing with the agency. The reports may be based upon specified procedures or procedures performed in the audit of the entity's financial statements. The reporting requirements of an audit in accordance with *Governmental Auditing Standards* (GAAS) is a prominent example of this form of direct reporting. In these types of engagements, the auditor is required to issue an additional report on compliance with laws and regulations based solely on the procedures required by GAAS. The report discloses all instances of noncompliance that are estimated to be material to the entity's financial statements and all indications of illegal acts that could result in criminal prosecution. Since the auditor ordinarily does not possess the expertise to evaluate whether an illegal act could result in criminal prosecution, he or she will normally report all illegal acts or possible illegal acts noted.

The second exception results in a form of direct reporting when the auditor decides to withdraw from the engagement, because management's response to an illegal act is not considered appropriate. If management does

not accurately describe the relationship of the illegal act to the change in auditor in the Form 8-K, the auditor is required to describe the matter in a response to the SEC.

Future Issues

Given the interest of Congress and regulators in others' compliance with laws and regulations, the auditor's responsibilities for illegal acts will no doubt be addressed again. Several issues appear relevant to any future consideration of these responsibilities. These issues and their research implications are presented below.

Can the Auditor's Detection Responsibilities be Expanded Under GAAS?

Current professional standards contain a relatively clear delineation of those illegal acts for which the auditor has detection responsibility. The auditor has a responsibility to design the audit to provide reasonable assurance of detecting violations of laws and regulations having a direct and material effect on financial statement amounts. Expanding the auditor's responsibility under GAAS would likely result in a level of responsibility that is more difficult to interpret.

Any approach to expanding the auditor's responsibility must involve increasing the auditor's responsibility for the contingent tail. But this runs headlong into the auditor's limited legal expertise. It's clear that the auditor could design procedures to obtain reasonable assurance of detecting violations of certain laws and regulations that might have an indirect effect on an entity's financial statements. For example, the auditor of a financial institution could design effective procedures for testing compliance with the requirement to submit currency transaction reports for all large cash deposits. Designing effective tests of compliance for indirect effect laws and regulations that have no reasonably objective criteria for identifying violations, simply would not be feasible. Therefore, any expanded responsibility would vary from industry to industry and perhaps, even from client to client in the same industry, depending on nature of the laws and regulations that affect the entity. Using this approach, a clear-cut definition of the auditor's responsibility under GAAS could be achieved only by developing professional standards or laws and regulations that set forth specifically those laws and regulations that the auditor would be required to test for compliance.

Another way to define this expanded responsibility would be to include in professional standards factors that affect the likelihood that the auditor will detect particular indirect effect illegal act. Such factors would probably include the following:

- The auditor's assessment of the materiality of the contingent effect of the act on the entity's financial statements (i.e., the materiality of the potential fine or penalty).
- The auditor's assessments of the joint probability that the entity committed the act and a claim will be successfully asserted.

- The auditor’s ability to recognize the act (i.e., the extent of the auditor’s knowledge of the subject matter of the law or regulation, and the complexity of the law or regulation).
- The extent of the evidence that is available that would provide an indication that the act has occurred.

This approach would leave the laws and regulations selected for testing, as well as the nature and extent of the procedures performed, largely to the judgment of the auditor. Therefore, a “fuzzy” definition of the auditor’s detection responsibility would result.

Both of these approaches to expanding the auditor’s responsibility under GAAS suffer from another limitation. The degree of assurance about the disclosure of the effects of a violation of a law or regulation would vary depending on the nature of the law or regulation. More assurance would be provided for those laws and regulations for which the auditor could design effective compliance procedures. It’s questionable whether these varying levels of assurance could be effectively communicated to users of the audit report. One might also question whether it is cost-beneficial to provide additional assurance for only certain types of contingencies. However, research addressing these questions would be useful. From a broad research perspective, it would also be useful to have information regarding the expectations of users about the auditors’ responsibility to detect illegal acts. What assurances about compliance with laws and regulations do investors and regulators expect from the audit in accordance with GAAS?

Can the Auditor’s Detection Responsibility be Expanded Outside of GAAS?

Expanding the responsibility of the auditor outside of GAAS is the approach that some regulatory agencies are currently taking or considering. As described above, laws and regulations are being developed that establish requirements for reports by auditors on the application of agreed-upon compliance procedures. This approach to expanding the auditor’s responsibility would appear to be more effective and efficient than expanding the auditor’s responsibility under GAAS. Regulators can contract for the level of auditing desired regardless of the effects of the laws or regulations on the entity’s financial statements. Also, all expansions of audit requirements would go through normal legislative or administrative due process.

This regulatory market for compliance auditing would also appear to be a fruitful subject for research. The use of agreed-upon procedures as a method to contract for these services creates a unique market in which the user can contract for a specific level of auditing. It provides a new setting for examination of agency relationships.

Is There a Need to Expand the Auditor’s Responsibility for Direct Reporting of Illegal Acts?

As indicated above, the auditor already has a limited responsibility to report illegal acts directly to regulators. Still, some regulatory agencies are re-

questioning that auditors assume more direct reporting responsibility. As a part of the Financial Institutions Reform, Recovery and Enforcement Act of 1989, the Secretary of the Treasury was instructed to study the feasibility of adopting regulations similar to those of England's Banking Act 1987. That act charges the U.K. accounting profession with the task of developing standards that define when the auditor should report management improprieties directly to the Bank of England. If auditors in the U.S. are required to communicate certain matters directly to regulators, how would this affect their relationship with management? Would it affect the level of communication between the two parties? These would also appear to be interesting research questions.

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Discussants' Response No. 1 to "Illegal Acts: What is The Auditor's Responsibility?"

Editor's Note: As mentioned in the preface, we have two discussants' responses for this paper. The first response represents the comments by three students from the accounting program at the University of Kansas. These students were selected as the 1990 Deloitte & Touche Symposium Fellows. The other response is the usual academicians' remarks by Professor McNair, Mississippi State University. The two responses are given below in the order they were presented.

Tim Damewood
Susan Harshberger
Russ Jones
University of Kansas

Our objective in critiquing the paper by Mr. Guy, Mr. Whittington and Mr. Neebes is to find ways of improving SAS 54 [AICPA, 1988]. Our comments will deal with issues related not only to reducing ambiguities in the interpretation and implementation of the SAS by different auditing firms but also with expanding the scope of SAS 54 to other issues that have not been considered by the profession. Our discussion will be directed towards SAS 54 because much of the paper is a restatement of the SAS.

We will address the following issues in our paper:

- The distinction between direct and indirect illegal acts.
- The auditor's competence in detecting illegal acts.
- SAS 54's "if necessary" clause.
- Auditor's neutrality towards industry in detecting illegal acts.
- Qualitative materiality.
- Auditor's responsibility towards communicating audit findings.

The first issue is direct versus indirect illegal acts. In order to accomplish the objective of consistent application of the SAS, there needs to be a more clear distinction between direct and indirect illegal acts within the SAS. In the case of direct effect illegal acts, the auditor is responsible for designing the audit to provide reasonable assurance that the financial statement amounts are free from material misstatement resulting from such acts. However, in the case of indirect effect illegal acts, the auditor is responsible for the detection of such acts only when information comes to his or her attention concerning their possible existence. The last sentence of paragraph seven of SAS 54 more clearly states the auditor's responsibilities for indirect illegal acts:

“. . . an audit made in accordance with GAAS provides no assurance that illegal acts will be detected or that any contingent liabilities that may result will be disclosed.” Given this wide disparity in the treatment between direct and indirect illegal acts, it is crucial that the auditor is provided with a clearer distinction between these two types of illegal acts. What if the auditor did not detect any illegal acts and therefore, according to SAS 54, assumed that any illegal acts that actually existed were indirect in nature and not within the auditor’s responsibilities? Then, in retrospect, assume that a direct effect illegal act did occur. Since the auditor did not detect nor disclose this act, he or she would be liable to the users of the financial statements.

It is clear that the difference in responsibility for direct and indirect illegal acts is critical in determining the auditor’s liability. The paper and SAS 54 define direct and indirect illegal acts primarily by example. We contend that their use of only one example to describe indirect illegal acts, which is simplistic compared to the complexities that can and do arise in reality, is insufficient in leading auditors to consistent application of the standard. The example used in the paper is the same one that was used in SAS 54. To illustrate these complexities consider the following situation. A chemical manufacturer is operating at a gross margin of ten percent while other companies in the industry are operating at an average of five percent. Suppose that this higher gross margin is due to the fact that the company has failed to acquire the requisite environmental protection equipment. One could argue that the difference in the gross margin has a direct effect on the financial statements, while another could argue that the effect of the illegal act is indirect due to fines or other contingent liabilities that might arise due to the company’s failure to follow the requirements of the Environmental Protection Agency (EPA).

A second important issue relates to the auditor’s competence in detecting illegal acts. As the authors state in the paper, SAS 54 professes that auditors do not possess the legal training necessary to recognize all circumstances leading to litigation. Also, the SAS contends that the determination as to whether or not a particular act is illegal is generally based on the advice of an informed expert qualified to practice law. Given the auditor’s lack of legal expertise, SAS 54 directs the auditor towards management in the search for illegal acts. Further, the paper states that audit procedures rely heavily upon the cooperation of the client’s management. However, this heavy reliance on the client’s management provides only limited evidence of compliance with laws and regulations. And, while this limitation is discussed in the paper, no alternative audit procedures are provided. We believe that the paper should highlight procedures outside of receiving management representations, such as examining regulatory approval letters or political contributions.

The third issue we wish to discuss deals with the “if necessary” words that appear in paragraph twelve of SAS 54. We believe that SAS 54 is contradicting itself with this paragraph. It first disclaims the auditor’s competence in the area of illegal acts, and then directs the auditor towards management for information concerning any such acts. But in paragraph 12, the auditor’s responsibilities are increased by the “if necessary” language. This clause takes the responsibility off of the client, where it rightfully belongs, and instead al-

lows the client to force the auditor to decide the legality of the client's acts. The client should be the one who makes any decisions and arrives at any conclusions necessary in regards to alleged illegal acts. The auditor should only be required to act upon the decisions of management. It is our belief that the "if necessary" clause should be removed from the SAS 54 and that auditors should be required to consult with a legal counsel when any and all illegal acts are discovered.

We are also concerned about one of the paper's recommendations. The authors argue that the auditor's detection responsibility for illegal acts cannot be expanded because the auditor is not an expert in the area. This is quite true, but auditors are often forced to use outside experts in the conduct of an audit when they lack the necessary expertise. In fact, SAS No. 11, *Using the work of a specialist* [AICPA, 1975, and 1989], addresses this subject.

So why not require the use of lawyers as outside experts during an audit? We are not suggesting that lawyers work alongside auditors throughout the audit or be used on every audit. Instead, a lawyer could be required if the auditor is not satisfied after inquiry of management counsel (the "if necessary" point). At the very least, a reference should be made to SAS No. 11.

A fourth issue deserving of comment on deals with auditor's neutrality towards industry in detecting illegal acts. Seeing no discussion of this issue in the paper and SAS No. 54 implies that the auditor should maintain a neutral attitude across industries. It is our contention that auditors should have greater skepticism before beginning audits in certain industries where illegal acts may be prevalent. The defense, savings and loan, and securities industries are prime examples.

Our fifth concern about SAS No. 54 deals with the definition of qualitative materiality. This issue was not addressed in the paper. SAS No. 54 requires the auditor to evaluate both the quantitative and qualitative materiality of an illegal act that comes to his or her attention. Qualitative materiality is defined by example with a reference to SAS No. 47 [AICPA, 1983]: "an illegal payment of an otherwise immaterial amount could be material if there is a reasonable possibility that it could lead to a material contingent liability or a material loss of revenue." We believe that such a definition is inadequate.

An illegal act could be "qualitatively material" even if its quantitative effect on the financial statements is not material now or even several periods later. The term "qualitatively material" suggests an illegal act that, if committed by top management or with the knowledge of top management, would affect the decision of a reasonable user of the financial statements. Examples of such illegal acts are: violations of securities laws, environmental laws, and bidding regulations for government contracts. By not adequately defining the term, SAS 54 may be allowing auditors not to require management disclosure of illegal acts which users would be genuinely concerned about. Illegal acts of this nature directly reflect the integrity of management.

Investors do actually care about more than merely the quantitative aspects of companies they invest in. The presence of "clean" mutual funds, which do not invest in companies with major ties to South Africa or companies with operations which harm the environment, is one indicator that investors are concerned about the qualitative aspects of companies they invest in.

We believe that qualitative materiality could be better defined. Of course, it is very difficult to define such an ideal standard which could be applied consistently across audits and among auditors. Any new definition would, of course, require future research. But a good definition of qualitative materiality as it applies to illegal acts might include the following points:

- The illegal act is a felony.
- A member of top management has been convicted of or charged with, or a member of top management knew of and could have prevented the act.
- Purely personal acts unrelated to the financial statements should be excluded.

In regards to our last issue that deals with auditor's responsibility towards communicating audit findings, the authors state:

One of the objectives of the expectation gap SAS's was to improve the communications to boards of directors and audit committees to help them fulfill their financial reporting and oversight responsibilities.

While we feel that SAS 54 does an adequate job improving communications between auditors and their clients, it falls short in the task of closing the expectation gap that exists between the public and the auditor in regards to the detection of illegal acts. Many people in the public incorrectly view an auditor as an expert on every matter relating to a client's financial statements. However, according to paragraph three of SAS 54, an auditor is "one who is proficient in accounting and auditing," not in the detection of illegal acts.

One way to close this expectation gap would be to modify the standard unqualified audit report to include an additional paragraph that deals with the client's system of internal control. Currently, the AICPA has formed a task force to examine this possibility. An internal control paragraph would serve two purposes. First, it would clearly communicate to users that *management is responsible* for establishing a system of internal control. The paragraph might also include the following items that the client's system is supposed to accomplish:

- Provide reliable data,
- Safeguard assets,
- Promote operational efficiency,
- Encourage adherence to proscribed management policies,
- Comply with the Foreign Corrupt Practices Act,
- *Prevent* and *detect* illegal acts.

In addition, the paragraph should state that management is responsible for the *design*, *installation*, and *effectiveness* of the company's internal control system as discussed in SAS 30. Also, the additional paragraph should include the auditor's opinion about how the client's internal control system is meeting the above objectives. According to the second standard of field work, the auditor is only required to obtain an "understanding" of the client's internal control system. In order for an auditor to express an opinion on the quality

of a client's internal control, more audit procedures may be required. The AICPA and auditing firms would be required to determine the appropriate amount of procedures that are necessary in order to issue an opinion. SAS 63 [AICPA, 1988] on auditing of governmental entities may be useful in designing any standard on the internal control reporting requirements for publicly traded firms. Auditors are required to report on the quality of a governmental entity's internal control structure.

While we believe that the modification of the standard audit report to include an opinion on the client's internal control would help close the expectation gap, it may not be necessary for all types of clients. For example, for a small, sole proprietorship with a small number of financial users the additional cost of evaluating their internal control system would probably be impractical. The additional procedures and fourth paragraph would be most appropriate for publicly traded companies with a large number of financial users.

In conclusion, a conversation that we had with Tom Bintinger, a partner with Deloitte & Touche and a member of the Auditing Standards Board at the time SAS 54 was adopted, summed up our reasons for suggesting a change in the standard audit report. He said that it would be far more constructive to establish preventive measures than to increase the auditor's detection responsibilities. After all, it would be better to stop illegal acts before they occur rather than simply discovering them after-the-fact.

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Discussant's Response No. 2 to "Illegal Acts: What is The Auditor's Responsibility?"

Frances M. McNair
Mississippi State University

When I agreed to discuss the paper by Dan Guy, Ray Whittington, and Don Neebes, I did not realize the task would be so difficult. Commenting on a paper about SAS No. 54, written by drafters of the statement, is difficult enough, but then to follow discussions by three of the brightest accounting students at the University of Kansas is really a chore.

Even with the enactment of SAS No. 54, the question of what the auditor is responsible for is still difficult to answer. Does this standard answer the question or does it raise the question, "What is the Auditor Responsible For?" The standard increases the auditor's responsibility for detection of a client's illegal acts and it may be difficult to determine where the responsibility stops.

Some of the work that I have done recently has been in the area of the accountant's liability and responsibility. Consequently, some of my comments concern the potential effect that this new SAS No. 54 could have on the auditor in terms of additional duties and liabilities. I would like to address four areas of concern: (1) the classification of illegal acts as direct or indirect; (2) potential increased liability; (3) interaction with other SASs; and (4) disclosure.

Direct vs. Indirect Illegal Acts

As discussed in the paper by the authors, illegal acts are divided into two categories. The auditor is prescribed different degrees of responsibility based upon the category in which the illegal act falls. The prescribed degree of care is much higher for the first category of acts – those illegal acts that have a *direct* and *material* effect on the financial statement amounts. Since this category of illegal acts would affect the financial statement amounts, the auditor should assess the risk that an illegal act may cause the financial statements to contain a material misstatement. Consequently, the auditor must design audit procedures to provide *reasonable assurance* of detecting the illegal act.

Much recent litigation has been based on the auditor's negligence when there was a failure to discover and report management's errors and irregularities, i.e., management fraud. This same standard of care required for discovery of management's errors and irregularities is now required for the discovery of the client's direct effect illegal acts. This means the auditor will have to understand the legal environment in which the client is operating in order to design procedures that would detect such offenses. This will have

a direct impact on the auditing procedures, especially those designed to test the internal control procedures of the client.

The detection of the indirect effect illegal acts as defined in SAS No. 54 may be much more difficult than the detection of the direct effect illegal acts. These are acts that normally do not have a material effect on the financial statement amounts. The auditor has a responsibility for their discovery, but to a lesser degree than for the discovery of the direct effect illegal acts. As is noted in the paper, except for a few examples given in the statement, differentiating direct effect illegal acts from indirect effect illegal acts is largely a matter of auditor's judgment. There appears to be a very fine line between the two types of illegal acts, and in some cases the distinction may be nonexistent. For example, if a contingent liability is identified as a result of an indirect effect illegal act and a portion of it is required to be accrued, then does it not become a direct effect illegal act with the higher standard of care? After all, this type of act does have a direct effect on the financial statement amounts.

It appears that the distinction between a direct effect illegal act and an indirect effect illegal act may be a source of confusion both to the accountant and to the public. If an illegal act has occurred (regardless of type), and it has a material effect on the financial statements, then it must be reflected in the financial statements. If the illegal act is immaterial, then no disclosure of the act is required to an outside party. However, can there be an illegal act of any consequence not requiring disclosure? Even if the act pertains to the operation of the organization, the commission of the illegal act can cause a legal liability to accrue. The probability of the act being discovered is not relevant; if the act has been committed then the consequences must be considered.

Some acts may not affect a specific line item on the financial statements, but they could affect the continuation of the business. For example, if an act has been committed that might cause an operating license to be revoked, this would affect the ability of the business to continue. If this were the situation, then a going concern assessment must be made and disclosed if the consequences were severe enough. Defining two categories of illegal acts may serve to confuse the auditor and possibly lead to more litigation. It appears that the auditor should look at the effect of the illegal act on the financial statements and whether disclosure could affect an investor's opinion.

Although the standard prescribes a higher standard of care than did SAS No. 17, one of the purposes of identifying two classes of illegal acts was to try to limit the auditor's responsibility. But has this been accomplished? The standard actually makes the auditor more responsible. Even if the illegal act is related to the operating environment, if it can have material effect on the financial statements or on the entity's operation, then is the auditor not responsible for detection? Is the distinction between a direct effect illegal act and an indirect effect illegal act really helpful, or does this provide a false sense of security for the auditor? Could a more useful test be developed?

Legal Liability

How does this increased responsibility fit with potential liability? SAS No. 54 prescribes the same standard of care for direct effect illegal acts as it does for client's errors and irregularities in SAS No. 53. The litigious nature of today's

environment makes the auditor more susceptible if he is careless in his responsibility to detect client's illegal acts. The problem of third party liability is a very real problem, as many accounting firms know.

The more liberal view of auditor responsibility adopted by many of the courts in the 1970s and 1980s proved to be costly to many accounting firms. While the opinions of the courts do vary from state to state, in general, a more liberal view was adopted with respect to third party liability. Many of the courts took the position that clients had a duty to third parties, particularly if the group was identifiable and limited. This standard has the potential for making the auditor liable for the client's injurious illegal acts.

One positive note however, is that a few of the court decisions in the late 1980s and early in 1990 have tended to take a more conservative view of third party liability. The *Credit Alliance* decision is one of the more important decisions in the 1980s.¹ In *Credit Alliance*, the court took a more conservative approach and limited liability to third parties that were identified prior to the engagement. A number of other state courts have adopted this view in 1988 and 1989. Also, early in 1990, in the *Caparo*² decision, the English House of Lords adopted a more conservative view similar to that taken in *Credit Alliance*.

Another interesting question that SAS No. 54 raises is the potential involvement of legal counsel in the audit process. Some actions may call for an expert opinion as to whether a law has actually been violated and the implications of the violation. While the accountant is not necessarily concerned with whether a specific act is illegal *per se*, there must be a determination to measure impact on the financial statements. For example, some of the provisions of the Securities Act of 1933 are complex and violations may be very technical.

The auditors' expertise also is at issue here. How familiar with law and regulations must the auditor be in order to make a judgment about violations? If the auditor does not have the degree of competency required, does this mean the employment of counsel may become a regular part of the audit procedure in firms where complex regulations apply? It appears that the potential is there to have legal counsel as a regular member of the audit team.

Interaction with Other SASs

SAS No. 54 is related specifically to a number of the new SASs that were issued in 1988. The auditor's responsibility for the detection of client direct effect illegal acts is the same as is required for the detection of client's errors and irregularities in SAS No. 53. As you know, SAS No. 53 has increased auditor responsibility by requiring the auditor to design audit procedures to provide reasonable assurance of detection.

The duty of the auditor to detect material misstatement as a result of client's illegal acts and the risk assessment (both control and inherent risk) have a direct bearing on the substantive test that are to be performed. If the audi-

¹*Credit Alliance v. Arthur Andersen & Co.*, 483 N.E. 2d 110, N.Y. App. (1985).

²*CAPARO Industries v. Dickman, et al.* (Touche Ross), English House of Lords (1990).

tor fails to consider the possibility of illegal acts and their impact on the financial statements, then the auditor may be setting himself up for a negligence charge in the event of subsequent problems.

SAS No. 55, *Considerations of the Internal Control Structure in a Financial Statement Audit*, is also impacted by SAS No. 54. The new internal control procedures require a higher degree of understanding of the company's internal control structure. The understanding of the control environment is especially important in relation to detecting illegal acts. The control environment includes such factors as management philosophy, the entity's organizational structure, and various external influences that affect the entity's operations and practices (such as requirements by legislative and regulatory bodies).

As I mentioned earlier, a client illegal act could affect the firm's ability to continue business which will cause a going concern evaluation under SAS No. 59. Obviously, a client illegal act will affect audit procedures required by other SAS's, i.e., the design of substantive procedures. These examples illustrate the far reaching effect of SAS No. 54.

Disclosure

Normally the responsibility of notifying parties outside the client's organization of an illegal act not reported in the financial statements is the responsibility of management. However, SAS No. 54, as well as recent court decisions, indicate that the auditor has a higher level of responsibility for reporting certain kinds of misconduct. The new statement seems to fall short in clarifying the auditor's responsibility for disclosure. It notes that in general, the auditor has no responsibility to notify parties outside of the client's organization of the illegal acts. However, it does suggest that circumstances *may* exist that would require disclosure to an outside party. The statement then lists several situations that may require disclosure, but still leaves the decision up to the judgment of the auditor in the specific situation. Some court decisions in the 1980s reinforce and strengthen the disclosure requirement. For example, in the *Rudolph* case, the court established its own disclosure standard.³ The court reasoned that it is not unreasonable to expect an accountant to expose fraud in certain circumstances. In *Rudolph*, the accountant had knowledge of fraud subsequent to the audit. The court stated "the accountant's information is obviously superior to that of the investors" and the auditor may have a duty to disclose.

Other courts contend that absent some duty to disclose, accountants are not required to tattle on their clients. As the court noted in *Baker*,⁴ liability depends on an existing duty to disclose. One question to be answered is does SAS No. 54 create a legal duty to disclose and if so to what circumstances does it apply? Again, it would appear that if the illegal act would impact the financial statement amounts or change an investor's decision, then there

³*Rudolph v. Arthur Andersen & Co.*, 800 F. 2d 1040 (11 Cir. 1986), rehearing denied at 806 F. 2d 1070 (1986), cert. denied, 107 S. Ct. 1604 (1987).

⁴*Baker v. Henderson, Franklin, Starnes and Hart*, 757 F. 2d 490 (7th Cir. 1986).

already is a duty to disclose. In a 1988 case, allegations that the accounting firm knew of fraud in partnership offering material, but allowed use of its name, led to a claim for aiding and abetting.⁵ Could this also apply to illegal acts of clients known by the auditor but not disclosed? Auditors can also subject themselves to RICO suits for merely being “associated with” an organization involved with RICO violations.⁶

Conclusion

In conclusion, the implication of this new SAS does raise some interesting questions. As the authors point out, one way to handle the problem may be to contract separately for compliance procedures. It appears that SAS No. 54 has raised the level of responsibility for the detection *and* disclosure of a client’s illegal act. This higher standard of care has the potential of creating an even more litigious environment for the accountant.

⁵Roberts v. Peat, Marwick, Mitchell & Co., 857 F. 2d 646 (9th Cir. 9/19/88).

⁶Schact v. Brown, 711 F. 2d 1343 (7th Cir.), cert denied, 104 S. Ct 508, 509 (1983).

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Panel Discussion on “The Impact of Mergers of Accounting Firms on the Auditing Profession”

Editor’s Note: The panel consisted of the following members:

Stephen J. Aldersley, Ernst & Young, Canada
David W. Hunerberg, Deloitte & Touche
Jonathon E. Killmer, Coopers & Lybrand
Julia A. Lelik, Peat Marwick Thorne, Canada
Roger R. Nelson, Ernst & Young
James K. Loebbecke, University of Utah

The practitioner’s comments were based on their personal experience and philosophy along with the firm’s experience and philosophy. The academic member of the panel, Professor James Loebbecke, concluded the discussion with his views on the subject. The comments are given below in the order they were presented.

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Stephen J. Aldersley
Ernst & Young, Canada

I would like to begin my comments with a short parable outlining some of the factors that led to the accounting firm mergers. Many of these were mentioned yesterday by Ed Kangas in his luncheon address.

The Parable of the Geese (Or, What to do when your goose is cooked!)

Once upon a time there were eight large flocks of colored geese. We’ll refer to each flock by its color: Red, Orange, Yellow, Green, Blue, Purple, White and Black. Geese from these flocks ate Kentucky Blue Grass, which was considered a delicacy amongst the geese species.

At the same time there lived a wide variety of hunters who grew grain to eat. Because they all believed that goose droppings were beneficial to their crops, the hunters always planted patches of Kentucky Blue near their crops so the geese would fly by. Occasionally, when there was a crop failure, there would be a local food shortage and the hunters would shoot the geese they had attracted with their Kentucky Blue.

Over time, each of the geese flocks developed relationships with smaller flocks of ducks who would take on the goose flock color, leading to big flocks of geese and ducks. Ducks, of course, couldn't eat Kentucky Blue, but they could eat almost anything else, or at least that's what they said. Hunters sometimes liked having ducks around because they would eat some of the weeds in the grain fields. Sometimes the ducks would get out of control and eat some of the grain. Since the hunters weren't that bright, they didn't always notice, but if they realized what the ducks were doing, they'd shoot them too. But this didn't happen very often.

One of the reasons the geese wanted to be with ducks is that a large combined flock around a patch of Kentucky Blue would keep other flocks away. The ducks liked the opportunities the geese provided and could usually scrounge some food even when there were no weeds. The only major difficulty they had was that sometimes ducks and geese would try to mate. Such attempts weren't always successful, and when they were, gucks were created. By the way, a guck doesn't know what its there for and he or she will oscillate between goose-like and duck-like behavior. This confused the hunters.

For the longest time the world seemed to be a nice place for the geese, the ducks and the hunters. There were the occasional little spats and a few geese and ducks were shot and eaten, but generally, things went along fairly smoothly. The different flocks got along pretty well, each one sticking to its patches of Kentucky Blue. Then things started to get complicated. Local hunters began to plant grain in other worlds and foreign hunters began to buy local fields. The big flocks began to grow and needed more Kentucky Blue. New rules of goose etiquette were proclaimed, making it harder for the geese to get at the Kentucky Blue. Hunters were given more powerful guns, Dingells for example. Hunters were also forming cooperatives and some were even going out of business.

The geese and their duck partners of course, were caught in the middle. All the colored flocks were making agreements with flocks in other worlds. They were also absorbing some of the lesser uncolored flocks. But the big problem they were all facing was that the hunters weren't prepared to plant as much Kentucky Blue to attract the geese. The geese, being birds, didn't help matters. One flock was always prepared to visit grain fields served by another flock for less grass. The overall result was that the growth in the amount of Kentucky Blue Grass was less than the desired growth in the size of the flocks, a real population crunch.

The solution, which came gradually, was to rationalize the flocks. The belief was that the largest flocks could muscle in on comparatively smaller flocks and grow through aggressive behavior by taking a larger portion of a smaller pie. First, the Red flock merged with a very large uncolored flock to become the Crimson flock. Then an attempt was made to merge the Blue flock with the Green flock, but they blew it when their affiliates in another world couldn't agree. Then came the big one. The Yellow flock merged with the White flock to become the Gingham flock. Very soon afterwards, the Green flock merged with the Black flock and the Blue flock tried to merge with the Orange flock. The last one didn't work nor were the others successful in all worlds. But the damage was done. Instead of eight colored flocks there were now only six.

It would be nice to be able to say that they all lived happily ever after, but unfortunately, it was not to be. Lord Caparo came along and said that hunters could not use bullets in their guns. It took a while for it to sink in, hunters are a little slow you see, but in the end they realized there was no point in giving the geese so much Kentucky Blue. If you couldn't shoot them, you couldn't eat them. They didn't taste very good anyway. Finally, the geese had to learn to eat weeds. So ends the parable of the geese.

What Does the Future Hold?

The parable deals with most of the factors that led to the mergers except perhaps for the competitive advantage that stronger industry specialization brings to the merged firms. The future still holds many challenges for the profession. The market for audit services will not grow faster than the economies of the countries in which the public accounting profession is well developed. (There are of course opportunities in Eastern Europe and in Asia, but the North American market is saturated.) In some cases it will not grow as fast. In the absence of mergers, all large firms (the Big Six) will grow at the same basic rate. There will be a period of trading, discounting etc., but in the end there will be relatively less for everyone in the business.

The middle market will gradually disappear as the mid-sized firms are caught in the squeeze between the large international firms and the small local practices. This has already begun in Canada with the complete or partial disintegration of Eisenberg, Collins Barrow, and Laventhol and Horwath. Firms which have only a regional or national scope will not be able to compete unless they find a niche.

Another critical challenge will be the relevance of the audit service itself. We need to respond to the Caparo¹ decision in the House of Lords in which the duty of care issue has been revisited. If this decision becomes an important precedent for other auditor litigation, there may be less exposure to liability but it would also challenge the utility of our services.

The expectation gap will continue to haunt the profession. The substantial auditing standards activity in the US will not prevent the future occurrence of "audit failures". These events have always been relatively rare and will continue to occur for the same reason they've occurred in the past. There is a limit to what can be accomplished in an audit, something that has been acknowledged in professional standards but has not been well understood by the public. The mergers do little to benefit the profession in this area and in some cases make matters worse as clients, and the public, fail to perceive any benefits to them.

The increasingly complex environment is making it hard to attract new students into the profession. In Canada, the qualification process that is added on to a fairly hefty educational requirement is a major ordeal for the students. As a profession, we are not always getting the best and brightest of the available graduates and it is now extremely difficult to attract students with non-accounting university education. This will certainly challenge our ability to grow our business in the future.

¹See *World Accounting Report*, May 1990.

Audit Approach in a Merger Environment

An interesting issue in a major merger situation is the audit approach that is adopted by the merged firm. It may surprise some that this issue is not a major factor in merger discussions. One would think that the process used for the primary business activity would be of considerable importance to the merger participants. But this doesn't seem to be the case. If all else is agreeable, then disagreements over methodology will not stop the merger. A compromise will be made.

Once merged, however, the audit methodology becomes a critical issue. When you throw staff from each predecessor firm into the same office so they work on the same clients, the daily work process is perhaps the most important issue. Given this motivation, there is tremendous pressure to quickly develop a merged audit methodology.

In many respects, the claims of the merged firms that their combined audit approaches are or will be superior to the approaches each used previously may well be valid. Since all big eight firms' audit approaches resulted in a high level of quality, one would expect that the effect of combining two approaches would not undermine their effectiveness. In practice what happens is the combined approach is developed by adopting what are perceived to be the strong points in each of the predecessor approaches. In what I've seen, the more extreme aspects of the predecessor methodologies have been eliminated in the merged approach, leading to a more efficient overall process.

Despite this efficiency improvement, there will remain aspects of the combined approach which are inefficient if only because adopting a more efficient method would introduce something neither predecessor firm was familiar with. Such situations can arise during the analysis of the predecessor approaches when opportunities to adopt more efficient approaches than either of the predecessors are identified. Implementation practicality issues also need to be considered. Everyone in the merged firm will need to learn something new but if the combined approach uses features similar to at least one of the predecessors, half the staff will be familiar with any one aspect of the approach. Something entirely new would affect everyone with no one having previous experience. The objective is efficiency and effectiveness of the entire process including the human factors. So the result of the combining process is not perfect, but in my view, it is surprisingly good given the time pressure involved.

David W. Hunerberg
Deloitte & Touche

Introduction

Good afternoon. I am David Hunerberg from the Kansas City office of Deloitte & Touche. As are my fellow panel members, I am here to present my perspectives of the impact of mergers of accounting firms on the auditing profession.

Before I present my views, I believe it's important for you to understand the perspective from which I am speaking. As you all know, Deloitte & Touche is currently experiencing, first hand, the results and the impacts of a merger from both a professional and business standpoint. I have been actively involved in the merger activities from my position as Office Managing Partner of the former Touche Ross Kansas City office, a position I have held since 1983. I am currently serving as the Office Managing Partner in the new firm, Deloitte & Touche, for the Kansas City office. I was a member of the Board of Directors of Touche Ross & Co. and, accordingly, was actively involved in many of the discussions and considerations which arose as a result of the merger. In addition, I currently serve as a Group Managing Partner for nine Deloitte & Touche offices in the central and the southwest portion of the country. And, I am a member of the Deloitte & Touche Management Committee. As a member, I actively participate in many of the management decisions and the development of policies and practices that are being established as we form our new firm. So, that's a little background on my perspective.

Base Line Assumptions

As we talk about the impact of mergers on the auditing profession, I think it's also important to comment briefly on why we have mergers in the profession. I believe that the mergers have been driven by both inside and outside demands and pressures. The outside pressures tend to focus around one key element – *client service*. Clients are continuing to demand, as they always have, a high level of professional quality service from their auditing firm. Clients should, as they always have, expect that much from an auditing professional. These expectations, however, have continued to change over the past several years as our clients have broadened their perspective and we looked (and found) additional ways to serve them. Our economy has become a global marketplace in which there are strong economic business centers in North America, Europe and the Pacific rim. As an example, more and more of our clients are finding themselves operating in this global environment and no longer focusing on merely local or regional economic developments, even in Kansas. This is true not only of the larger clients of any office, but is perhaps surprisingly true for many of the smaller clients of any office that find themselves purchasing from foreign vendors and even acquiring foreign subsidiaries or opening purchasing offices or distribution centers over-

seas. Because of these pressures, the profession is changing in reaction to the worldwide global marketplace perspective gained by our clients. To be effective, a professional auditing firm must have a strong presence in these significant global marketplaces – North America, Europe and the Pacific rim. The inside reasons are a lot about economics, leverage and profitability. Clearly, the very large firms understand and tout the benefits of their size. We see it in the efforts they put into research, contributions and in recruiting, as just three examples.

Impact of Mergers on the Professional

The number one asset of any professional firm is its *people*. The continued development and growth of these resources is critical to the survival of any professional firm and is essential to insure continued quality service. I believe mergers of accounting firms will have a positive impact on research, education and technical developments. But the mergers will also provide opportunities to the individual professional in terms of his or her personal and professional growth. As firms become larger and broader in perspective, individuals within those firms will have more opportunities to specialize in various industries or to develop and refine expertise in various technical areas. With the expansion of the client base and the combination of human resources created by the mergers, the individual professional is better able to focus his or her efforts and development in his or her own area of interest and expertise. As an example, in Kansas City, the professionals who previously served ten different clients in five or six different industries will now be able to concentrate their skills in one or two different industries – enabling them to grow professionally at a faster rate and deliver a higher level of client service to our customers. Mergers will have the same impact on the technical resource professionals who are typically based at national offices of the firms. These professionals are able to regroup and refocus on more specialized lines or functional responsibilities as the national offices of merged firms are brought together.

Our primary practice focus has not been changed by the merger. The audit partner continues to be responsible for insuring that the audit services meet the client expectations and firm and professional standards. The merger will better equip the partner to fulfill his responsibilities by providing increased and more specialized resources.

As I mentioned earlier, the exterior reason to merge is to provide quality client service. That has always been a very high priority for any professional services firm. Client service should be driven by the needs of the client. The realities of today's economy such as the increasing importance of business in Japan, the unification of Europe, free trade with Canada and the emergence of Eastern Europe are fairly obvious changes in our current economic reality and require a change in our focus and an increased emphasis in our service delivery capabilities.

Consulting

All the major firms have become consulting firms. Each firm reports that 50-60 percent of their revenues come from auditing but only two-thirds of that

amount come from “standard auditing”. That may mean that only approximately 40 percent of the business is the standard recurring audit. Clients hire consultants for their ability to identify and help solve problems in specific areas of their business. They want to know, most likely, if you have ever done this specific job before. We have vast networks to identify these experts throughout the firm and now have more of them.

The nature of the “standard audit” has changed, too. Companies continue to look for advice outside of the opinion area. In proposal situations, a winning proposal often is one that contains substantive consulting comments about operations or tax planning ideas.

This consultive focus is not an impact of mergers, but the audit professional will find himself better prepared to face the challenge as a result of the larger firm networks and improved resources created by the mergers.

Impact on Audit Practice and Technical Developments

The mergers of accounting firms are creating opportunities to refine, streamline and modernize the audit process. As firms combine, audit methodologies will be developed that will draw from the best of the merged firms. In fact, at Deloitte & Touche we are currently in the process of introducing a new audit approach that will take the best of the two predecessor firms. In fact, when asked whether the new audit approach most resembles the Deloitte approach or the Touche approach, the head of the audit methodology task force said the new D&T audit approach would be drawn 75 percent from the Deloitte approach and 75 percent from the Touche approach. We hope that this is an instance where the sum of the two parts taken together will result in a process that is well beyond where either firm had been in the past.

In today’s business environment having the best audit approach is no longer enough. It must be supported by powerful and flexible mainframe and microcomputer software. Today’s audit professionals will have at their command an impressive array of computer-assisted audit systems and tools. We have a development center located in Princeton, New Jersey dedicated to keeping us on the leading edge of technology. With our clients’ information processing systems becoming more complex, we need specialists, at the direction of the audit engagement team, to evaluate the controls within that environment.

The development of new auditing processes and technological advancements are not unique results of the mergers of accounting firms. All firms, in the past, have revised and updated their audit process almost continually in order to remain competitive and to react to changes in the environment and the economy. These refinements, however, have typically been slow and have taken a great deal of time to develop, implement and refine. Competitive pressures brought upon other firms through the creation of these new audit processes will force other auditing firms to critically evaluate and perhaps revise their audit techniques sooner than they may have without the impact of the mergers.

Support for Education and Research

I also hope that mergers of accounting firms will create opportunities for improvements in research, education and technical developments. As the national offices of the merged firms are combined, the result is clearly a sum greater than the total of the two parts. The combination of pools of technical resource people enables these people to focus on specialized accounting areas, the development of top quality educational programs and continued research on accounting and auditing issues. By reallocating the use of human resources within the combined national offices of the merged firms, the firms are able to either examine new and different topics and issues or double their efforts in the completion of current projects that were underway prior to the merger. Although there will certainly be some elimination of duplicate positions and responsibilities, the mergers also provide the opportunity to make use of the best resources available in all instances.

I don't believe that the mergers of firms will result in a reduced level of academic support. I hope Deloitte & Touche will expand the existing programs of support and activity.

Conclusion

I have discussed but a few of the impacts of mergers on the auditing profession. As you can imagine, within a merged firm the impacts, consequences and challenges are great and there are many issues that need to be dealt with both on a national and a local level. However, our emphasis has not changed. Our number one focus is to provide quality professional service to our clients. As a result, we believe that our clients are the big winners as a result of the mergers of firms. Our clients have benefited from an improved, more effective and efficient auditing process, better trained and well-rounded auditing professionals and the receipt of services from an enhanced, worldwide organization that is balanced and strong in the world's major economic regions.

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Jonathon E. Killmer

Coopers & Lybrand

Today I speak to you on the subject of mergers in the accounting profession from the viewpoint of a firm that has not participated in the "mega-merger binge". Coopers & Lybrand has not found it necessary nor advantageous to enter into a merger with another large firm.

To appropriately analyze the impact of a merger, or, in the case of Coopers & Lybrand, no merger, one must have an understanding of the reasons why a firm would seek to strengthen its position by undertaking what has been termed a "mega-merger".

Four areas surface when one explores why a firm would merge. These are:

- Better service to global clients
- Technology
- Capital
- Economics

Of course, on the other side of the formula for mergers, there are inherent risks. These can be categorized as follows:

- Significant dislocation and change
- Diversion of focus from the marketplace to tasks involved in internal integration
- Possible diversion from client service because of change
- Uncertainty in the minds of partners and staff

Clearly, Coopers & Lybrand is not opposed to mergers, but we do not believe in merging just for a merger's sake. In fact, we have been the beneficiary of recent mergers, particularly in the European market, which has positioned Coopers & Lybrand as a pre-eminent firm as we approach 1992. However, we at Coopers & Lybrand value our culture and recognize it as a significant competitive strength.

Let me share with you a series of events that took place in 1989 and 1990 that were the result of "inappropriate cultural fits", which in turn significantly enhanced Coopers & Lybrand.

In February, 1989, the Swedish representative of KPMG merged with Coopers & Lybrand.

In April, 1989, Treuarbeit, German representative of Price Waterhouse, merged with Coopers & Lybrand.

In October, 1989, Deloitte in the United Kingdom announced its intention to merge with Coopers & Lybrand, rather than joining in the Touche merger.

In October, 1989, Deloitte in the Channel Islands announced it would merge with Coopers & Lybrand.

In October, 1989, Deloitte Belgium merged with Coopers & Lybrand.

In November, 1989, Deloitte Austria merged with Coopers & Lybrand.

In January, 1990, Touche Ross Spain merged with Coopers & Lybrand.

I bring these mergers up to point out why the cultural fit is so critical. We strongly believe that a strong cultural fit is of paramount importance. Basically, culture includes the personalities of the firms, the way they are organized, and their objectives, philosophy and priorities. This is particularly true in an professional services firm, where teamwork is the foundation of a successful organization. When the fit isn't right, dysfunction results and ultimately secession occurs.

Therefore, a primary consideration at Coopers & Lybrand for considering any merger is that we are not willing to give up our culture and, in essence, become a different firm. Those firms which embody the same cultural traits as Coopers & Lybrand become ideal merger candidates. Such traits include quality service, commitment to attracting and retaining outstanding

people, an environment that is open, encouraging and driven by self determination, and an environment where initiative, innovation and creativity are encouraged.

Now, let us address some other points, including practice, technology, consulting and support for education and research.

As I previously stated, one of the reasons most often given for mergers is to provide better service to global clients, with mergers creating a better balance of global coverage for the firms involved. Fortunately, Coopers & Lybrand started on this voyage in 1957 with the creation of Coopers & Lybrand International – bringing together principally the U.S. firm of Lybrand Ross Bros. & Montgomery and Cooper Bros., a U.K. firm spanning the British Commonwealth.

Through the years, we have added countries and firms – and incidentally have never had a member firm secede – to where Coopers & Lybrand has, in place, the critical mass necessary to successfully compete in the global marketplace. Recent additions to our firm’s roster of clients – such as Avon, Cadbury, Schweppes, Kraft, the Limited, Mutual of Omaha, Sanyo, and Unilever – attest to our worldwide competitiveness. Now, with the addition of the firms previously mentioned, we have significantly added to an already potent force.

Touching briefly on technology, Coopers & Lybrand has long been acknowledged as a leader in audit technology – developing, many years ago, a worldwide uniform audit approach. Coopers & Lybrand also established the first fully dedicated computer auditing group and first created expert system software such as ExperTax. We are currently developing a fully integrated microcomputer-based audit workstation.

At our Manufacturing Technology Center, clients can play out “what if” scenarios to determine the impact of advanced technologies, such as just-in-time or computer integrated manufacturing, before making a multimillion dollar investment.

We have more than sufficient capital to continue our investments in technology. In fact, our challenge is not in the availability of capital, but to make sure that we are investing in the right activities to stimulate our long-term growth.

Let us now focus on consulting. Our management consulting practice has long been recognized for focusing on emerging issues. Our recent study “Made in America: A Survey of Manufacturing’s Future”, has captured national attention with its findings on the competitive position of U.S. manufacturers. Our philosophy of “Solutions for Business” is a reflection of the consulting practice.

This philosophy means bringing value by helping to identify and assess the risks and opportunities formed in the shifting business landscape. This, of course, translates into quality service. We remain committed to strengthening and enhancing our global consulting network, along with our other services, through internal growth as well as merger and acquisition opportunities in specific markets.

This brings us to the issue of support for education and research. This has been and will continue to be a strength of our firm. In the area of higher

education, a Coopers & Lybrand Foundation program, "Excellence in Audit Education", has reached over 25,000 students at 250 colleges and universities across the country. This program includes the widely acclaimed "Cable Co. Chronicles" videotape series.

The firm continues to fund significant developments in the whole education process, particularly curriculum development and teaching. We are also proud to support the cooperative effort of all six large firms, including Coopers & Lybrand, in funding the Accounting Education Change Commission – a truly extraordinary effort to improve accounting education.

Finally, we recently launched "Supporting Youth Education", a mobilization of our people in a national effort to keep students in high school and to improve the quality of education. For example, in my office in St. Louis, we have 35 volunteers, both professional and administrative, providing tutoring sessions and conducting role model classes in six middle schools in the inner city public schools.

In review of the four reasons for merging, let us look at each of the criteria as it relates to Coopers & Lybrand.

- Better client service to global clients – C&L already has the infrastructure in place.
- Technology – our firm is already on the leading edge and continues to demonstrate its creativity and innovativeness.
- Capital – as previously stated, we have sufficient capital – the key is directing its appropriate use.
- Economics – our present organization is functioning well and is appropriately focused on the marketplace

This basically states the reasons why Coopers & Lybrand chose not to enter into a merger. But of course, as previously stated, the most important issue is culture.

In summary, at Coopers & Lybrand, we have demonstrated we have the size, strategy, momentum and the will required to compete successfully in the global marketplace. But most importantly, we continue to achieve significant growth. For example, from 1982 to 1989, worldwide, Coopers & Lybrand revenues more than doubled. Our firm is well positioned domestically and internationally to meet the opportunities and challenges of our new environment. At Coopers & Lybrand, we face the future with confidence and a spirited commitment to the continued, well-managed growth of our firm.

Julia A. Lelik

Peat Marwick Thorne

No one who practices in the auditing profession will have failed to notice that the landscape is changing. As the world realigns itself economically and politically, it is also growing smaller with the advent of technological achievements in communication and the continued growth and dominance of multinational corporations. The market place is more competitive and many businesses (some, the largest in the world) know no geographical boundaries.

Auditing firms are reacting to this global change by positioning themselves to better serve their clients as they expand their businesses into the larger and seemingly more fertile international marketplace. We have already seen one result – mergers either nationally or internationally, or both. Many of the panel members here today have experienced the magic and mystery of mergers. Auditing firms that a short time ago saw themselves as competitors, are now pooling their auditing, accounting, consulting, taxation and other resources.

Mergers mean bringing people, standards, methodologies, technologies and cultures together. This “bringing together” presents many challenges and opportunities which arise as the fabric of a new and larger auditing firm is woven. As a result the impact of mergers on the auditing profession can be addressed in a number of ways. I would like to limit my observations to my own recent experience in “merging” the auditing methodologies of the predecessor firms that now represent Peat Marwick Thorne, the Canadian firm of Klynveld Peat Marwick Goerdeler (KPMG).

Background

In September, 1989 Peat Marwick Thorne was formed through the merger of Thorne Ernst and Whinney and Peat Marwick. Thorne Ernst and Whinney was a member of the international firm of Ernst & Whinney (now Ernst & Young) and Peat Marwick was a member of KPMG. The international firm of KPMG itself was formed in 1987 through the merger of KMG (Klynveld Main Goerdeler) and PMI (Peat Marwick International).

Both Canadian predecessor firms were well established in the Canadian auditing scene with histories dating back to 1869 for Thorne Ernst and Whinney and 1913 in the case of Peat Marwick. Peat Marwick Thorne emerged as the largest auditing firm in Canada after the merger activity settled down.

Comparing Audit Approaches

When firms merge, a natural step is to compare the way things were done in the predecessor firms. Previously, as competitors, information as to how “the other firm” conducted its audits was, at best, sketchy. The merger afforded us an opportunity to consider and study in considerable detail “the other” methodology. In today’s auditing environment it was not surprising

to find our audit processes were supported by quantitative models and computer technology.

Much energy is devoted to studying and structuring auditing models to assist auditors in making consistent judgements. Nevertheless I have found that auditors tend to ask two very fundamental and practical questions:

What procedures need to be applied in the circumstances?
How much do I need to do?

While this may appear to be an obvious observation, these questions were at the root of many of the specific and more technical issues being considered as we were making our comparisons. In my view, the successful development of an audit process and its acceptance by its users depends not so much on its sophistication but rather on its ability to quickly and appropriately answer those simple questions on a basis consistent with their own intuitive judgement.

The Whole is not the Sum of its Parts

Another common question auditing firms ask is: are we doing more or less than our competition? A merger presents the opportunity to assess the validity of a perception that may have existed that one firm was doing more or less audit work than the other.

In making comparisons between audit processes, my experience suggests that each model must be considered as a complete package. If the model is dissected and comparisons made only on a component by component basis there is limited insight into the end product gained if the whole is not also considered. For example, how much to audit is traditionally determined by decisions as to the risk of error in the account and the auditor's required precision. If we only compared the risk levels being used in the models we might inappropriately conclude that one approach causes us to do more work than the other because the detection risk being assumed is lower than the other. On the other hand, we may reach a different conclusion if a comparison was made of both the precision and risks being used.

Do we stop there? Should we also measure and take into account the various hurdles each process sets to lower detection risk? For example, more onerous documentation or compliance testing standards to establish lower control risk in one approach may provide a greater barrier to increasing detection risk than under another. Does this then mean one approach will cause the auditor to do more, more often than the other?

Implications for the Auditing Profession

In the end, if one looks at the actual procedures selected and amount of work done under the different approaches they were remarkably similar. But an examination of the details of the processes suggests that different firms follow somewhat different pathways to answer those simple questions. If the end result is about the same, then a stringent policy in one component in a given process would need to be balanced by a less rigorous requirement in another. But between the two audit processes themselves the mix of the pol-

icy decisions made may be different. I once heard someone say that there are two pathways to the truth – through science or faith. In auditing firms there seem to be many!

In a merger, the challenge lies in reconciling the differing pathways so that the auditors using the “merged” audit process see it as familiar, yielding results consistent with their own judgement. Expand this harmonization effort from a national level to the international arena and the complexity of the process is multiplied. But to better serve our clients internationally there is no other option.

In the larger context of standard setting for the profession one can only speculate. Imagine a body of auditors meeting to discuss one aspect of auditing with each deriving their view of the specific issue from their experience with their own audit process. Will the standard evolve as a stringent one or not? Would the standard have been different had all at the table known the pathway used by the others?

One cannot help but wonder what impact, if any, the combination of increased knowledge of the “competition’s” audit process and fewer auditing firms on the playing field will have on the auditing standards the profession will set for itself in the future.

Some Closing Thoughts

In closing, I would just like to add that, while mergers bring with them problems, they also bring solutions. They bring with them not only challenges but also opportunities. They bring with them the jolt of sudden change but they can also spur progress on. They bring with them conflict but also harmony. They bring with them unknowns but also insight. Mergers mean coping with and managing change. But then is not one of life’s constants change itself?

V

Roger R. Nelson
Ernst & Young

Good Afternoon!

Why Merge

Professional services firms face significant challenges from the external environment in terms of *globalization, regulation, deregulation, privatization, specialization*, and rapid *technological change*. In addition, we must face the internal challenges of *client service, quality, productivity*, and *cost*. Succeeding in the professional services business depends on how we succeed with these challenges. It will not suffice simply to respond to them, but to constantly adjust our course.

Let me comment on why I'm talking about professional services firms rather than CPA firms. The demand for tax and management consulting services is growing at a faster rate than the demand for audit services, so these services are becoming more important as avenues for growth. As a matter of interest, I spent the past 20 years of my 29 working years primarily in international operations and consultation after starting in audit.

Increasingly, clients are looking to us to view their business issues from a business advisory perspective. To respond to this demand from the marketplace, we are expanding our vision of the business to include a broader range of financial, operational, and information management skills and services.

Competition for professional services has been intensifying and this will continue. Ten years ago, as CPA firms, we could not advertise or solicit business. Now, we compete in developing business relationships worldwide, and competing against a wide variety of professional services firms. These firms include our traditional Big Six competitors, and increasingly, non-traditional competitors like investment and commercial banks, law firms, and various consulting firms.

Globalization of Markets

Let's look at some other forces transforming the marketplace. We're experiencing the birth of a truly global business environment. Long-standing trade barriers are being eliminated, new markets are opening, and joint ventures are criss-crossing national boundaries. Globalization will be the watchword of the 1990s. The ability to attract and retain major accounts depends on the depth of your worldwide resources.

1992 – the U.S.-Canada Free Trade Agreement – emerging world markets, and cross-border offerings are rapidly establishing global free trade. Enormous business opportunities are emerging from these initiatives. Most recently, we have witnessed remarkable social and political events in the Soviet Union, East Germany, and Hungary which have profound implications. As a matter of interest, I feel professional services is one of the few areas the U.S. has a true competitive advantage and a lead on foreign competition.

In Continental Europe, a unified, deregulated market of 320 million people is well on its way to becoming a reality. Even before 1992, the transition to a fully integrated European market is creating increased activity. Companies are recognizing the need to move quickly and intelligently to position themselves to benefit from this enormous market. The need for strong, leading edge practices outside the U.S. *was a driving force in our merger.*

Speaking of competition, let's not neglect to mention the importance of Japan. The tremendous growth in Japan's stature and influence in the global business community is shown by statistics pertaining to the top 10 worldwide banks by size. Twenty years ago, there were six U.S. banks on the list, and none from Japan. Today, there are eight from Japan, and none from the U.S.

These market forces were an important consideration in our forming Ernst & Young. Our clients are demanding greater levels of service and industry expertise from their business advisors in every market as they move toward global operations. The merger gives us extensive professional serv-

ice capabilities to meet and anticipate our clients' needs worldwide. Meeting the needs of clients, no matter where they do business, is a fundamental reason for mergers of professional services firms. Meeting those needs with a depth of service capability is essential. Mergers are driven by these objectives.

Globalization has led us to develop: a strong worldwide firm; industry and functional capabilities to help multinational corporations address financial, operational, and information management needs; a single worldwide audit approach; and the ability to coordinate audit teams no matter where located. Multinationals want outstanding resources in places like Nigeria, Korea, Thailand. The merger also allows us to accelerate our response to the opportunities provided in the worldwide market.

Competitive Position

While the opportunities are significant for professional services firms, so are the competitive threats. For professional services firms, market position is critical to being competitive. This is true for geographic, industry, and functional markets. Building position generally requires significant investment and time. Mergers are one way to quickly gain the critical mass needed in target markets to improve market position and needed to develop service capabilities that can be responsive to the most significant and complex client issues. The merger has given us greater geographic coverage in functional specializations by industry, allowing us to take advantage of more market opportunities by providing more services to clients.

Compatibility

In order for merged firms to take proper advantage of these opportunities, the merging firms must be compatible in international and domestic geographic markets, in industry markets, and in functional markets. The merging firms must also be compatible in goals, strategies, and values. Otherwise the merger may cause as many problems as it solves. Compatibility was a prime consideration in planning Ernst & Young.

Client Service

There are a number of other important reasons for mergers that are client-related. Clients increasingly seek help dealing with a variety of complex business issues, including:

- Industry-specific issues,
- Technology issues,
- Operations issues, and
- Finance issues.

We know that industry experience is the single most sought-after trait among clients looking for a firm like ours. And, clients also want quality service at reasonable fees. The critical mass created makes it easier to specialize, and it accelerates the ability to identify market needs and respond to opportunities.

In the case of Ernst & Young, our recent merger better positions us to help clients by deepening and broadening our functional and industry service capabilities. It allows us to better provide services when and where they are needed in technical specialties within targeted industry practices such as financial services and health care. The expanded services available are important to clients of all sizes, not just large multinationals, but mid-size companies and others as well.

Financial Implications

Another reason for mergers is that they help increase efficiency. The resulting firm is better positioned to use its resources more effectively as a result of greater economies of scale. Moreover, there are opportunities for rationalization in the administrative area, and for enhancing service. A larger base is available to support significant investments in the audit, tax, and consulting practices for future growth and profitability. Specifically:

- There can be increased investments in productivity, quality, research, education and training, marketing, and proprietary software.
- Management information systems can be combined and enhanced, which is the case with Ernst & Young.
- Offices in the same city can be merged, however, long term leases and the cost of negotiating new ones make this complex.

“Corporate Citizenship”

Merged firms also are generally in a better position to act as good corporate citizens by making greater contributions to the community. For example, we are the sponsor of the U.S. Olympic Job Opportunity Program in which we are helping 400 U.S. Olympic athletes obtain career-oriented employment.

Worldwide, we have been authorized by the Nobel Foundation to sponsor the Nobel Prize Services of programs, consisting of the Nobel Prize ceremonies telecast, and the Nobel video and curriculum library for high schools and colleges.

Human Resources

In the human resources area, media coverage of mergers tends to focus on people displacement, and rarely mentions the opportunities mergers present to the people involved. The expanded capabilities of a merged firm should be attractive in the marketplace.

The merger impacts people, management, processes, systems – and most people have some difficulty with change. On the other hand, it has allowed us to use a clean sheet of paper to design what is needed, going forward.

What, then, is the bottom line? Our merger has significantly strengthened our firm and the profession. We can now *invest in the people* and *technology* to keep up with the challenges of our changing business environment.

James K. Loebbecke

University of Utah

I have been invited to this conference to present my views on the fact of the recent mergers among large accounting firms. These mergers present a number of interesting questions and issues. Certainly, they are complex and it is unlikely that their impact can be discernable until a significant period of time passes. In order to accomplish the goals of this paper, I have chosen to focus on the possible impact of the mergers on the quality of audits. In fact, my views are really in the nature of concerns that arise from firm size, whether the result of merger or growth from other sources. I will present these concerns along three lines of reasoning.

1. Too Much Help

One of the reasons that firms merge is to marshal more and better developmental resources. When national staffs are assembled for the purpose of research and development, naturally they undertake activities consistent with that purpose. In today's environment, that means developing more, and more sophisticated, computer-based audit decision aids. These tools should improve both the effectiveness and the efficiency with which audits are performed, and provide greater consistency across the firm's practice. However, they also may provide certain negative effects:

- First, sophisticated audit tools require training for proper use. There may be a risk that if the cost of that training is great, a firm will fail to provide it on a comprehensive and/or timely basis. This could result in improper implementation and misuse of the tools.
- Second, use of decision aids may cause auditors to become mechanistic in their approach to the audit. Their focus may fall on completing the questionnaire or getting the computer program to work rather than on accomplishing the audit objective. They may fail to understand the concepts and processes that underlie the tools, and this may result in failure to recognize aberrations to the situations the tools were designed for and how to deal with them.
- Finally, use of decision aids may preclude auditors from developing experience of the type required to make higher-level judgments. In other words, if the auditor's efforts are aimed at successful use of the decision aids, those efforts may supplant other types of experiences that are more instructive in nature.

2. Growth, Growth, Growth

Large firms seem to need to keep growing. I see at least two reasons for this. First, there appears to be an economically-based growth spiral in effect. Firms need to hire and provide incentives to top-notch people in order to stay competitive. This requires that new opportunities exist for those people.

Those opportunities can be created by acquiring new clients and engagements. In addition, as a firm grows, so do the number of its partners. In turn, as time passes, the number of retired partners increases significantly. A growing pool of current and future retired partners carries with it a significant pension funding obligation. In order to meet that obligation and at the same time adequately compensate working partners, the firm must maintain increasing profits over time, which requires growth.

In addition to the economic spiral, or perhaps because of it, there seems to be an attitude of competitiveness among members of large accounting firms that motivates growth. It might be expressed as a “grow or die” philosophy; or a belief that bigger firms are inherently superior to smaller firms, so growth is a means of becoming the best among the large firms.

I see several potentially negative effects from an over-orientation towards growth:

- First, it may cause pressure to free partner time to devote to practice development, which in turn results in delegation of engagement responsibilities to lower staff levels. This may reduce audit quality.
- Second, it may serve as a motivation to accept marginal clients. This could have several ramifications. For example, clients may be obtained that have dishonest management who could effectively deceive the auditor. Or, the client acceptance might be rationalized by understating the real risks associated with the client, thereby increasing the audit risk incurred.
- Growth may cause increased specialization. On the one hand, that could be beneficial to an audit practice, but on the other hand, it could go too far and result in a lack of auditors who can provide a broad perspective to managing audit engagements.
- It’s possible that partners or managers who are not effective business developers will be pressured or culled out of the firm. These may, however, be persons who have strong technical skills. Over time, this could seriously deplete a firm’s technical resources.
- There may be pressure on audit partners to “go beyond the audit” and be a “true financial advisor” to the client. This could cause the partner to lose his or her objectivity in conducting audits.

3. Unbalancing the Risk-Reward Relationship

The area of practice that has the greatest potential for growth is consulting. Not only is the market broader in terms of service opportunities, profit margins are greater than for audit services. Some firms follow a strategy of providing audit services for artificially low fees in order to create opportunities for higher-profit consulting work. As a firm expands in consulting, and audit is relatively stable, one could expect mounting economic pressures within the firm to allocate earnings in proportion to contribution, i.e., more earnings to consulting partners and less to audit partners.

At the same time, audit partners are subject to greater risk than consultants due to the nature of auditing and the related liability that exists, including criminal liability. Thus, the situation exists where the risk-reward relation-

ship for partners in the audit practice of a firm can become severely out of balance. Better audit partners will respond to this by leaving the audit practice, which in turn will negatively effect audit quality.

4. Summary and Conclusion

The purpose of my remarks has been to indicate a series of concerns that I have about some potential negative effects on the quality of auditing that could arise from the extensive growth of large public accounting firms. In doing this, it is not my intention to suggest that mergers and growth should be disallowed. Rather, I am attempting to suggest that large firms must be sensitive to these problems and control them through effective management. This may be problematical, however, because of all of the urgencies affecting management during the period of a large merger as well as the fact that the problems I have cited are essentially behavioral in nature and difficult to deal with.