L'Association Canadienne des Professeurs de Comptabilité
The Canadian Academic Accounting Association

COMPTE RENDU
PROCEEDINGS

CONGRES ANNUEL DE 1986
1986 ANNUAL CONFERENCE

Mai 1986 / May 1986

L'Université du Manitoba
The University of Manitoba
Winnipeg

PROCEEDINGS OF THE 1986 ANNUAL CONFERENCE

COMPTE RENDU DU CONGRES ANNUEL DE 1986

THE CANADIAN ACADEMIC ACCOUNTING ASSOCIATION

TORONTO

1986

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L'Association Canadienne des Professeurs de Comptabilité
The Canadian Academic Accounting Association

September 30, 1986

**To the Members of the
Canadian Academic Accounting Association:**

These proceedings contain the program, paper abstracts and many of the papers presented at the 1986 Annual Conference of the Canadian Academic Accounting Association held at the University of Manitoba, May 28th and 29th. Some of the research papers have not been included in this volume at the request of the authors.

The program consisted of invited papers, and papers received in response to the general call. Twenty-two papers were received in response to the general call, of which ten were accepted following a review by two referees.

Many persons contributed to the planning and to the presentation of this conference. The 1985-86 CAAA Executive under the chairmanship of Len Brooks, the Education and Research Committees chaired by Morley Lemon and William Scott respectively, the local arrangements chairman Murray Hilton, and the CAAA Administrative Officer Barbara Jaeger, all contributed significantly. Thirty-three persons played a critical role in refereeing the papers received in response to the general call. A list of the referees and their university or business affiliation follows. We acknowledge especially those who presented the invited and submitted papers, and we thank all those who responded to the general call but whose papers could not be included in the program. A final acknowledgement is appropriate to the one hundred and eight members who attended the conference and by their presence and involvement contributed to its success.

We trust that this conference and the papers contained in these proceedings will further the development of accounting and accounting education in Canada.

Yours sincerely,

George C. Baxter

George C. Baxter, Ph.D., C.A.
Professor of Accounting
University of Saskatchewan
1986 CAAA Conference Program Chairman

GCB:vaf

L'Association Canadienne des Professeurs de Comptabilité
The Canadian Academic Accounting Association

Le 30 septembre 1986

A l'intention des membres de l'Association canadienne des professeurs de comptabilité:

Vous trouverez ci-joint le programme du congrès 1986 de notre Association tenu à l'Université du Manitoba les 28 et 29 mai. Nous y avons joint les résumés des mémoires qui y ont été présentés ou dans certains cas leur texte intégral. A la demande de leurs auteurs, certains mémoires n'ont pas été inclus.

Les mémoires présentés lors du congrès avaient fait l'objet d'une sollicitation individuelle ou générale. Des vingt-deux mémoires reçus en réponse à notre sollicitation générale, dix ont été acceptés après examen par deux arbitres.

De nombreuses personnes ont contribué de façon significative à la préparation et la présentation de ce congrès, le bureau exécutif 1985/86 de notre Association, présidé par Len Brooks, les Comités d'enseignement et de recherche présidés respectivement par Morley Lemoi et William Scott, le président du Comité des arrangements sur place, Murray Hilton et l'adjointe administrative de notre Association, Barbara Jaeger. Trente trois personnes ont accepté de juger les mémoires reçus en réponse à notre sollicitation générale. Vous trouverez plus loin les noms de ces arbitres ainsi que ceux de leur université ou compagnie. Si nous sommes particulièrement reconnaissants à ceux qui ont présenté des mémoires, nous aimerions également remercier tous ceux qui nous ont soumis des textes ainsi que les cent huit participants qui ont permis de faire de ce congrès une réussite.

Nous avons bon espoir que ce congrès et les mémoires présentés contribueront à l'avancement des sciences comptables et à leur enseignement au Canada.

George C. Baxter

George C. Baxter, Ph.D., C.A.
Professeur de comptabilité
Université de la Saskatchewan
Président du congrès 1986 de l'A.C.P.C.

CCB/cs

Referees of papers submitted for the 1986 Annual Conference in Winnipeg

Arbitres des mémoires soumis pour le Congrès 1986 à Winnipeg

Names - Noms	Universities or Affiliations Universités ou institutions affiliées
Derek Ackland	Concordia
Joel Amernic	Toronto
Ross Archibald	Western
Tom Beechy	York
John Brennan	Saskatchewan
Dominique Charron	Concordia
Dick Chesley	Dalhousie
John Courtis	Waterloo
Murray Davis	Calgary
Jerry Feltham	UBC
Leo Gallant	St. Francis Xavier
Mike Gibbins	Alberta
Barry Hicks	Laurentian
Wayne Hopkins	Regina
John Hughes	UBC
Bruce Irvine	Saskatchewan
Judy Kehler	Saskatchewan
Morley Lemon	Waterloo
Daryl Lindsay	Saskatchewan
Norman Lloyd	Concordia
Norm MacIntosh	Queen's
Alex Milburn	Clarkson Gordon
George Murphy	Saskatchewan
James Newton	Alberta
John Parker	Dalhousie
David Pendrill	Saskatchewan/Cardiff
David Quirin	Toronto
Pamela Ritchie	UNB
Chris Robinson	York
Pierre Royer	HEC
Harold Silvester	Saskatchewan
Wally Smieliauskas	Toronto
Dan Thornton	Toronto

L'Association Canadienne des Professeurs de Comptabilité
The Canadian Academic Accounting Association

1986 CONFERENCE PROGRAM

University of Manitoba, Winnipeg

Tuesday, May 27

From 8:00 a.m. — **Registration** at University Centre

7:00-10:00 p.m. — **CAAA Welcome Reception**
(Sponsored by John Wiley & Sons, Canada)
Speechly Hall, University of Manitoba

Wednesday, May 28 (Simultaneous Translation Available, Room 240)

From 8:00 a.m. — **Registration** at University Centre

9:00- 9:15 a.m. — **Welcome** - Len Brooks, CAAA President
- Dean Roland Grandpre, University of Manitoba
Location: Room 240 University College

9:15-10:30 — **Plenary Session**: "The Expectations Gap"
Location: Room 240 University College
Chairperson: George Baxter, University of Saskatchewan
Speaker: Wm. R. Kinney, Jr., Price Waterhouse Auditing Professor and Director of Research of the American Accounting Association.
Discussant: W. W. Buchanan, FCA, General Director of Research, Canadian Institute of Chartered Accountants

10:30-10:45 a.m. — **Break** (Refreshments at all breaks are compliments of Prentice Hall)

10:45-12:00 noon — **Concurrent Sessions I a and I b**

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Session I a

Location: Room 240 University College
Chairperson: Yvon Houle, Université du Québec à Montréal.

Pierre Smith, École des Hautes Études Commerciales
"L'Information Financière Prévisionnelle: Un Support Quantitatif."

Jeffrey Kantor, University of Windsor
Teviah Estrin, University of Windsor
"The Usefulness of Management Accounting Education: Future Management Accounting Practitioners are not Getting What They Need!"

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Session I b

Location: Room 237 University College
Chairperson: W. Morley Lemon, Peat, Marwick, Mitchell, & Co., Toronto.

Dan Simunic, University of British Columbia
Michael Stein, University of British Columbia

"Product Differentiation in Auditing: A Study of Auditor Choice in the Market For New Issues."

Don Leslie, Clarkson Gordon, Toronto
Steve Aldersley, Clarkson Gordon, Toronto
Don Cockburn, Clarkson Gordon, Toronto
Carolyn Reiter, Clarkson Gordon, Toronto

"An Assertion-Based Approach to Auditing."

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12:00- 2:00 p.m. **CAAA Awards Luncheon**, Sponsored by Certified General Accountants Association
Location: Great Hall, University College
Chairperson: Len Brooks, President CAAA
Presentation of Awards
Address by Dr. Robert Sprouse, past member U.S. Financial Accounting Standards Board

2:00- 3:15 p.m. **Concurrent Sessions II a and II b**

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Session II a

Location: Room 240 University College
Chairperson: Derek Acland, Concordia University

Thérèse Tremblay, École des Hautes Études Commerciales

"Une Etude Internationale des Pratiques Comptables de Présentation d'Information Comptables Relatives aux Activités Internationales des Multinationales et Leurs Associations avec Leur Structure Organisationnelle."

Wm. Richardson, McMaster University

"Allocation of Capital Lease Liabilities Between Current and Non-Current Classifications - Canadian Requirements and Practice."

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Session II b

Location: Room 237 University College
Chairperson: George Murphy, University of Saskatchewan

Alan Macnaughton, University of Waterloo

"Minimizing Tax on Capital Gains on Principal Residences: A Mathematical Approach."

Duane Kennedy, Doctoral Student, Cornell University

"Classification Techniques for Accounting Research."

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3:15- 3:30 p.m. **Break**

3:30- 5:00 p.m. **CAAA Annual Meeting**
Location: Room 240 University College
Chairperson: President Len Brooks
Business: CAAA Committee Reports
Address: Wm. R. Kinney, Jr.

5:00- 7:30 p.m. **CAAA Members Reception**
(Sponsored by the Canadian Institute of Chartered Accountants and the Institute of Chartered Accountants of Manitoba)
Location: Great Hall, University College

Thursday, May 29

9:00-10:15 a.m. **Plenary Session:** "Artificial Intelligence and Expert Systems"
Location: Room 240 University College
Chairperson: Jacques Fortin, École des Hautes Études Commerciales
Speakers: J. Efrim Boritz, University of Waterloo
Steve Aldersley, Clarkson Gordon, Toronto

10:15-10:30 a.m. **Break**

10:30-11:45 a.m. **Concurrent Sessions III a and III b**

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Session III a

Location: Room 240 University College
Chairperson: Ken Clowes, University of Manitoba

Ira Solomon, University of Illinois at Urbana-Champaign

"Group Decision Making in Auditing: Some Methodological Considerations."

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Session III b

Location: Room 237 University College
Chairperson: Irene Gordon, Simon Fraser University

Tom Beechy, York University

"'International Accounting' in the Accounting Curriculum."

Discussant: Anne Fortin, Université du Québec à Montréal

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12:00- 1:30 p.m. **CAAA Members Luncheon**
(Sponsored by the Society of Management Accountants of Canada)
Location: Pembina Hall Dining Room
Chairperson: Alex Milburn, Clarkson Gordon, Toronto

1:45- 3:00 p.m. **Concurrent Sessions IV a and IV b**

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Session IV a

Location: Room 240 University College
Chairperson: Wayne Hopkins, University of Regina

Michael Gibbins, University of Alberta

"Developing a Business Needs-Oriented Introductory Undergraduate Financial Accounting Course."

Discussant: Steve Glover, Institute of Chartered Accountants of Alberta

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Session IV b

Location: Room 237 University College
Chairperson: Murray Davis, University of Calgary

Alan Richardson, University of Alberta

"Homage to Santa Rosalia or Why Are There So Many Kinds of Accounting Associations?"

Brian Gaber, University of Waterloo

"A Representational Model of Audit Judgment in Evaluating Controls."

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3:00- 3:15 p.m. **Break**

3:15- 4:30 p.m. **Concurrent Sessions V a and V b**

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Session V a

Location: Room 240 University College
Chairperson: Chris Robinson, York University

Wm. Scott, University of Waterloo

"Report on Demand and Supply Survey of Canadian Ph.D.'s in Accounting, 1985."

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Session V b

Location: Room 237 University College
Chairperson: Joel Amernic, University of Toronto

Donald Brown, Brock University
Richard Burke, University of Saskatchewan

"Accounting Education: A Learning Styles Study of Professional Technical and Future Adaptation Issues."

Robert Bloom, Concordia University
J. J. Segovia, Concordia University

"Applying the Case Method with Guided Design and CoRT Techniques to Accounting Instruction."

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THE CAAA WOULD LIKE TO THANK THE SSHRCC FOR AN "ATTENDANCE GRANT" WHICH IS HELPING TO DEFRAY THE TRAVEL COSTS OF CONFERENCE ATTENDEES.

L'Association Canadienne des Professeurs de Comptabilité
The Canadian Academic Accounting Association

PROGRAMME DU CONGRES DE 1986
A L'UNIVERSITE DU MANITOBA, WINNIPEG
du 27 au 29 mai 1986

Mardi 27 mai

A partir de 8 h	Inscription au Centre universitaire
19 h à 22 h	A.C.P.C. Soirée d'accueil (parrainée par John Wiley & Sons, Canada) Speechly Hall, Université du Manitoba

Mercredi 28 mai (Interprétation simultanée sera fournie aux participants dans la salle 240)

A partir de 8 h	Inscription au Centre universitaire
9 h à 9 h 15	Discours de bienvenue - Len BROOKS, président de l'A.C.P.C. - Doyen Roland GRANDPRE, de l'Université du Manitoba Salle 240, University College
9 h 15 à 10 h 30	Séance plénière: "The Expectations Gap" Salle 240, University College Président: George BAXTER, Université du Saskatchewan Conférencier: W.R. KINNEY, Jr., professeur Price Waterhouse en vérification et directeur de la recherche de l'American Accounting Association. Participant: W.W. BUCHANAN, F.C.A., directeur général de la recherche, Institut canadien des comptables agréés.
10 h 30 à 10 h 45	Pause-café (Prentice-Hall fournira les rafraîchissements pendant le congrès)
10 h 45 à 12 h	Deux séances simultanées Séance Ia, Salle 240, University College. Président: Yvon HOULE, Université du Québec à Montréal Pierre SMITH, Ecole des Hautes Etudes Commerciales: "L'information financière prévisionnelle: un support quantitatif."

L'A.C.P.C. TIENT À REMERCIER LA S.S.H.R.C.C. POUR SA SUBVENTION DESTINÉE À DÉFRAYER UNE PARTIE DES FRAIS DE VOYAGE POUR LES PARTICIPANTS AU CONGRÈS.

Jeffrey Kantor, University of Windsor
Teviah ESTRIN, Université de Windsor: "The Usefulness of Management Accounting Education: Future Management Accounting Practitioners are not Getting What They Need!"

Séance Ib, Salle 237, University College

Président: W. Morley LEMON, Peat, Marwick, Mitchell & Co., Toronto

Dan SIMUNIC, Université de Colombie Britannique; Michael STEIN, Université de Colombie Britannique: "Product Differentiation in Auditing: A Study of Auditor Choice in the Market for New Issues."

Don LESLIE, Clarkson Gordon, Toronto; Steve ALDERSLEY, Clarkson Gordon, Toronto; Don COCKBURN, Clarkson Gordon, Toronto; Carolyn REITER, Clarkson Gordon, Toronto: "An Assertion-Based Approach to Auditing."

12 h à 14 h — Déjeuner en l'honneur des lauréats des prix de l'A.C.P.C. (parrainé par l'Association des comptables généraux agréés du Canada)
Great Hall, University College

Président: Len BROOKS, président de l'A.C.P.C.
Présentation des prix
Allocution par Dr. Robert SPROUSE, ancien membre du Financial Accounting Standards Board des Etats-Unis.

14 h à 15 h 15 — Deux séances simultanées

Séance IIa, Salle 240, University College

Président: Derek Acland, Université Concordia

Thérèse TREMBLAY, Ecole des Hautes Etudes Commerciales: "Une étude internationale des pratiques comptables de présentation d'informations comptables relatives aux activités internationales des multinationales et leurs associations avec leur structure organisationnelle."

W. RICHARDSON, Université McMaster: "Allocation of Capital Lease Liabilities between Current and Non-Current Classifications - Canadian Requirements and Practice."

Séance IIb, Salle 237, University College

Président: George MURPHY, Université du Saskatchewan

Alan MACNAUGHTON, Université de Waterloo: "Minimizing Tax on Capital Gains on Principal Residences: A Mathematical Approach."

Duane KENNEDY, étudiant en doctorat, Université Cornell: "Classification Techniques for Accounting Research."

15 h 15 à 15 h 30 Pause-café

15 h 30 à 17 h Réunion annuelle de l'A.C.P.C.
Salle 240, University College

Président: Len BROOKS
Sujet: Rapports des comités de l'A.C.P.C.
Allocution: W.R. KINNEY Jr.

17 h à 19 h 30 Réception des membres de l'A.C.P.C.
Great Hall, University College
(parrainée par l'Institut canadien des comptables agréés et l'Institut des comptables agréés du Manitoba)

Jeudi 29 mai

9 h à 10 h 15 Séance plénière: "Artificial Intelligence and Expert Systems."
Salle 240, University College

Président: Jacques FORTIN, Ecole des Hautes Etudes Commerciales
Conférenciers: J. Efrim BORITZ, Université de Waterloo
Steve ALDERSLEY, Clarkson Gordon, Toronto

10 h 15 à 10 h 30 Pause-café

10 h 30 à 11 h 45 Deux séances simultanées

Séance IIIa, Salle 240, University College

Président: Ken CLOWES, Université du Manitoba

Ira SOLOMON, Université de l'Illinois à Urbana-Champaign: "Group Decision Making in Auditing: Some Methodological Considerations."

Séance IIIb, Salle 237, University College

Président: Irene GORDON, Université Simon Fraser

Tom BEECHY, Université York: "'International Accounting' in the Accounting Curriculum."

Participante: Anne FORTIN, Université du Québec à Montrèal.

12 h à 13 h 30 — Déjeuner des membres de l'A.C.P.C.
Pembina Hall Dining Room
(parrainé par la Société des comptables en management du Canada)

Président: Alex MILBURN, Clarkson Gordon, Toronto

1 h 45 à 15 h — Deux séances simultanées

Séance IVa, Salle 237, University College

Président: Wayne HOPKINS, Université de Régina

Michael GIBBINS, Université de l'Alberta: "Developing a Business Needs-Oriented Introductory Undergraduate Financial Accounting Course."

Participant: Steve GLOVER, Institut des comptables agréés de l'Alberta

Séance IVb, Salle 237, University College

Président: Murray DAVIS, Université de Calgary

Alan RICHARDSON, Université de l'Alberta: "Homage to Santa Rosalia or why are there so many kinds of Accounting Associations."

Brian GABER, Université de Waterloo: "A Representational Model of Audit Judgment in Evaluating Controls."

15 h à 15 h 15 — Pause-café

15 h 15 à 16 h 30 — Deux séances simultanées

Séance Va, Salle 240, University College

Président: Chris ROBINSON, Université York

W. SCOTT, Université de Waterloo: "Report on Demand and Supply Survey of Canadian Ph.D.'s in Accounting, 1985."

Séance Vb, Salle 237, University College

Président: Joel AMERNIC, Université de Toronto

Donald BROWN, Université Brock; Richard BURKE, Université du Saskatchewan: "Accounting Education: A Learning Styles Study of Professional Technical and Future Adaptation Issues."

Robert BLOOM, Université Concordia; J.J. SEGOVIA, Université Concordia: "Application of the Case Method to Accounting Instruction."

L'Association Canadienne des Professeurs de Comptabilité
The Canadian Academic Accounting Association

ABSTRACTS

1986 CAAA ANNUAL CONFERENCE

THE UNIVERSITY OF MANITOBA

WINNIPEG

May 27 - May 29, 1986

ACPC Secrétariat / CAAA Secretariat (416) 828 - 5461
Room 34E, Crossroads Building, Erindale Campus, University of Toronto, 3359 Mississauga Rd., Mississauga, Ontario, Canada, L5L 1C6

ABSTRACTS
(Presented in Order of Sessions)

CONCURRENT SESSION I(a) - Wednesday May 28, 10:45 a.m.

Financial Forecasts: Quantitative Support

(Pierre Smith, Ecole des Hautes Etudes Commerciales)

Over the last few years, members of the accounting profession in such countries as Great-Britain, the United States and Canada have analyzed the issue of disclosure of financial forecasts. Among the problems raised, the quality (accuracy/correctness) of the forecasts and the participation of the auditor in the "substantive procedure" used to test the disclosure remain important issues that are still unresolved. The Box-Jenkins/ARIMA methodology has been suggested as a possible solution to these problems.

Carrying on the previous research done in the U.S., this monograph presents an experiment in statistical modelling done on a sampling of 31 Canadian firms. Quarterly "operating income" time series from 1969 to 1984 have been analyzed, using the Box-Jenkins/ARIMA methodology and later on compared, for their "modelling" as well as their "forecasting" capabilities, to different models based on the mean characteristics of the sample.

Taking into account the limits of the sampling and the time span studied, the results, as far as the "modelling" aspect is concerned, favor the ARIMA analysis by firm. Those dealing with the "forecasting capability" aspect do not allow us to come to any definite conclusions on the relevance of these different approaches. Further research is needed.

CONCURRENT SESSIONS I(b) - Wednesday May 28, 10:45 a.m.

Product Differentiation in Auditing: A Study of Auditor Choice in the Market for New Issues

(Dan Simunic and Michael Stein, University of British Columbia)

A fundamental issue with respect to the market for audit services is whether or not such services are homogeneous across suppliers. This question is important because it affects the manner in which many market phenomena are interpreted. In this monograph, we begin by reviewing the basic principles and findings concerning differentiated product markets as they have been developed in the economics literature. Using Lancaster's characteristics framework, we posit that the audit service contains three principal attributes - labeled control, credibility and product line - valued by the top management

of a company. An audit firm may be able to concurrently produce different engagement-specific quantities of control and product line to satisfy the demands of different clients. However, because the audit production process is not observable to outsiders, it is limited to producing a single level of credibility at a moment in time, which is communicated through the firm's brand name. Thus, the choice of credibility level is the principle determinant of auditor choice by top management.

Identifying credibility with the power of the auditor's tests, we develop hypotheses concerning the demand for credibility based on differences in the prior probability that financial statements contain material errors and differences in the effect of errors on user wealth. These hypotheses are tested using a sample of 469 U.S. companies which first offered common shares to the public during 1981. We identify a number of systematic determinants of the auditor choices of these companies and conclude that audit services are not homogeneous across audit firms. We also find that auditor choice in this context appears to be strongly influenced by the degree of uncertainty surrounding the future cash flows of the company issuing the securities.

An Assertion Based Approach to Auditing

(D.A. Leslie, S.J. Aldersley, D.J. Cockburn and C.J. Reiter, Clarkson Gordon)

This paper is an exposition of a comprehensive audit methodology based upon an assertion-oriented strategy. It begins with a very brief description of the history of the assertion concept. The elements of an audit strategy are identified and used to organize an explanation of the assertion-oriented strategy into a discussion of the sources of audit assurance, assertion-procedure links and the effect of the accounting model on the audit process. Audit evaluation is presented as the driving concept that underlies the audit planning process. It then describes how these elementary concepts can be operationalized in a practical audit methodology and briefly explain an approach to automating the process using microcomputer software. It closes with some thoughts on the future evolution of audit methodology.

Copies of the paper will be available to those attending the session.

CONCURRENT SESSIONS II(a) - Wednesday May 28, 2:00 p.m.

Allocation of Capital Lease Liabilities Between Current and Non-Current Classifications — Canadian Requirements and Practice

(A.W. Richardson, McMaster University)

Section 3065 of the CICA Handbook states that a "...lessee should account for a capital lease as an asset and an obligation". Among the various requirements for statement presentation and disclosure for a capital lease is the specification that "(a)ny portion of lease obligations payable within a year out of current funds should be included in current liabilities". However, there is no specific statement as to how the total

capital lease obligation is to be allocated between current and non-current liabilities. The only guidance is provided in the examples in Appendix A of Section 3065. Examination of the two case studies shows that case study A follows what has been termed the "present value of the next year's payments" approach whereas case study B follows the "change in present value" approach. Thus it appears that the CICA Handbook implicitly sanctions two approaches to this particular allocation.

This issue of allocating a capital lease obligation between current and non-current classifications is examined in this paper. First, the differences between the two approaches and the information resulting from them is considered. Although the difference between the valuations obtained for the current liability of a capital lease obligation by the two methods is significantly different in many cases, no arguments which, on balance, support one approach rather than the other are apparent. Second, the relative frequency of use of the two approaches in current Canadian financial reporting is examined using a sample of larger Canadian companies which reported sufficient information on their capital leases to allow analysis. The results obtained lead to the conclusion that the "change in present value" approach is dominant; in fact, no evidence for use of the "present value of the next year's payments" approach is found. Third, the impact on financial statement analysis of using one approach rather than the other approach is investigated. Although a completely general analysis of the question can not be made, the particular analysis done leads to the conclusion that use of one approach rather than the other approach to determination of the current portion of capital lease obligations is unlikely to have a significant impact on financial statement analysis.

A final conclusion resulting from this study is that Canadian financial reporting practice for the allocation of capital lease obligations between current or non-current classifications and the likely impact of a change in approach to this allocation are the same as found earlier for the U.S.A.

A Study of International Accounting Practices... see end of section

CONCURRENT SESSIONS II(b) – Wednesday May 28 – 2:00 p.m.

Minimizing Tax on Capital Gains on Principal Residences: A Mathematical Approach

(Alan Macnaughton, University of Waterloo)

It is not uncommon for a taxpayer or a family unit to own and occupy more than one dwelling, such as a city house and a cottage. In such situations, Canadian tax law generally requires the inclusion in income for tax purposes of at least part of the capital gains realized on the sale of the dwellings. More precisely, the income inclusion on the sale of a particular dwelling is a decreasing function of the number of years that the taxpayer chooses to designate that dwelling as his or her principal residence. The tax planning problem is that only one dwelling can be designated as a principal residence in any year.

This paper solves the above tax planning problem using mathematical methods. The taxpayer is assumed to wish to minimize the present value of taxes payable on the sale of the dwellings. The constraints of the problem are the applicable tax rules. Using the Kuhn-Tucker therem in non-linear programming, an analytical solution to the problem is derived. This solution can be implemented using hand calculations or a computer spreadsheet.

The mathematical methods used in this paper may be useful in solving other complex but well-defined tax planning problems.

Classification Techniques for Accounting Research

(Duane Kennedy, Ph.D. Candidate, Cornell University)

Many accounting research problems involve classification of observations into discrete categories. Examples of such problems include the prediction of bond ratings, classification of outstanding bank loans, and the study of managments' choice of accounting methods. There are a number of statistical techniques that can be used to classify observations into categories. This paper identifies and describes five classification techniques that can be used in problems involving more than two categories. The assumptions and characteristics of each technique are discussed. The techniques are:

1. multiple discriminant analysis
2. McKelvey & Zavoina n-chotomous probit.
3. Walker & Duncan ordinal logit
4. multinomial logit
   4A) Nerlove & Press polytomous logit
   4B) McFadden conditional logit
5. classification trees.

PLENARY SESSION - Thursday May 29, 9:00 a.m.

Artificial Intelligence and Expert Systems

(Efrim Boritz, University of Waterloo and Steve Aldersley, Clarkson Gordon)

"Expert systems" is a field of research that is considered a sub-set of the general research area called artificial intelligence. An expert system is a special type of computer-based decision-support system. It uses a knowledge base and inference procedures to solve problems difficult enough to require significant human expertise for their solution.

Although some of these problems may be subject to algorithmic solutions, such solutions may be impractical to implement due to their computational complexity or due to finite limits on computing resources.

Expert systems contain heuristics (i.e., "short cuts") derived from the study of expert behaviour which permit satisfactory solutions to difficult problems to be obtained.

The quality of an expert system is largely determined by the quality of its knowledge-base; i.e., the facts and heuristics encoded therein.

This session will provide an introductory overview of expert systems concepts and summarize the current state of accounting reseach in this area. Implications for future research and professional practice will also be discussed.

CONCURRENT SESSION III(a) – **Thursday May 29, 10:30 a.m.**

Group Decision Making in Auditing:
Some Methodological Considerations

(Ira Solomon, University of Illinois)

Over the last 10-15 years, a great deal of research has investigated how and how well auditors make judgments and decisions. Despite the fact that many real-world audit judgments and decisions are made in a multi-person setting, however, virtually all of this research has been single-person oriented. Since it is well documented in the psychology and social psychology literatures that the results of studies of individual judges and decision-makers typically have limited applicability to groups or teams, the single-person orientation of auditing studies has been criticized for constraining our ability to learn about auditing and auditors as they appear outside the laboratory.

The extant research literature contains only a few studies of audit teams or groups. Following a discussion of the attributes of the type of audit teams and groups that one observes in practice, these studies will be reviewed. This review will culminate with an assessment of the "State-of-the-Art" as well as some suggestions for future research. Subseqeuntly, there will be discussion of issues involved in the design and execution of the type of studies that will have been suggested. The session will conclude with a question and answer period.

CONCURRENT SESSION III(b) – **Thursday May 29, 10:30 a.m.**

"International Accounting" in The Accounting Curriculum

(Thomas H. Beechy, York University)

This presentation will discuss the offering of a course in International Accounting as a part of a business school curriculum. The general areas of concern that comprise international accounting will be presented, including (1) accounting as a tool in the international capital markets, (2) accounting and control in multinational enterprises, (3) the accomplishment of national goals aided by accounting measurement, and (4) international auditing standards. An example of an actual course will be presented. Source material and textbooks in the subject area will be described.

CONCURRENT SESSION IV(a) - Thursday May 29, 1:45 p.m.

Developing a Business Needs-Oriented Introductory Undergraduate Financial Accounting Course

(Michael Gibbins, University of Alberta)

The session will contain information and discussion on efforts at the University of Alberta to develop a course presenting accounting as a set of responses to needs of business people (and investors and others) for decision-making, control and learning information.

Topics will include

1. Course objectives
2. Course structure
3. Redevelopment emphases
4. Course materials
5. Microcomputer materials and usage
6. Term papers
7. Exams
8. Data on whether the 1985-86 course was successful
9. Further development plans

Those attending the session will receive handouts covering various issues within the above topics. Time for discussion from the floor will be provided.

CONCURRENT SESSION IV(b) - Thursday May 29, 1:45 p.m.

A Representational Model of Audit Judgment in Evaluating Controls

(Brian Gaber, University of Waterloo)

Understanding how judgment formation occurs and the environmental and contextual framework within which it occurs is a necessary precursor to improving the process of professional judgment. A model of judgment is a useful, albeit crude, representation of this framework. This paper attempts to develop a representational model of judgment for a typical audit task - the evaluation of internal control. The underlying premise which forms the basis for the model is that auditors will attempt where possible to incorporate both the requirements of their Professional Standards and of their firm approach into their personal decision-making framework. The paper reviews in some detail the applicable Professional Standards governing internal control and reconciles this normative model with a representational model depicting the approach to internal control evaluation used by many public accounting firms. The major conclusion of the paper is that most auditors now employ an objectives approach to evaluating internal control, which implies a disaggregated evaluation. This may have implications for interpreting past internal control studies which often elicited global or aggregate judgments, and for experimental designs in future research.

Homage to Santa Rosalia
or
Why Are There So Many Kinds of Accounting Associations?

(Alan J. Richardson, University of Alberta)

The paper applies a population ecology perspective to the question of why there are so many kinds of accounting associations in Canada. Drawing on historical data, the paper identifies forces favouring and limiting the diversity of associations.

Increasing diversity is favoured by factors which create 'niches' or domains in which associations may operate. The existence of self-contained local markets, legislative boundaries and functional differences each served to isolate domains to which associations could adapt and through specialization increase their chances for survival. Limited communication also served to increase the diversity of associations by reducing the opportunities for competition and co-operation, allowing associations to form and develop independently. The diversity of accounting associations also increased during periods of heightened economic activity when opportunities were created which the members of existing associations did not exploit.

The diversity of accounting associations has been limited through competition and professionalization. Competition has often resulted in mergers which reduce the number of associations while allowing the individuals involved to continue their practices. Professionalization serves to reduce the diversity of associations by creating convergence of structure and procedures which reduces ideological differences, increases the lines of communication and enhances the prospects of merger. Finally, the diversity of accounting associations is reduced by the demands of society for consistent standards of accounting and auditing practice. The need to establish such standards creates a political process which encourages interaction among associations, and acts as a centralized form of control over accountants regardless of their professional association.

The balance between the forces and for and against diversity in accountancy has been shifting over the history of the profession. Initially the balance clearly favoured increasing diversity but since the Second World War the balance has tilted the other way. The general trend towards the professionalization of accountancy and the demand for consistent standards of practice, even to the extent of spanning national borders, would indicate a general pattern of decreasing diversity in the accounting profession. The significance of these trends for the use of resources in the profession, the development of standards and the representation of minority interests is discussed.

CONCURRENT SESSIONS V(a) - Thursday May 29, 3:15 p.m.

Report on Demand and Supply Survey of Canadian Ph.D.s in Accounting 1985

(W.R. Scott, University of Waterloo)

The shortage of academic accountants with doctorate is well known. However, there appears to have been no recent research in Canada to document the actual extent and likely future trends of this shortage. Consequently, in 1985 the CAAA decided to support a survey of the demand for and supply of accounting Ph.D.s in Canada.

A total of 54 Canadian universities was identified as offering courses in accounting. Each was mailed a questionnaire asking for information about their needs for accounting faculty with doctorate. If a university had a Ph.D. program in accounting, information was requested about numbers of students involved. This information was requested over a five year horizon from 1985. A total of 46 universities responded (85% response rate).

The survey results include the following. There are about 473 full-time accounting faculty at Canadian universities. Of these, 150, or 32% have a Ph.D. This compares with at least 57% of non-accounting business faculty with Ph.D. In addition, 41% of the full-time positions that Canadian universities would like to fill with Ph.D.s are either vacant or filled with non-Ph.D.s. There are nine Ph.D. programs in Canada that can offer an accounting specialization. This represents a considerable expansion from three such programs as recently as 1979. However, based on conservative assumptions about the output from these programs and also based only on universities' present plans for developing their accounting programs, it appears that the 41% shortage will worsen by at least 20% over the next five years.

Traditionally, many Canadians have gone outside of Canada for their Ph.D. However, even if all Canadians now studying abroad (mostly U.S.) return to Canada this will not substantially reduce the shortfall.

Several additional universities indicated an intention to mount an accounting Ph.D. program, usually subject to financial considerations and government approval. The study concludes that their efforts are deserving of encouragement.

CONCURRENT SESSIONS V(b) - Thursday May 29, 3:15 p.m.

Accounting Education: A Learning Styles Study of Professional Technical and Future Adaptation Issues

(H. Donald Brown, Brock University,
and Richard C. Burke, University of Saskatchewan)

It has been suggested that the Experimental Learning Model and the concept of learning styles described by Kolb (1982) may be useful for studying the learning orientations of individuals in a variety of disciplines

and careers. The model has created considerable interest in some professional fields but to date has attracted little attention in accounting.

Kolb's Learning Style Inventory (LSI) was administered to undergraduate business students at the University of Saskatchewan and accounting graduates from the same institution for the years 1981 through 1984. The study yielded 729 usable responses. The results showed that there were differences in learning style preferences among student groups categorized by major fields of study and that there was a movement towards a preference for one particular learning style as accounting students and graduates were exposed over time to a greater concentration of accounting education and related work experience. These findings suggest that the concept of learning styles provides potentially useful information in accounting education research.

Applying the Case Method with Guided Design and CoRT Techniques to Accounting Instruction

(Robert Bloom and Juan J. Segovia, Concordia University)

This paper is an outgrowth of the 1984 Waterloo Symposium on Accounting Education, which was designed to improve the quality of accounting instruction at the university level and to introduce new instructional techniques to accounting professors. One of the authors of this paper attended the symposium and has since attempted to apply the techniques presented there in the classroom.

The case method, which is the focus of this paper, is a highly desirable approach for instructors to use with a view to enabling students to understand the function of accounting in organizational decision-making and external reporting. As an experimental approach, the case method can serve to bring the real world into the classroom and allow for integration of topics across various disciplines. This method, especially when dealing with actual companies, may well be used to motivate students, enhance their zest to learn, and even attract better students to the accounting discipline, those who would otherwise shy away from procedural drudgery.

For various reasons, the case method has not been widely used in accounting instruction. We consider such arguments in this paper. Additionally, we discuss alternative ways of applying the case method to accounting instruction and recommend the use of the Guided Design approach formulated by Wales[1] along with CoRT techniques developed by DeBono.[2] Guided Design is an educational approach intended to develop students' decision-making skills. This paper explains how Guided Design works.

Guided Design can also be used along with CoRT in applying the case method. CoRT stands for Cognitive Research Trust and consists of six units, each of which is composed of ten techniques. CoRT is designed to get students to think, to generate ideas, to broaden their perception, to organize information. Although each unit of CoRT has a specific goal to be achieved through its application, any technique(s) can be used without previous knowledge of the others.

We recommend a combination of an adapted version of Guided Design and CoRT in order to develop students' decision-making skills. Guided Design provides a structure for learning how to make decisions while CoRT provides exploratory tools for developing thinking skills. This hybrid approach can be used as a means to an end: to smooth the transition from the use of structured to less structured material, i.e., to introduce the case method to accounting students. Once the students have been sufficiently exposed to case analysis, then a less structured, less directive, and more efficient approach to casework can be applied. The approach we are recommending appears to us to be especially appealing to students who have a low threshold for ambiguity, and hence it should serve to alleviate the anxiety of students associated with the case method. We provide a specific accounting-oriented case in this paper and apply Guided Design and CoRT to its analysis.

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1. C.E. Wales and R.A. Stager, Guided Design, privately published, 1977.

2. E. DeBono, CoRT Thinking Program, The Cognitive Research Trust, Pergamon Press, 1981.

CONCURRENT SESSION II(a) - Wednesday May 28, 2 p.m.

A study of international accounting practices used by a set of multinationals and their relationships with organizational structure

Thérèse Tremblay, Université Laval

Making accounting standards uniform throughout the world is still a distant ideal. Meanwhile, trying to understand the forces and conditions which constitute similar situations in different countries will bring us closer to harmonizing international accounting standards. With this goal in mind, the author presents a year-long international study dealing with the financial reporting practices used in the international operations of a group of multinational corporations. By using some explanatory variables such as the type of organizational structure, the nationality and the industrial sector, the author was able to present four research hypotheses so as to explain the possible models for the disclosure of segmented disseminated information. The author verifies her hypotheses within the framework of an exploratory research. After having defined the objectives of the research, the author puts the problem in perspective, briefly presents a literature review so as to find a model for the dissemination of segmented financial information and also a classification for the organizational structures of multinational corporations. Moreover, the author shows how to make the model operational. Descriptions of the methodology used, the processing, the analysis and the interpretation of data will be presented as well. The author concludes by indicating the limitations, the conclusions and the possible extensions of this study.

L'Association Canadienne des Professeurs de Comptabilité
The Canadian Academic Accounting Association

RÉSUMÉS

CONGRÈS 1986 DE L'A.C.P.C.

L'UNIVERSITÉ DU MANITOBA

WINNIPEG

du 27 au 29 mai 1986

L'INFORMATION FINANCIERE PREVISIONNELLE: UN SUPPORT QUANTITATIF

Pierre Smith

Ecole des Hautes Etudes commerciales

Ces dernières années, les milieux comptables professionnels de pays tels la Grande-Bretagne, les Etats-Unis et le Canada se sont penchés sur la présentation d'informations financières prévisionnelles. Parmi les problèmes soulevés, la qualité (précision/exactitude) des prévisions et la participation de l'expert-comptable/vérificateur à la "validation" de cette information demeurent des questions importantes à résoudre. La méthodologie de Box-Jenkins/ARIMA est avancée comme possibilité de solution à ces problèmes.

Dans le prolongement des recherches antérieures menées aux Etats-Unis, le présent mémoire fait état d'une expérience de modélisation statistique sur un échantillon de trente et une (31) sociétés canadiennes. Des séries chronologiques de "bénéfice net d'exploitation" trimestriel, de 1969 à 1984, ont été analysées à l'aide de la méthodologie de Box-Jenkins/ARIMA et ont par la suite été comparées, tant du point de vue "modélisation" que de celui de la "capacité prévisionnelle", à différents modèles fondés sur les caractéristiques moyennes de l'échantillon.

Compte tenu des limites inhérentes à l'échantillon et à la période étudiée, les résultats sous l'aspect "modélisation" s'avèrent favorables à l'analyse ARIMA par société; l'aspect "capacité prévisionnelle" ne permet pas de conclure définitivement sur la pertinence des diverses approches. Cette question devra faire l'objet de recherches ultérieures.

Séance I b
Mercredi 28 mai 10 h 45

DIFFERENCIATION DES PRODUITS EN VERIFICATION: UNE ETUDE DU CHOIX DU VERIFICATEUR DANS LE MARCHE DES NOUVELLES EMISSIONS

(Dan A. Simunic et Michael Stein, Université de la Colombie Britannique)

Une question fondamentale concernant le marché des services de vérification est de savoir si les services diffèrent selon les fournisseurs. Cette question est importante parce qu'elle influence la façon dont sont interprétés de nombreux phénomènes de marché. Ce mémoire passera d'abord en revue les normes et conclusions fondamentales ayant trait aux marchés de produits différenciés telles qu'elles ont été formulées dans les ouvrages d'économie. Nous servant des caractéristiques de Lancaster, nous sommes partis du principe que le service de vérification comprend trois principaux attributs: contrôle de qualité, crédibilité et gamme de produits que les cadres supérieurs d'une compagnie considèrent particulièrement importants. Un cabinet de vérification peut être en mesure de produire simultanément des contrôles et des gammes de produits différents pour satisfaire les exigences diverses de ses clients. Toutefois, les vérificateurs étant les seuls à s'occuper de la procédure de vérification, celle-ci ne peut générer de la crédibilité qu'à un seul niveau et à un moment déterminé par l'intermédiaire de la marque de fabrique. Ainsi le choix de niveau de crédibilité est le motif principal derrière le choix d'un vérificateur par les cadres supérieurs.

Déterminant la crédibilité grâce aux tests du vérificateur, nous formons des hypothèses concernant la demande de crédibilité basées sur les différences, assumant que les états financiers contiennent des erreurs et des divergences importantes entrainant une opinion erronée de la fortune de l'utilisateur. Ces hypothèses sont vérifiées en utilisant un échantillon de 469 compagnies des Etats-Unis ayant été les premières à offrir des actions ordinaires au public en 1981. Nous distinguons un certain nombre de déterminants systématiques des choix de vérificateur par ces compagnies. Nous constatons aussi que le choix de vérificateur dans ce contexte semble être fortement influencé par le degré d'incertitude entourant les futurs mouvements de trésorerie de la compagnie émettant les titres et valeurs.

Séance Ib
Mercredi 28 mai 10 h 45

UNE APPROCHE DE LA VERIFICATION BASEE SUR L'ASSERTION

(D.A. Leslie, S.J. Aldersley, D.J. Cockburn et C.J. Reiter, Clarkson Gordon)

Ce mémoire décrit une méthodologie de vérification basée sur une stratégie de l'assertion. Il débute par un bref historique du concept d'assertion puis détermine les éléments d'une stratégie de vérification. Ces éléments sont ensuite utilisés pour présenter une explication de la stratégie basée sur l'assertion en examinant les sources de fiabilité, les liens de la procédure de vérification avec l'assertion et l'effet du modèle comptable sur le processus de vérification. L'évaluation de la vérification est présentée comme le concept de base sur lequel repose le processus de planification de la vérification. On montre ensuite comment ces concepts élémentaires peuvent être les fondements d'une méthodologie pratique de vérification et l'on présente brièvement une approche d'automatisation du processus à l'aide de logiciels de micro-ordinateurs. On offre pour terminer quelques réflexions sur l'évolution future de la méthodologie de vérification.

Les participants à cette séance recevront un exemplaire de ce mémoire.

Séance IIa
Mercredi 28 mai 14 h

UNE ETUDE INTERNATIONALE DES PRATIQUES COMPTABLES DE PRESENTATION D'INFORMATION COMPTABLE RELATIVE AUX ACTIVITES INTERNATIONALES D'UN GROUPE DE MULTINATIONALES ET LEURS ASSOCIATIONS AVEC LEUR STRUCTURE ORGANISATIONNELLE

Thérèse Tremblay, Université Laval

Penser à uniformiser des normes comptables à travers le monde est d'un idéal lointain. Dans l'intervale, chercher à connaître les forces et les conditions, qui créeront des situations similaires, semblent un pas vers l'harmonisation des normes comptables internationales. A ce titre, l'auteure présente une étude internationale s'échelonnant sur un an et portant sur les pratiques comptables de présentation de l'information financière se rapportant aux opérations internationales d'un groupe de multinationales. L'utilisation de quelques variables explicatives telles que le type de structure d'organisation, la nationalité et la branche industrielle permit à l'auteure de formuler 4 hypothèses de recherche dans le but d'expliquer des modèles possibles de présentation d'information sectorielle diffusée. C'est dans le cadre d'une recherche exploratoire que l'auteure vérifie ses hypothèses. Après avoir défini les objectifs de cette recherche, l'auteure fait une mise en situation du problème, présente birèvement une revue de littérature afin de dégager d'une part un modèle de diffusion de l'information financière sectorielle et d'autre part un classement des structures d'organisation de multinationales. De plus l'auteure présente les étapes d'opérationnalisation du modèle retenu. Egalement une description de la méthodologie, du traitement, de l'analyse et de l'interprétation des données sera présentées. Enfin l'auteure termine en indiquant les limites, les conclusions et les voies possibles de cette étude.

Séance IIa
Mercredi 28 mai

VENTILATION DU PASSIF ENTRE LES CLASSIFICATIONS A COURT ET A LONG TERME POUR LES LOCATIONS-ACQUISITIONS - REGLES ET PRATIQUE AU CANADA

A.W. Richardson, Professeur-adjoint de comptabilité,
Université McMaster, Hamilton, Ontario, L8S 4M4

La Section 3065 du Manuel de l'I.C.C.A. dit qu'un "preneur à bail devrait compter une location-acquisition comme un élément d'actif et une obligation." Parmi les différentes règles établies pour la présentation d'états financiers dans le cas d'une location-acquisition se trouve la spécification que ""toute portion des obligations de bail payable au cours de l'année avec des biens liquides devrait être inclue dans le passif à court terme." Toutefois, rien n'indique comment on doit ventiler l'obligation complète de location-acquisition entre le passif à court terme et à long terme. Les seules indications sont les exemples cités dans l'Appendice A de la Section 3065. L'examen des deux études de cas montre que l'étude du cas A suit ce que l'on a appelé l'approche de la "valeur actualisée des paiements de l'année suivante", tandis que l'étude du cas B suit l'approche "changement dans la valeur actualisée". Il semble donc que le Manuel de l'I.C.C.A. approuve implicitement deux approches pour cette ventilation.

Nous traiterons dans ce mémoire de la ventilation d'une obligation de location-acquisition entre les classifications à court et à long terme. Nous nous pencherons d'abord sur les différences entre les deux approches et l'information que nous pouvons en retirer. Bien que les évaluations obtenues pour l'élément de passif à court terme d'une obligation de location-acquisition en nous servant des deux méthodes puissent différer considérablement, rien ne semble favoriser une approche plutôt qu'une autre. Nous examinerons ensuite la fréquence relative de l'utilisation des deux approches dans la communication de l'information financière effectuée en ce moment au Canada en utilisant un échantillon des compagnies canadiennes importantes ayant publié suffisamment d'information sur leurs locations-acquisitions pour que nous puissions les analyser. Les résultats obtenus nous font conclure que l'approche du "changement dans la valeur actualisée" prédomine. En fait nous ne trouvons aucun exemple d'utilisation de l'approche "valeur actualisée des paiements de l'année suivante". Nous tenterons en troisième lieu de déterminer l'effet sur l'analyse des états financiers de l'utilisation de l'une ou l'autre de ces deux approches. Bien que nous ne puissions pas faire une analyse générale de cette question, l'analyse particulière effectuée nous donne à conclure que l'utilisation d'une approche plutôt que de l'autre pour déterminer la portion des obligations de location-acquisition à court terme n'aura sans doute pas d'effet significatif sur l'analyse de l'état financier.

Nous pouvons conclure de cette étude que la pratique de la communication de l'information financière au Canada pour la ventilation des obligations de locations-acquisitions entre les classifications à court et à long terme et l'effet probable d'un changement d'approche pour cette ventilation sont les mêmes qu'aux Etats-Unis.

TECHNIQUES DE CLASSIFICATION POUR LA RECHERCHE EN COMPTABILITE

(Duane Kennedy, étudiant en doctorat, Université Cornell)

De nombreux problèmes de recherche comptable nécessitent la classification des observations en catégories discrètes, par exemple: la prédiction de notations des obligations, la classification des prêts bancaires impayés et l'étude du choix de méthodes comptables par la direction d'une compagnie. On peut utiliser un certain nombre de techniques statistiques pour ranger les observations par catégorie. Ce mémoire distingue et décrit cinq techniques de classification pouvant servir dans des problèmes où plus de deux catégories sont en jeu. Les assomptions et charactéristiques de chaque technique mentionnée ci-dessous feront l'objet d'une discussion.

1. analyse du discriminant multiple
2. probit n-chotome de McKelvey & Zavoina
3. logit ordinale de Walker & Duncan
4. logit multinome
   4A) logit polytome de Nerlove & Press
   4B) logit conditionnelle de McFadden
5. arbres de classification

Séance IIb
Mercredi 28 mai 14 h

COMMENT REDUIRE L'IMPÔT SUR LES GAINS EN CAPITAL REALISES LORS DE LA VENTE DE RESIDENCES PRINCIPALES

UNE APPROCHE MATHEMATIQUE

(Alan Macnaughton, Université de Waterloo)

Il est courant pour un contribuable ou une famille de posséder et d'occuper plus d'une résidence comme par exemple une maison en ville et un chalet. Le droit fiscal canadien demande alors pour des raisons fiscales de déclarer au moins une partie du revenu obtenu lors de gains en capital réalisés sur la vente de résidences. Plus précisément, le revenu inclu lors de la vente d'une résidence particulière est une fonction décroissante du nombre d'années au cours desquelles le contribuable a désigné cette résidence sa résidence principale. Le problème de planification fiscale est qu'au cours d'une même année on ne peut déclarer qu'une seule résidence sa résidence principale.

Ce mémoire résout le problème de planification fiscale en utilisant des méthodes mathématiques. On assume que le contribuable désire réduire le montant actuel des impôts redevables lors de la vente de résidences. En tenant compte pour résoudre ce problème des règles fiscales en vigueur, on peut arriver à une solution analytique à l'aide du théorème de Kuhn-Tucker sur la programmation non-linéaire. On peut mettre en pratique cette solution au moyen de calculs sur papier ou de tableaux de ventilation sur ordinateur.

Les méthodes mathématiques utilisées dans ce mémoire pourront servir à résoudre d'autres problèmes de planification fiscale complexes mais bien précis.

Séance plénière
jeudi 29 mai 9 h

INTELLIGENCE ARTIFICIELLE ET SYSTEMES D'EXPERTS

(Efrim Boritz, Université de Waterloo et Steve Aldersley, Clarkson Gordon)

Les "Systèmes d'experts" constituent l'un des domaines de la recherche entreprise sur l'intelligence artificielle. Un système d'experts est un certain type de système informatique d'aide décisionnelle. Il utilise une base de connaissances et des procédés de déduction pour résoudre des problèmes si difficiles que leur solution nécessite une expertise humaine considérable.

Même si certains de ces problèmes peuvent être résolus grâce à l'algorithmie, il est possible que ces solutions soient difficiles à obtenir en raison de la complexité des calculs et de ressources informatiques limitées.

Les systèmes d'experts contiennent des raccourcis qui ont été conçus après avoir étudié la conduite des experts et qui permettent d'obtenir des solutions satisfaisantes à des problèmes difficiles.

La qualité d'un système d'experts repose sur la qualité de sa base de connaissances, c'est à dire des faits et de l'euristique qui y sont encodés.

Au cours de cette séance, nous donnerons une vue d'ensemble des concepts utilisés dans les systèmes d'experts et nous résumerons l'état de la recherche dans ce domaine. Nous y discuterons aussi des conséquences pour la recherche et la pratique de la profession comptable.

Séance IIIa
Jeudi 29 mai 10 h 30

PRISES DE DECISION COLLECTIVES EN VERIFICATION: DES CONSIDERATIONS METHODOLOGIQUES

(Ira Solomon, Université de l'Illinois)

Au cours des dix à quinze dernières années, un grand nombre de chercheurs ont essayé de déterminer comment les vérificateurs émettaient des jugements et prenaient des décisions et quelle en était la valeur. En dépit du fait que beaucoup de jugements et décisions sont le fait d'un groupe, presque toute la recherche s'est penchée sur les décisions prises par une seule personne. Puisque les ouvrages de psychologie et de psychologie sociale montrent bien que les résultats d'études de juges et décideurs individuels n'ont qu'une portée d'application limitée pour les groupes ou les équipes, l'optique des études sur la vérification ne mettant en cause qu'une seule personne a été critiquée parce qu'elle ne permet pas d'étudier la vérification et les vérificateurs tels qu'ils existent en réalité.

Les ouvrages de recherche publiés à ce jour n'étudient qu'un petit nombre d'équipes ou de groupes. Nous procéderons à une revue de ces études après avoir présenté les attributs du genre d'équipes et de groupes de vérification observés dans la pratique. Nous évaluerons ensuite l'état de la recherche actuelle et offrirons des suggestions pour la recherche future. Nous parlerons aussi des problèmes inhérents à la planification et à la réalisation du type d'études qui auront été suggérées. La séance se terminera par une période de questions et réponses.

Séance IIIb
Jeudi 29 mai 10 h 30

LA COMPTABILITE INTERNATIONALE DANS LE PROGRAMME DE COMPTABILITE

(Thomas H. Beechy, Université York)

Nous discuterons ici de l'intérêt d'offrir un cours en comptabilité internationale dans le cadre du programme d'études d'une faculté de commerce. Les principaux domaines relevant de la comptabilité internationale feront l'objet d'une présentation, notamment: 1) la comptabilité comme outil dans les marchés financiers internationaux, 2) la comptabilité et les contrôles dans les entreprises multinationales, 3) l'accomplissement de buts nationaux à l'aide de mesures comptables et 4) les normes internationales de comptabilité. Nous présenterons un exemple de cours et décrirons les manuels et la documentation traitant du sujet.

Séance IVa
Jeudi 29 mai 13 h 45

COMMENT METTRE SUR PIED UN COURS DE COMPTABILITE GENERALE A L'INTENTION DES ETUDIANTS NON DIPLOMES QUI REPONDRAIT AUX BESOINS DU MONDE DES AFFAIRES

(Michael Gibbins, Université de l'Alberta)

Au cours de cette séance nous vous ferons part des efforts accomplis par l'Université de l'Alberta pour mettre sur pied un cours présentant la comptabilité comme un ensemble de réponses aux besoins des gens d'affaires (de même que des investisseurs et d'autres particuliers) lorsque ceux-ci désirent prendre des décisions, effectuer des contrôles et obtenir de l'information.

Nous traiterons des sujets suivants:

1. But du cours
2. Plan du cours
3. Principales modifications à apporter au cours actuel
4. Documentation pour le cours
5. Equipement informatique nécessaire
6. Devoirs trimestriels
7. Examens
8. Evaluation du cours 1985-86
9. Plans pour l'avenir

Ceux qui assisteront à la séance recevront de la documentation traitant des sujets mentionnés ci-dessus. Nous réserverons également du temps pour la discussion.

Séance IVb
Jeudi 28 mai 13 h 45

HOMMAGE A SANTA ROSALIA
OU
POURQUOI Y-A-T-IL AUTANT D'ASSOCIATIONS COMPTABLES ?

(Alan J. Richardson, Université de l'Alberta)

Ce mémoire adopte une perspective écologique pour expliquer pourquoi il y a autant d'associations comptables au Canada. Tenant compte des données historiques, le mémoire indique quelles sont les forces qui favorisent et limitent la diversité des associations.

Des facteurs créant des niches ou des domaines dans lesquels les associations peuvent fonctionner favorisent une diversité grandissante. L'existence de marchés locaux indépendants, de lois et de besoins différents, a servi à créer des domaines dans lesquels les associations pouvaient s'adapter et, en se spécialisant, améliorer leurs chances de survie. Lorsque le réseau de communications était peu développé, la diversité des associations a augmenté, réduisant les occasions de rivalité et de coopération et permettant aux associations de se former et de se développer de façon indépendante. La diversité des associations s'est aussi accrue pendant les périodes où l'économie était en plein essor et où les membres des associations existantes n'avaient pas saisi les occasions qui se présentaient.

La diversité des associations comptables a été limitée par la concurrence et la professionnalisation. La concurrence a souvent entrainé des fusions réduisant le nombre des associations tout en permettant aux personnes concernées de continuer leur travail. La professionalisation a servi à réduire la diversité des associations en créant une convergence des structures et des procédures, limitant ainsi les divergences idéologiques, multipliant les communications et renforçant les possibilités de fusion. Finalement, la diversité des associations comptables est réduite par les besoins de la société en matière de normes comptables et de méthodes de vérification homogènes. Le besoin d'établir de telles normes crée un processus politique qui encourage l'interaction entre les associations et agit comme une forme centralisée de contrôle sur les comptables, quelle que soit leur association professionnelle.

L'équilibre entre les forces pour et contre la diversité en comptabilité s'est déplacée au cours de l'histoire de la profession. Au début, la balance penchait nettement du côté de la diversité mais depuis la deuxième guerre mondiale, un renversement s'est produit. La tendance générale vers la professionalisation de la comptabilité et la demande de normes de pratique homogènes qui dépasseraient même les frontières du pays sembleraient signaler un mouvement vers une diversité décroissante dans la profession comptable. Nous discuterons dans ce mémoire de la signification de ces tendances pour l'utilisation des ressources dans la profession, du développement des normes et de la représentation des intérêts minoritaires.

Séance IVb
Jeudi 29 mai 13 h 45

UN MODELE REPRESENTATIF DU JUGEMENT DE VERIFICATION LORS DE L'EVALUATION DES CONTROLES

(Brian Gaber, Université de Waterloo)

Comprendre comment s'effectue la formation du jugement et dans quel genre d'environnement et de contexte ce jugement est émis est essentiel si l'on désire améliorer le processus du jugement professionnel. A cette fin un modèle de jugement est une représentation utile bien qu'assez sommaire. Ce mémoire essaye de donner un modèle représentatif de jugement pour une tâche typique de vérification, l'évaluation du contrôle interne. Ce modèle est formé en partant du principe que les vérificateurs essayeront dans toute la mesure du possible de tenir compte à la fois de leurs normes professionnelles et de l'optique de leur compagnie pour prendre leurs décisions. Ce mémoire passe en revue les normes professionnelles utilisables gouvernant le contrôle interne et effectue une conciliation de ce modèle normatif avec un modèle représentatif décrivant l'approche utilisée par de nombreux cabinets d'experts-comptables pour l'évaluation du contrôle interne. La principale conclusion de ce mémoire est que la plupart des vérificateurs se concentrent maintenant sur les objectifs à atteindre lorsqu'ils évaluent le contrôle interne, ce qui entraine une évaluation désagrégée. Ceci peut avoir des conséquences pour l'interprétation des études de contrôle interne faites précédemment et qui souvent donnaient naissance à des jugements globaux ou agrégés et pour la recherche ultérieure.

RAPPORT SUR L'ETUDE DE L'OFFRE ET LA DEMANDE CONCERNANT LES DOCTEURS EN COMPTABILITE AU CANADA (1985)

W. R. Scott
Université de Waterloo

Dans le milieu universitaire, la pénurie de professeurs de comptabilité possédant un doctorat n'est un secret pour personne. Il ne semble toutefois pas que l'on ait cherché au Canada à en déterminer l'étendue exacte, à court et à long terme. C'est pourquoi, l'A.C.P.C. a décidé en 1985 de réaliser une étude sur l'offre et la demande concernant les docteurs en comptabilité au Canada.

D'après notre enquête, 54 universités canadiennes offrent des cours de comptabilité. Nous leur avons envoyé un questionnaire afin de déterminer le nombre de docteurs en comptabilité dont elles auraient besoin. Si une université offrait un programme de doctorat en comptabilité, nous avons voulu connaitre le nombre d'étudiants inscrits et les prévisions quant aux futures inscriptions pour la période allant de 1986 à 1990.

Quarante six universités nous ont répondu, soit un taux de 85% de réponses. Les résultats obtenus nous indiquent que sur un total d'environ 473 professeurs de comptabilité à plein temps, 150 ou 32% possédent un doctorat (Ph.D.) tandis qu'au moins 57% des professeurs de la faculté de commerce (n'enseignant pas la comptabilité) possèdent ce diplôme. Sur un nombre total de postes que les universités aimeraient voir occupés par des docteurs en comptabilité, 41% sont, soit vacants, soit occupés par des professeurs sans doctorat. Neuf programmes de Ph.D. au Canada peuvent offrir une spécialisation en comptabilité, ce qui représente une augmentation considérable, si l'on songe qu'il n'y avait que 3 programmes semblables en 1979. Toutefois, les prévisions se fondant sur le nombre de candidats devant recevoir leur doctorat et les plans actuels d'expansion des programmes de comptabilité présentés par les universités veulent que le taux de 41% s'aggrave d'au moins 20% au cours des 5 prochaines années.

De nombreux Canadiens vont faire leurs études de doctorat hors du Canada. Néanmoins, même si tous les Canadiens étudiant maintenant à l'étranger (surtout aux E.U.) revenaient au Canada, ceci ne suffirait pas à réduire cette pénurie de façon significative.

Plusieurs universités ont indiqué leur intention de mettre sur pied un programme de doctorat en comptabilité si elles peuvent obtenir les fonds nécessaires et l'approbation du gouvernement. L'étude conclut que leurs efforts méritent d'être encouragés.

Séance Vb
Jeudi 29 mai 15 h 15

ENSEIGNEMENT DE LA COMPTABILITE: UNE ETUDE DES STYLES D'APPRENTISSAGE DES QUESTIONS PROFESSIONNELLES, TECHNIQUES ET D'ADAPTATION

(H. Donald Brown, Université Brock et
Richard C. Burke, Université du Saskatchewan)

Il semble que le Modèle expérimental d'apprentissage et le concept des styles d'apprentissage décrits par Kolb (1982) pourraient être utiles pour étudier la façon dont les individus acquièrent des connaissances dans une variété de disciplines et de carrières. Le modèle en question a suscité un grand intérêt dans certains domaines professionnels mais n'a pas, jusqu'à présent,attiré l'attention du milieu comptable.

L'Inventaire des styles d'apprentissage de Kolb a été utilisé pour faire une étude auprès des étudiants en commerce non diplômés de l'Université du Saskatchewan et des diplômés en comptabilité de cette même université pour la période allant de 1981 à 1984. En examinant les 729 réponses utilisables obtenues dans le cadre de cette étude, on a pu constater qu'il y avait des différences de style d'apprentissage parmi les groupes d'étudiants selon les domaines d'études entreprises et que lorsque les étudiants en comptabilité étaient exposés à une plus grande dose d'enseignement et d'expérience professionnelle en comptabilité, ils tendaient à préférer un style d'apprentissage particulier. Ces conclusions suggèrent que le concept des styles d'apprentissage fournit une information qui pourrait être utile dans la recherche en enseignement de la comptabilité.

Séance Vb
Jeudi 29 mai I5 h 45

COMMENT APPLIQUER LA METHODE DES CAS DANS L'ENSEIGNEMENT DE LA COMPTABILITE EN SERVANT DE "GUIDED DESIGN", UNE APPROCHE STRUCTUREE ET DES TECHNIQUES CoRT

(Robert Bloom et Ján J. Segovia, Université Concordia)

Ce mémoire a été conçu après le symposium de Waterloo en 1984 sur l'enseignement de la comptabilité. Ce symposium, destiné aux professeurs de comptabilité, cherchait à trouver des moyens d'améliorer la qualité de l'enseignement de la comptabilité au niveau universitaire et à présenter de nouvelles techniques d'enseignement. L'un des auteurs de ce mémoire a essayé, après avoir assisté au symposium, d'adapter dans ses classes les techniques présentées.

La méthode des cas qui est l'objet principal de cette étude permet aux étudiants de comprendre la fonction de la comptabilité dans les prises de décision au sein des organisations et dans la communication de l'information financière. En tant qu'approche expérimentale, la méthode des cas peut servir à introduire la réalité dans la salle de classe et montrer comment les sujets étudiés relèvent de disciplines diverses. Cette méthode, en particulier lorsque l'on prend pour exemples des compagnies réelles, peut servir à motiver les étudiants, les inciter à étudier et même disposer les meilleurs étudiants que l'apprentissage des procédures comptables rebutait, à étudier la comptabilité.

Pour différentes raisons que nous exposerons ici, la méthode des cas n'a guère été utilisée dans l'enseignement de la comptabilité. Nous examinerons diverses façons de se servir de la méthode des cas et recommanderons l'utilisation de l'Approche structurée (Guided Design)[1] de Wales accompagnée des techniques CoRT, mises au point par DeBono.[2] L'Approche structurée est avant tout éducative, elle vise à faire des étudiants de bons décideurs. Nous expliquerons comment l'utiliser.

CoRT, c'est à dire le Fonds de recherche cognitive (Cognitive Research Trust), comprend 6 unités composées chacune de 10 techniques. On peut combiner l'utilisation de celles-ci avec l'Approche structurée pour étudier des cas. CoRT cherche à faire penser les étudiants, leur faire trouver des idées, leur faire élargir leur vision et organiser leurs informations. Chaque unité de CoRT vise un but spécifique et chaque technique peut être utilisée seule.

Nous recommandons de combiner une version adaptée de l'Approche structurée et les techniques de CoRT pour apprendre aux étudiants l'art de prendre des décisions. L'Approche structurée donne une structure d'apprentissage tandis que CoRT donne les moyens de devenir un bon décideur. Cette combinaison de 2 méthodes peut être utilisée pour faciliter la transition

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1. C.E. Wales et R.A. Stager, Guided Design, publié sans éditeur, 1977

2. E. DeBono, CoRT Thinking Program, The Cognitive Research Trust, Edition Pergamon, 1981.

entre l'utilisation de matériaux structurés et celle de matériaux moins structurés, c'est à dire pour présenter la méthode des cas aux étudiants en comptabilité. Une fois que les étudiants auront été suffisamment exposés à l'analyse des cas, une approche moins rigide, moins autoritaire et plus efficace pourra être utilisée. L'approche que nous recommandons nous semble particulièrement adaptée aux étudiants qui supportent difficilement l'ambiguité. Elle devrait réduire l'appréhension des étudiants confrontés à la méthode des cas. Nous donnons ici un exemple de cas ayant trait à la comptabilité et l'analysons à l'aide de l'Approche structurée et de CoRT.

L'INFORMATION FINANCIÈRE PRÉVISIONNELLE:

UN SUPPORT QUANTITATIF

Par

Pierre Smith
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OBJECTIFS DE LA RECHERCHE

La théorie comptable a donné lieu à plusieurs travaux sur la divulgation de suppléments d'information à caractère prévisionnel. Cette recherche constitue un prolongement de trois facteurs ou influences: les efforts des normalisateurs comptables, l'existence d'une «technologie» de la prévision et les travaux récents d'origine américaine.

Depuis plus d'une dizaine d'années, les milieux comptables professionnels de Grande-Bretagne, des Etats-Unis et du Canada se sont intéressés à cette question, par exemple sous forme de travaux de recherche et de directives; toutefois les efforts déployés par les normalisateurs ont été freinés par deux problèmes non encore résolus:

- la qualité des prévisions (précision-exactitude)
- la participation de l'expert-comptable/vérificateur à la «validation» de l'information prévisionnelle.

Parallèlement, des solutions intéressantes aux problèmes soulevés précédemment pourraient se trouver du côté d'outils statistiques prévisionnels déjà utilisés en économique et en finance, en particulier l'analyse de séries chronologiques par la méthodologie de Box et Jenkins (ARIMA).

Enfin, et ce surtout depuis une dizaine d'années, des chercheurs comptables américains ont étudié des séries chronologiques de postes comptables à l'aide de la méthodologie de Box-Jenkins/ARIMA: Foster (1977) et Brown et Rozeff (1979). Il semble, par ailleurs, que de telles études n'ont pas été conduites en milieu canadien.

Compte tenu des facteurs énoncés précédemment, cette recherche avait pour objectif d'appliquer, à un échantillon de sociétés canadiennes, la méthodologie statistique de Box-Jenkins, et de la proposer comme avenue de solution aux problèmes soulevés antérieurement.

MÉTHODOLOGIE

Variable d'étude

La présente recherche s'est limitée au «bénéfice net d'exploitation» (ou «bénéfice tiré des secteurs d'activité en exploitation»), puisqu'il est possible d'avancer que ce poste permet une estimation adéquate des flux monétaires futurs, devenant ainsi une variable importante aux fins des décisions d'investissement (voir FASB (1979)).

La périodicité retenue pour ce poste sera par trimestre, en raison surtout de l'apparente supériorité de capacité prévisionnelle du résultat trimestriel par rapport au résultat annuel, comme le mentionnent Bao et al.(1983).

Modèles étudiés

Pour l'échantillon de sociétés canadiennes étudié ici, des comparaisons ont été effectuées entre:

1. Un modèle «global», dérivé des caractéristiques «moyennes» de l'échantillon,

2. Des modèles issus des recherches américaines; les trois structures indentifiées ont été (en notation $(p,d,q) * (P,D,Q)_s$:
   - . Foster $(1,0,0) * (0,1,0)_4$
   - . Watts-Griffin $(0,1,1) * (0,1,1)_4$
   - . Brown-Rozeff $(1,0,0) * (0,1,1)_4$

3. Des modèles «sectoriels», dérivés des caractéristiques «moyennes» des secteurs industriels constatés dans l'échantillon,

4. Des modèles estimés pour chacune des sociétés de l'échantillon, selon la méthodologie de Box-Jenkins (modèles «individuels»).

Données

L'échantillon a été tiré (et les données recueillies) du fichier du Financial Post Corporation Service, qui comportait 602 sociétés canadiennes au 31 décembre 1984; par ailleurs, en raison de la source utilisée, la période d'étude s'étendait de 1969 à 1984 inclusivement.

Echantillon

L'échantillon étudié fut le résultat de l'application de trois filtres successifs, de manière à obtenir:

- .une fin d'exercice identique (31 décembre),
- .des séries relativement stables sur la période d'étude, et
- .un nombre suffisant d'observations (résultats trimestriels) par société de l'échantillon.

L'échantillon final comprenait 31 sociétés canadiennes (voir tableau 1); par le fait même, il importe de souligner que cet échantillon n'était pas aléatoire et donc non nécessairement représentatif de l'ensemble des sociétés canadiennes.

insérer le tableau 1 ici

Modélisation

L'application de modèles dits "globaux" exigeait l'identification d'une structure $(p,d,q) * (P,D,Q)_s$ fondée sur l'examen des caractéristiques "moyennes" de l'ensemble des sociétés comprises dans l'échantillon; cette structure était imposée par la suite à chacune des firmes.

L'application des modèles proposés par des chercheurs américains (Foster, Watts-Griffin et Brown-Rozeff) ne nécessitait que l'imposition de chaque structure pertinente à chacune des 31 sociétés de l'échantillon.

Les modèles "sectoriels" exigeaient des méthodes similaires à l'approche "globale", mais appliquées dans le cadre des divers secteurs industriels relevés dans l'échantillon. Aux fins de cette

étude, la définition de "secteur industriel" s'apparente au "grand groupe industriel", deuxième niveau de la "Classification Type des Industries" énoncée par Statistique Canada (1980).

L'approche de modélisation "individuelle" (i.e. société par société) est fondée sur la méthodologie proposée par Box et Jenkins: identification, estimation et validation statistique.

Evaluation des prévisions

Deux aspects méthodologiques sont abordés sous cette rubrique: la façon de générer les prévisions et les mesures de capacité prévisionnelle.

Pour des raisons reliées aux directives de la Note d'Orientation (période de prévision d'un exercice) ainsi qu'à l'évaluation de la capacité prévisionnelle sur divers horizons, la période de prévision s'est étendue sur huit (8) trimestres, selon deux phases distinctes.

Dans la première phase, désignée à "point de départ fixé", les prévisions étaient produites à partir d'un point de départ unique, le quatrième trimestre de 1982, pour les huit périodes en avant, et ce pour tous les modèles.

Dans la deuxième phase, désignée à "point de départ variable", les deux "meilleurs" modèles de la première phase ont été évalués comme suit: initialement, les prévisions étaient produites à partir de 1982.4 pour huit périodes en avant; par la suite, le modèle était réestimé en incorporant l'observation de 1983.1 (valeur réelle) constituant une nouvelle pièce d'information et donnant lieu à sept prévisions en avant à partir de 1983.1 jusqu'à 1984.4; cette procédure était répétée jusqu'à 1984.3, avec une prévision d'une période en avant. En principe, si le modèle est adéquat, l'information additionnelle (i.e. les observations réelles postérieures à la période initiale d'estimation) peut possiblement améliorer les prévisions produites.

L'évaluation des prévisions était fondée sur "l'erreur de prévision" ($\hat{e}_T$), soit la différence entre la valeur réelle (y_T) et la valeur prédite ($\hat{y}_T$), pour un horizon T:

$$\hat{e}_T = y_T - \hat{y}_T \qquad (1)$$

Les mesures d'erreur de prévision utilisées dans cette recherche furent les suivantes:

- .la moyenne de la valeur absolue des erreurs relatives, en pourcentage, pour chacun des horizons T,
- .la médiane de la valeur absolue des erreurs relatives, en pourcentage, pour chacun des horizons T,
- .la moyenne des erreurs relatives, au carré, pour chacun des horizons T, et
- .le rang moyen pour chacun des modèles, pour un horizon déterminé, attribué sur la base de la valeur absolue des erreurs relatives.

Il importe de noter que le critère du rang moyen n'a pas été utilisé au cours de la deuxième phase d'évaluation puisque seulement deux types de modèles étaient examinés.

RESULTATS

Modélisation

Les résultats relatifs à l'aspect "modélisation" seront énoncés suivant chaque type de modèle ayant fait l'objet de comparaisons.

En regard d'une structure globale, déduite des caractéristiques moyennes de l'échantillon, l'examen des corrélogrammes moyens laisse voir que l'application d'une différence saisonnière semblait suffisante pour induire la stationnarité. Pour ce qui est de la structure de la série moyenne, l'étude simultanée des autocorrélations et des autocorrélations partielles révèle deux possibilités:

- . $(1,0,0) * (0,1,0)_4$ (2)
- . $(1,0,0) * (0,1,1)_4$ (3),

la structure (2) ayant été proposée par Foster (1977), tandis que

le processus (3) a été signalé par Brown-Rozeff (1979). Donc, pour l'échantillon de sociétés canadiennes, il est apparu des structures similaires à celles constatées en contexte américain. (1)

Les trois structures de la littérature américaine ont été imposées à l'échantillon de sociétés canadiennes. Sur la base des résultats à l'estimation, il semble que le modèle de Foster (1977) soit celui qui corresponde le mieux au comportement "moyen" de l'échantillon(1).

Du point de vue sectoriel, et compte tenu du petit nombre de sociétés comprises dans l'échantillon, il fut décidé qu'un secteur industriel devait comprendre au moins deux sociétés. Les résultats à l'identification sont présentés au tableau 2; à part un secteur (pétrole et charbon), des structures connues apparaissent dans chaque secteur. Par ailleurs, lorsqu'imposées aux firmes des divers groupes, ces modèles ne paraissent pas expliquer suffisamment les comportements observés(1).

Insérer le tableau 2 ici

En dernier lieu, les résultats de l'application, société par société, de la méthodologie Box-Jenkins (modèles "individuels") sont présentés au tableau 3; il est possible de dégager quelques particularités:

Insérer le tableau 3 ici

(1) Résultats disponibles sur demande à l'auteur.

(a) Transformation logarithmique

Dix-neuf sociétés (sur 31) nécessitaient une telle transformation afin de rendre leur série stationnaire.

(b) Facteur saisonnier

En termes de différenciation, vingt et une sociétés exigeaient soit une différence saisonnière (13), soit à la fois une différence régulière et saisonnière (8). Au niveau des paramètres, quatorze firmes présentaient un paramètre au délai saisonnier (soit pur ou régulier). Ainsi, le comportement saisonnier attendu d'une série trimestrielle était présent dans l'échantillon examiné.

(c) Modèles des recherches américaines

Seule la société Leons Furniture présentait un comportement s'apparentant à un modèle "global" américain: celui de Foster, $(1,0,0) * (0,1,0)_4$; il semble donc que les caractéristiques individuelles sont "noyées" dans le comportement "moyen".

(d) Divers

Il faut également remarquer:

- l'estimation a été effectuée en respectant le "principe de parcimonie".
- l'ordre maximal était de quatre (sauf pour trois sociétés)
- le terme constant a été estimé seulement lorsque jugé significatif au point de vue statistique.

Pour conclure sur cette partie, les modèles résultant de l'approche "globale", à l'exception du modèle de Foster, ne semblent pas très adéquats; une conclusion similaire pourrait être portée sur les modèles "sectoriels". Quant aux modèles issus de la méthodologie Box-Jenkins, il s'avère possible (par expérimentation) d'arriver à des structures adéquates, conformes aux particularités de chacune des sociétés.

Evaluation des prévisions

La capacité prévisionnelle a été évaluée selon chacune des deux phases énoncées dans la section portant sur la méthodologie. Il importe en premier lieu de signaler la taille élevée des diverses mesures calculées à partir de l'erreur de prévision $\hat{e}_t$, possiblement causée par la période d'étude fortement perturbée (1969 à 1984).

En s'appuyant sur les quatre mesures de capacité prévisionnelle, deux catégories de modèles ont été retenues à la fin de la première phase (point de départ fixé) afin d'être évaluées lors de la deuxième phase: les modèles Box-Jenkins et le modèle de Foster, qui se sont détachés des autres catégories au cours de cette phase initiale(2).

Le tableau 4 présente les résultats de la deuxième phase (point de départ variable), selon trois critères: la moyenne des erreurs relatives (en valeur absolue et au carré) et la médiane des erreurs relatives absolues.

Insérer le tableau 4 ici

En regard des "moyennes" (en valeur absolue et au carré), le modèle de Foster montrait des prévisions plus précises, et ce pour tous les horizons. Pour les médianes, on ne peut être aussi catégorique: aux horizons courts (1 à 4), le modèle Foster l'emportait alors qu'aux horizons éloignés (5 à 8), les modèles Box-Jenkins individuels semblaient plus précis. Dans l'ensemble, soit pour les horizons 1 à 4 et 1 à 8, la taille des erreurs de prévision était similaire.

Pour résumer, si la première phase nous donne à penser que la méthodologie de Box-Jenkins produit des modèles acceptables en terme de "capacité prévisionnelle", le résultat est partagé dans le contexte de la seconde phase.

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(2) Résultats disponibles sur demande à l'auteur.

Conclusions

Les résultats de la recherche empirique ne permettent pas de conclure définitivement sur la pertinence de la méthodologie de Box-Jenkins/ARIMA comme solution aux problèmes inhérents à l'information financière prévisionnelle. Cette recherche comporte par ailleurs quelques limites:

.échantillon non-aléatoire,
.période d'étude à fortes perturbations conjoncturellles (récessions, inflation),
.variable d'étude unique: bénéfice net d'exploitation.

A ce titre, il est possible de suggérer quelques pistes susceptibles de guider ou d'inspirer des recherches ultérieures:

.constitution d'un échantillon aléatoire, avec un plus grand nombre d'entreprises, afin d'étudier plus en profondeur la question de l'effet sectoriel,

.application de la méthodologie Box-Jenkins/ARIMA à d'autres postes de résultats: ventes, charges, etc.; le bénéfice par action ainsi que d'autres ratios pourraient aussi être étudiés, de même que les postes de résultats «sectoriels», (i.e. non-consolidés), et

.comparaison entre les méthodes de prévision qualitatives, causales et extrapolatives, appliquées à des séries comptables de sociétés canadiennes.

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Tableau 1 : Sociétés de l'échantillon

Abréviation	Raison sociale
Alngas	Alberta Natural Gas
Babn	British American Bank Note
BCTel	British Columbia Telephone
Bell	Bell Canada Enterprises
Camalt	Canada Malting
Crain	R.L. Crain
Crown	Crown Forest Industries
DRG	DRG Inc.
GSW	GSW Inc.
Gulfca	Gulf Canada
Impoil	Imperial Oil
Indusm	Indusmin
Intppl	Inter Provincial Pipeline
Leons	Leons Furniture
Locem	Lake Ontario Cement
MacHun	Maclean-Hunter
MarTel	Maritime Telegraph and Telephone
McGraw	McGraw-Hill / Ryerson
Moore	Moore Corporation
NBTel	New Brunswick Telephone
NewFlp	NewFoundland Light and Power
Phicab	Phillips Cables
Photee	Photo Engravers and Electrotypers
QueTel	Québec Téléphone
Scott	Scott Paper
Slacem	Ciments St-Laurent
Tranpl	Trans Canada Pipelines
Thomsn	Thomson Newspapers
Tralta	Trans Alta Utilities
Wajax	Wajax Inc.
Westra	Westcoast Transmission

Tableau 2 : Modélisation sectorielle

Secteur industriel	Nombre	Modèle
papier et produits connexes	3	Watts-Griffin
imprimerie et édition	7	Brown-Rozeff
produits minéraux non-métalliques	2	Brown-Rozeff
pétrole et charbon	2	MA(1), $(0,1,1)*(0,0,0)_S$
transport par pipelines	4	Watts-Griffin
communications	5	Brown-Rozeff
autres services publics	2	Watts-Griffin

Tableau 3 : Modèles Box-Jenkins (individuels)

Société	(p,d,q)*(P,D,Q)	Log	Estimation des paramètres AR	T(AR)	MA	T(MA)	Constante	T(cte)	Ljung-Box	D.L.
Alnges	(8,0,0)*(0,1,0)	non	ϕ_8 0.50	3.45			147.47	2.46	16.70	23
Babn	(0,0,1)*(0,1,0)	oui			θ_1 -0.30	-2.65			17.64	22
					θ_4 0.52	4.60				
Bctel	(2,1,0)*(0,0,0)	oui	ϕ_2 -0.603	-5.31					29.09	23
Bell	(0,1,12)*(0,0,0)	non			θ_1 0.510	4.61			31.32	22
					θ_{12} -0.466	-4.95				
Camalt	(4,1,1)*(0,1,0)	oui	ϕ_4 -0.36	-2.44	θ_1 0.59	4.80			28.50	22
Crain	(5,0,0)*(0,1,0)	oui	ϕ_1 0.698	6.17					29.44	21
			ϕ_4 -0.479	-3.16						
			ϕ_5 0.309	2.04						
Crown	(0,1,1)*(0,0,0)	non			θ_1 0.274	2.04			15.55	23
DRG	(1,1,0)*(0,0,0)	oui	ϕ_1 -0.59	-4.40					19.75	23
GSW	(1,0,0)*(1,1,0)	oui	ϕ_1 0.34	2.47					28.09	22
			Φ_1 -0.40	-2.32						
Gulfca	(0,1,1)*(0,0,0)	oui			θ_1 0.44	3.47			15.91	23
Impoil	(0,1,1)*(0,0,1)	oui			θ_1 0.39	2.84			10.64	22
					θ -0.61	-5.23				
Indusm	(0,0,1)*(0,1,0)	oui			θ_1^s -0.25	1.83			8.81	23
Intppl	(0,0,1)*(0,1,0)	oui			θ_1 -0.70	-6.88			29.09	23
Leons	(1,0,0)*(0,1,0)	oui	ϕ_1 0.338	2.41					18.43	23
Locem	(1,1,0)*(0,1,0)	oui	ϕ_1 -0.407	-3.04					26.45	23
Machun	(4,1,1)*(0,1,0)	oui	ϕ_4 -0.54	-4.30	θ_1 0.33	2.47			21.19	22
Martel	(0,1,1)*(0,0,0)	oui			θ_1 0.36	2.93			29.86	22
McGraw	(0,0,1)*(0,1,0)	non			θ_2 0.31	2.00	56.07	3.95	18.90	23
Moore	(4,1,1)*(0,1,0)	oui	ϕ_4 -0.479	-3.71	θ_3 -0.373	-2.71			26.51	22
Nbtel	(4,1,0)*(0,1,0)	oui	ϕ_3 -0.30	-2.62					20.26	22
			ϕ_4 -0.57	-5.05						

Tableau 3 : Modèles Box-Jenkins (individuels) suite

			Estimation des paramètres							
Société	(p,d,q)*(P,D,Q)	Log	AR	T(AR)	MA	T(MA)	Constante	T(cte)	Ljung-Box	D.L.
Newflp	(0,0,1)*(0,1,0)	non			θ_1 -0.60	-5.21			20.68	23
Phicab	(0,1,1)*(0,0,0)	non			θ_1 0.47	3.70			20.81	23
Photee	(0,0,1)*(0,1,0)	non			θ_1 -0.523	-4.08	23.37	2.92	18.84	23
Quetel	(0,0,1)*(0,1,0)	oui			θ_1 -0.485	-3.92			25.86	22
					θ_4 0.226	1.70				
Scott	(0,1,1)*(0,0,0)	non			θ_1 0.49	3.98			17.21	23
Slacem	(0,0,1)*(0,1,0)	non			θ_1 -0.372	-2.78			13.86	23
Tcanpl	(0,1,1)*(0,1,0)	non			θ_1 0.463	3.57			13.39	23
Thomsn	(4,0,0)*(0,1,0)	oui	θ_4 -0.537	-3.49			.255	8.91	23.28	23
Tralta	(4,1,0)*(0,1,0)	oui	θ_1 -0.437	-3.93					23.73	22
			θ_4 -0.490	-4.36						
Wajax	(1,1,0)*(0,1,0)	non	θ_1 0.285	1.99					13.84	23
Westra	(0,1,1)*(0,0,0)				θ_1 0.411	2.56			13.63	23

Note: Chi-deux à 21 degrés de liberté:
à 5% : 32.7
10% : 29.6

Chi-deux à 22 degrés de liberté:
à 5% : 33.9
10% : 30.8

Chi-deux à 23 degrés de liberté:
à 5% : 35.2
10% : 32.0

Tableau 4: Prévisions - deuxième phase

(a) Moyenne des erreurs relatives absolues (en %) par modèle - 31 sociétés

Horizon	1	2	3	4	5	6	7	8	1-4	1-8
Modèle										
Box-Jenkins	63.173	65.321	66.040	65.941	88.537	99.858	133.063	196.189	65.119	97.265
Foster	60.643	63.483	57.362	56.794	75.852	91.735	117.280	161.891	59.571	85.630

(b) Médiane - erreurs relatives absolues - 31 sociétés

Horizon	1	2	3	4	5	6	7	8	1-4	1-8
Modèle										
Box-Jenkins	16.342	18.092	19.676	19.318	25.703	29.722	34.159	34.454	17.774	20.633
Foster	15.608	16.107	16.290	16.836	29.018	32.180	33.091	38.025	16.209	19.348

(c) Moyenne des erreurs relatives au carré (en %) par modèle - 31 sociétés

Horizon	1	2	3	4	5	6	7	8	1-4	1-8
Modèle										
Box-Jenkins	460.021	603.238	603.072	760.203	1326.011	1818.430	2775.438	4079.678	606.634	1553.261
Foster	499.835	746.926	408.435	417.158	632.457	864.161	1225.325	2137.335	518.089	866.454

THE USEFULNESS OF MANAGEMENT ACCOUNTING EDUCATION: FUTURE MANAGEMENT ACCOUNTING PRACTITIONERS ARE NOT GETTING WHAT THEY NEED!

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THE USEFULNESS OF MANAGEMENT ACCOUNTING EDUCATION: FUTURE MANAGEMENT ACCOUNTING PRACTITIONERS ARE NOT GETTING WHAT THEY NEED!

Management Accounting Education at universities must change with the the times in order to meet the needs of the 'management accountant' role in an increasingly complex, competitive and technologically advanced society.

Management Accounting Education is regarded as including: a) the specific techniques/concepts taught; b) the teaching style or method employed; c) the type of work environments stressed; d) the importance of developing non-content/technical skills; and e) the use of new technology.

The role of the management accountant has shifted from "the preparation of accounting reports and analysis useful to management for decision-making" [Tipgos, Holmes and Lander 1983, p. 54] to being:

> "involved actively in the process of managing the entity. ...The management accountant participated as part of management, in assuring the the organization operates as a unified whole in its long-run, immediate, and short-run best interests..." [Tipgos, Holmes and Lander, 1983, p. 56].

As a member of the management team (and no longer a staff employee), greater interpersonal and oral communication skills will be required. Moreover gathering, selecting, organizing and presenting evidence to support positions will increasingly be needed.

Management Accounting students, therefore, should not only be prepared for the workplace by being taught skills specific to their likely future jobs but also they should be prepared for life by learning a) to think analytically, critically and diagnostically and b) to communicate both orally and in writing.

Shultis [1981] proposes the following five suggestions to educators, that if carried out will prepare students for more productive careers in management accounting: 1) Teach students to read; 2) Teach students to communicate effectively with others; 3) Teach students that accounting rules are merely conventions to be bent or broken if necessary to achieve the right answer for management; 4) Teach students the importance of business ethics; 5) Teach students to motivate others and to work through people.

Shultis concludes: "After the student joins the business world, there are plenty of opportunities for him to improve his technical skills but there are too few opportunities for him to improve his basic knowledge and to hone his philosophy of work. And chances are he will not take advantage of those which do exist" [p. 52].

EDUCATION/PRACTICE GAPS

The objective of management accounting education is to provide university education which will be instrumental in effective on-the-job performance. Gaps can be said to exist in those instances where that which is taught has little or no relevance for practice and/or where important aspects of practice are not covered in the classroom.

There are three major interacting elements of the problem: the individual, the work situation and education. Whether or not gaps exist (and their nature) will depend on the interaction among these three elements.

For example, a given individual with expertise in economic order quantity (EOQ) analysis learned at university, might be able to restructure

his/her job so that the application of EOQ becomes a major function. Another individual, in a similar work situation, may perform satisfactorily without reference to EOQ and may not even realize that there is any detriment to not knowing about EOQ because of the manner in which he/she has structured the work situation.

For the purpose of this paper the individual aspect is assumed away so that all gaps result from differences between the work situation and education or between educators and practitioners. Educators appear to be concerned with how things should be done and less with how things actually are done. In contrast, the attitude of practitioners is more pragmatic. They are concerned with what works satisfactorily in practice rather than what is ideal. Sterling [1973] maintains that academics and practitioners display a stubborn unwillingness to compromise and come to any agreement with respect to correct theoretical methodologies and accepted practices.

A second reason why gaps may exist is because of a lack of communication between management accounting practitioners and academics. There is growing concern that academics are out of touch with practice and that their teaching does not cover the current problems faced by practitioners.

Kaplan [1984] gives a third reason:

> "The cost accounting and management control procedures developed more than 60 years ago for the mass production of standard products with high direct labour content may no longer be appropriate for the planning and control decisions of contemporary organizations" [p.390].

Finally, Scapens [1983] argues that it is the very nature of managerial accounting textbooks which perpetuates the divergence between education and practice. In practice one will rarely find an isolated situation where all the the information is known with certainty and a single technique will give the desired result. Textbooks, he argues, portray management accounting as a series of techniques.

This paper is concerned with, among other things, an identification of gaps in order that urgent remedial action may be taken. Accordingly the following hypothesis is tested:

> H1: For specific management accounting techniques/concepts, the amount of emphasis at university is significantly different to the extent of use in practice.

RESEARCH SAMPLE STUDIED

The population used in this paper included all persons who had completed advanced management accounting (with a grade of 62% or above - representing a 'C') between the 1976 academic year and the 1982 academic year from the University of Windsor in Ontario, Canada.

In February 1985 survey questionnaires were sent to 1042 people using addresses supplied by the university. In all, 254 questionnaires were returned from the post office stamped 'address unknown'. A second mailing was sent out in March 1985. A total of 147 completed surveys were received (127 from the first mailing; 20 from the second mailing) representing a response rate of 18.7% (147 out of a possible 788).

Of the 788 'non-returned' surveys (1042 minus 254), many were probably never received by the ex-students. This is because of the unavailability of updated addresses and the likelihood, therefore of much of this correspondence being reviewed by others and disposed of. Despite this and although a 18.7% response is reasonable, the issue of non-response bias has been addressed. It was important to ensure that the respondents were representative

of the total population rather than drawn from a biased segment of the population. Results for all the respondents and for respondents from each of the mailings separately are discussed. Furthermore chisquare tests were conducted to determine the representativeness of the respondent groups.

The significance of differences between the samples and the population were tested using the chi-square criterion with the following results.

Attribute	Population%	Respondent %	Significance
Males	76.1%	81.6%	not significant
Females	23.9%	18.4%	not significant
Business Majors	97.6%	98.0%	not significant
Full-time Students	78.7%	83.0%	not significant
Average Age	24.6 yrs.	23.7 yrs.	not significant

However, significant differences were found when comparing grades in advanced management accounting between the respondents and the population.

Grade	Total %	Resopndent %	Grade	Total %	Respondent %
A+ (96%)	1.2%	2.7%	B+ (77%)	13.1 %	12.9%
A (90%)	5.9	7.5	B (72%)	18.9	25.2
A- (83%)	9.3	14.3	C+ (67%)	19.1	14.3
			C (62%)	32.5	23.1

These results appear reasonable since people who do better in a course are indeed more likely to respond to surveys thereon. When the chisquare test of sample vs. population grades was applied to the second mailing respondents only,no statistically significant difference was found. In testing the hypothesis of this paper, tests are, as previously discussed, repeated for each of the mailings separately.

Chisquare testing was redone for those newly graduated people who completed the advanced management accounting course in the academic years of 1980 through 1982 (87 respondents - 73 from first mailing; 14 from second). Chisquare results were similar to those found using all the respondents.

The respondents were asked to indicate the extent of their agreement (1=very little; 5=very much) that most of what they learned about management accounting was a) studied in the university classroom; b) covered in seminars provided by their organization; c) learned from their superiors/peers at work; or d) gained through intuition/gut feel on the job. Mean results were 3.844, 1.748, 2.544, and 2.633 indicating that most management accounting was, in the opinion of these respondents, studied in the university classroom.

OTHER STUDIES OF THE TOPIC

Education/Practice Gaps

Regarding the content of managerial accounting courses, a number of surveys have been conducted to determine the relevance of topics taught. Van Zante [1980] mailed 400 questionnaires to a stratified random sample of 270 industrial accountants and 100 accounting educators. Respondents were asked to rate the importance of 28 management accounting topics to the curriculum of a student interested in pursuing an industrial accounting career immediately upon graduation from a university

Van Zante found that educators tended to place more importance on management accounting topics than did industrialists. One explanation for this is:

> "That a majority of industry accountants rate 'importance' from a practical viewpoint. That is, to them 'importance' means

> direct usefulness. The majority of accounting educators, on the other hand, probably rate 'importance' from a broader point of view which may include other factors as well" [p. 20].

A similar study was undertaken by Knight and Zook [1982]. A questionnaire was sent to a sample of public accountants and a sample of controllers from the Fortune 500 firms. The purpose of the survey was to obtain an insight as to what topics in accounting have the greatest relevance. Eight of the 13 topics under Management Accounting were rated significantly higher by the controllers.

The problem with these and other studies is that the samples differ on issues other than the nature of their activities and therefore any comparison among populations is questionable.

RESULTS OF THE CURRENT STUDY

This paper reports on a survey which presents to its potential respondents a listing of 33 management accounting techniques/concepts selected from a review of management accounting (including cost accounting) textbooks and discussions with management accounting practitioners. The respondents were asked to indicate in the first column the extent of use (1 = very little, 5 = very much) of the techniques/concepts in practice based upon their observations and experience. In addition, the respondents were asked to indicate in the second column the amount of emphasis (1 = very little; 5 = very much) given to the techniques/concepts in their management accounting university training.

As a reliability check, the means between use in practice (use) and emphasis at university (emphasis) were compared for each technique/concept. This was done for the first mailing respondents only (1); the second mailing respondents only (2); using the sample from academic years 1976 through 1982 inclusive (A); and using the sample from academic years 1980 through 1982 inclusive (B).

Table 1 below presents the results of respondents' ratings of those management accounting techniques/concepts whose means differ significantly as between use and emphasis for a) first mailing respondents only using the 1976-1982 sample (1A); b) second mailing respondents only using the 1976-1982 sample (2A); c) all respondents using the 1976-1982 sample (1,2A); d) first mailing respondents only using the 1980-1982 sample (1B); e) second mailing respondents only using the 1980-1982 sample (2B) and f) all respondents using the 1980-1982 sample (1,2B).

For each of the nine techniques/concepts, the amount of emphasis exceeded the amount of use. It is interesting to note that some of the techniques ranked high, some medium and some at the bottom. These are the areas which require most urgent revision by accounting educators. Decreases in their class emphasis would be in order.

TABLE 1
Respondents' Ratings of Management Accounting Techniques/Concepts: Differences between Use and Emphasis

TECHNIQUE/CONCEPT	Extent of Use In Practice		Amount of Emphasis at University	
	Rank	Mean	Rank	Mean
Variance Analysis **	3	3.231	2	3.687
Standard Costing ***	7	2.939	3	3.667
Process Costing ***	19	2.524	8	3.286
Capital Budgeting (IRR) ***	25	2.408	10	3.197
Joint Product Costing ***	26	2.184	17	2.864
Statistical Techniques ***	28	2.122	15	2.912
Economic Order Quantity Analysis ***	30	1.946	21	2.687
Mathematical Models ***	32	1.755	28	2.374
Linear Programming ***	33	1.429	25	2.571

** difference between means (using all the n = 147 respondents) is statistically significant (2-tailed) at $p < .01$.
*** difference between means (using all the n = 147 respondents) is statistically significant (2-tailed) at $p < .001$.

Table 2 presents the results of respondents' ratings of those management accounting techniques/concepts whose means differ significantly (emphasis > use) as between use and emphasis for some (but not all) of the six samples.

TABLE 2
Respondents' Ratings of Management Accounting Techniques/Concepts: Possible Differences between Use and Emphasis (Emphasis > Use)

TECHNIQUE/CONCEPT	Extent of Use In Practice		Amount of Emphasis at University	
	Rank	Mean	Rank	Mean
Capital Budgeting (NPY) ***(a)	15	2.680	4	3.544
Variable Costing ***(b)	6	3.129	1	3.748
Cost-Volume-Profit Analysis ***(b)	8	2.918	6	3.388
Job Order Costing ***(b)	22	2.476	9	3.204
Breakdown Analysis ***(c)	9	2.864	7	3.347
Management by Objective **(c)	20	2.497	16	2.871
Cost Allocations *(d)	24	2.449	20	2.721
Flexible Budgeting *(e)	11	2.816	11	3.082
Transfer Pricing *(f)	17	2.619	14	2.939
Zero-based Budgeting *(f)	31	1.850	30	2.102
Sales Mix Analysis *(g)	23	2.463	19	2.728
Capital Budgeting (Payback)(h)	16	2.646	17	2.864

* difference between means (using all the n = 147 respondents) is statistically significant (2-tailed) at $p < .05$.
** difference between means (using all the n = 147 respondents) is statistically significant (2-tailed) at $p < .01$.
*** difference between means (using all the n = 147 respondents) is statistically significant (2-tailed) at $p < .001$.
a-h explained in Table 4.

Table 3 presents the results of respondents' ratings of those management accounting techniques/concepts whose means differ significantly (use > emphasis) as between use and emphasis for some (but not all) of the six samples.

TABLE 3
Respondents' Ratings of Management Accounting Techniques/Concepts:
Possible Differences between Use and Emphasis (Use > Emphasis)

TECHNIQUE/CONCEPT	Extent of Use In Practice		Amount of Emphasis at University	
	Rank	Mean	Rank	Mean
Profit Planning ***(a)	1	3.816	13	2.946
Business Valuations ***(a)	14	2.701	33	1.850
Sales Forecasting ***(c)	3	3.231	26	2.463
Divisional Performance ***(c)	5	3.136	22	2.667
Mergers & Acquisitions **(c)	21	2.483	32	1.986
Inventory Planning *(f)	12	2.769	27	2.449

* difference between means (using all the n = 147 respondents) is statistically significant (2-tailed) at $p < .05$.
** difference between means (using all the n = 147 respondents) is statistically significant (2-tailed) at $p < .01$.
*** difference between means (using all the n = 147 respondents) is statistically significant (2-tailed) at $p < .001$.
a-f explained in Table 4.

TABLE 4
Explanation of Codes in Tables 2 and 3

SAMPLE / CODE	1A (n=127)	2A (n=20)	12A (n=147)	1B (n=73)	2B (n=14)	12B (n=87)
a	S	S	S	S	NS	S
b	S	NS	S	S	S	S
c	S	NS	S	S	NS	S
d	NS	S	S	NS	S	S
e	NS	NS	S	NS	NS	S
f	S	NS	S	NS	NS	NS
g	NS	NS	S	NS	S	NS
h	S	NS	NS	S	NS	NS

S = a statistically significant difference
NS = not a statistically significant difference

Table 5 presents the results of respondents' ratings of those management accounting techniques/concepts whose means do not differ significantly as between use and emphasis.

TABLE 5
Respondents' Ratings of Management Accounting Techniques/Concepts:
No Differences between Use and Emphasis

TECHNIQUE/CONCEPT	Extent of Use In Practice		Amount of Emphasis at University	
	Rank	Mean	Rank	Mean
Ratio Analysis	2	3.408	5	3.415
Responsibility Accounting	9	2.864	12	2.986
Product Pricing	13	2.748	24	2.592
Risk Analysis	18	2.578	23	2.646
Behavioral Implications	27	2.129	29	2.150
Social Cost-Benefit Analysis	29	2.068	31	2.061

Thus 27 of the 33 techniques/concepts (82%) differ as to their use and emphasis. These results are consistent with the hypothesis that for specific management accounting techniques/concepts, the amount of emphasis at university is significantly different to the extent of use in practice. This strongly suggests that management accounting educators are not serving the needs of future management accountants. Emphasis exceeds use for 21 areas; use exceeds emphasis for six areas.

OTHER CONSIDERATIONS

a) The Economic Shift From Manufacturing

Since the early manufacturing sector emphasis of management accounting, many exogenous changes have occurred which have reshaped the face of the industry and brought about a new business climate [Kaplan, 1984]. However, the tried and true management accounting techniques have endured, as is reflected in this paper.

Respondents were asked to indicate the extent to which they agreed (1 = very little; 5 = very much) that most of their management accounting studies covered a) the manufacturing sector; b) the service-related sector and c) nonprofit organizations. Results were 4.497, 2.170, and 1.279 respectively. A review of the 33 techniques/concepts, suggests that, in the classroom, not enough emphasis is presently given to non-manufacturing sectors.

b) Impact of Computers on Management Accounting

Stone [1974] argues that:

> "Integration of the computer into the accounting curriculum is necessary because of its pervasive and substantial impact on the practice of accounting and management. It is desirable because of the many ways in which the computer can enhance the environment in which accounting education takes place and augment our capabilities as accounting educators"[p. 300].

Also Anderson [1976] suggests that "managerial accounting instruction should introduce students to computer techniques as they relate to managerial accounting" [p. 622].

Recent developments in industry include communications technology - the most notable of which is the computer. Since the major purpose of management accounting is one of providing management with relevant and valid information, one can envisage the influence of the computer, and the need for both academics and practitioners to be fully cognizant of it. The development of such 'information technology' has changed the role of the management accountant quite dramatically as is discussed by Gale and Kaye, 1984 and by Kirby and Pliniussen, 1984.

81.6% of the respondents felt that the computer has an impact on management accounting practice. In answer to a question about specific software packages used, 72.4% said Lotus 1-2-3, 4.3% said a wordprocessing program, 13.0% said dBase III and 10.3% suggested other software. Despite these comments, present graduates are not sufficiently (if at all) exposed to the computer in Management Accounting university studies.

c) The Case Method Teaching Approach to Management Accounting

Despite the popularity of the lecture method of teaching management accounting, in recent years the case method of teaching has begun to receive more widespread use. The case method is a learning method in which emphasis is placed on the preparation for and classroom discussion of a situation that

is described in a case. It can be contrasted with the so called 'textbook problem method' in which the emphasis is on memorizing and understanding material contained in a textbook and working on the numerical solution to problems or exercises.

Anthony [1974] states the following advantages of the case method:

a)According to educational psychologists knowledge is learned more thoroughly and retained more completely if the student is actively involved in the learning process.

b)Analysis and discussion of a case helps the student appreciate the fact that textbook knowledge does not provide a complete solution to real world problems.

c)Oral or written reports of a case help in developing the student's communication skills.

d)If the student prepares the case as a member of a group, he/she develops interpersonal skills.

83.3% of respondents suggest that a combination of lectures and the case method is the most effective method for teaching management accounting. 12.5% of respondents prefer the case method alone while 4.2% of respondents preferred the lecture approach alone. Despite these comments, some university management accounting courses are still being taught using the lecture method only.

DISCUSSION

Objective of Management Accounting Studies

Shute [1979] suggests that:

> "There is a tendency to cover an ever-increasing amount of content in most accounting curricula.... Perhaps in our wish to cover more topics, we have actually reduced the number of topics that are truly understood by most students .... I believe this has profound implications for accounting education. We are not going to help our accounting students develop the level of thought processes necessary to function in the profession, if by our approach to the subject, we emphasis content rather than thought processes" [p.37].

Flaherty [1979] suggests that:

> "On an overall basis respondents placed more emphasis upon conceptual knowledge than on technical ability. The implication from our respondents, therefore, is that accounting education, looked at from an overall standpoint, should be more conceptual than technical in its orientation ... One does not have to give up technical education in order to strengthen conceptual education, except to the extent that time becomes a restraining factor" [p. 127].

Finally Ingram and Frazier [1980] comment:

> "If the discrepancy between accounting practitioners' assessments of communication skills needed and those demonstrated by their employees is to be taken seriously by accounting educators, it is evident that an increased emphasis on communications in the accounting curriculum is necessary" [p. 47]

These comments are consistent with the findings of this paper that on a scale of 1 (very little) to 5 (very much):

a) Management Accounting studies should concentrate on the thought process rather than content - 3.667;

b) Management Accounting studies should concentrate on conceptual

rather than technical skills - 3.184. (When it was suggested that only a minimal amount of technical know how was needed to meet the requirements of entry level positions, respondents were not convinced - 2.061).

c) Management Accounting studies should concentrate on communication skills - 3.639.

In response to the open ended questions on the survey, there were two interacting themes, variations of which were suggested by most of the respondents. First, that in the classroom, not enough emphasis is presently given to the thought process, conceptual skills and to communication. Second, that not enough class time is given to the application and implementation of classroom theory to practical on-the-job management accounting situations.

RECOMMENDATIONS

Admittedly, there may be questions about the application of the results of a study based on the rejection of a null hypothesis, such as this one, to strong prescriptions for action. However. the method of science is to persuade rather than to prove and questions will always remain. The facts are that this current study is consistent with other studies referred to in the text, which taken as a whole suggest the following recommendations to improve the usefulness of management accounting and to decrease the gaps between techniques/concepts emphasized in university and the requirements of practice:

a) decrease or increase the emphasis given to specific techniques/concepts (see Tables 1 to 3 for details) in university curricula and pressure professional accounting bodies to accept these changes.

b) move away from the strictly manufacturing emphasis, found today in university studies, to various other types of enterprise.

c) encourage a closer liaison between educators/academics and practitioners including:
   - business internships, practica and other experience for educators;
   - encouraging educators to also have professional designations;
   - seminars between educators and practitioners on common problems.
   - joint research projects on topics of common interest to both groups;
   - bringing practitioners into the classroom.

Previts and Coffman [1980] conclude:

"...there appears to be a strong argument to forge new links of partnership between educators and practitioners to meet the future challenges of the profession" [p. 45].

Other suggestions connoted by the study include:

a) increasing the use and emphasis of computers in the classroom;

b) supplement lectures & problems with debates, role playing & cases;

c) emphasize communication skills and thought processes;

Similar recommendations have been made by many including most recently by Knortz [1985]. This paper strongly recommends that the time has come to no longer recommend, hypothesize, discuss and send for further investigation.

The implication of such actions would include:

a) an increase in the prestige of the management accountant in the eyes of potential management accountants and the public at large;

b) better funding possibilities (from both professional accounting firms and business in general) for university academics to do research and narrow gaps between education and practice;

c) encouraging the researcher to "return to field-based research to discover the innovative practices being introduced by organizations successfully

adapting..." [Kaplan, 1984, p. 390] and as argued by Scapens [1983], research into management accounting practice will eventually develop relevant new and updated theories.

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CONFERENCE

ASSOCIATION CANADIENNE DES PROFESSEURS

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CONGRES NATIONAL

UNIVERSITE DU MANITOBA, WINNIPEG

RESUME

Une étude internationale des pratiques comptables de présentation d'information comptable relatives aux activités internationales d'un groupe de multinationales et leurs associations avec leur structure organisationnelle

THERESE TREMBLAY

28 MAI 1986

TABLE DES MATIERES

INTRODUCTION

. Objectifs de l'étude

La présente étude s'inscrit dans le cadre des recherches en comptabilité internationale qui visent à accroître l'uniformité de l'information comptable et à proposer un cheminement possible pour parvenir à une comptabilité sans frontière se rapportant à la diffusion d'une information comptable découlant des opérations à l'étranger des multinationales.

La démarche suivie est exploratoire dans la mesure où l'étude aborde un champ de recherche en friche, où les modèles théoriques sont rares et les méthodologies et les outils de recherche peu élaborés.

PROBLEMATIQUE ET REVUE DE LITTERATURE

A l'heure actuelle, nous pouvons affirmer que bon nombre de multinationales fournissent deux documents comptables importants:

. des états financiers consolidés qui constituent une image significative de la puissance économique et financière du groupe;

. une information sectorielle qui permet, par le jeu d'une segmentation des données comptables consolidées, une connaissance de la contribution des différentes composantes du groupe aux documents consolidés.

Cependant, les pratiques de diffusion de cette information segmentée reflètent-elles adéquatement les activités internationales de la firme que les utilisateurs sont en droit d'attendre? Peut-on compter sur un mode de présentation de l'information sectorielle uniforme? Présentement les modalités à la fois comptable et législative présentent une diversité certaine.

Quoique l'uniformisation des normes comptables à travers le monde est d'un idéal lointain, la comptabilité internationale, pour réduire les écarts dans la présentation de l'information financière, peut diriger ses efforts vers la connaissance des forces et des conditions qui créeront des situations similaires à l'échelle internationale. L'une des voie qui lui est donnée est la classification des multinationales selon leur modèle de structure organisationnelle par exemple. Cette variable explicative permettra de répondre à ces questions et de formuler les hypothèses de

recherche suivantes: existe-t-il une relation entre la quantité d'information sectorielle diffusée et le type de structure organisationnelle de la multinationale? Existe-t-il une relation entre la nationalité de la multinationale ayant un type de structure et la quantité d'information sectorielle qu'elle diffuse? Existe-t-il une relation entre le secteur d'activité de la multinationale ayant un type de structure et la quantité d'information sectorielle qu'elle diffuse? Et enfin, existe-t-il une relation entre la nationalité, le type de structure ainsi que la branche industrielle dans laquelle fonctione la multinationale et la quantité d'information sectorielle qu'elle diffuse?

. Revue de littérature

Le point de départ de notre investigation, est de savoir si oui ou non l'information comptable diffusée reflète les opérations internationales des multinationales de notre échantillon. Un objectif, sous-jacent à cette question est de présenter un ensemble de mesures à partir duquel les pratiques comptables de diffusion des opérations internationales des multinationales peuvent être quantifiées.

Pour les fins de cette recherche, nous utiliserons le modèle de Kochanek reproduit au tableau I parce que nous nous intéressons principalement:

. à la présentation de l'information sectorielle;

. à la quantité de détails révélés dans les états financiers des multinationales;

. à l'existence possible de situations semblables

et qu'il utilise certains types d'information sectorielle qui ont été identifiés et qui ont été généralement acceptés par les chercheurs comme étant pertinentes du point de vue des investisseurs. Cependant, pour donner à l'index une dimension internationale, nous devrons compléter le modèle de Kochanek par une information portant sur les secteurs géographiques, jugée pertinente par les investisseurs internationaux. Dans ce but, l'examen des principaux travaux des chercheurs tels que Choi, Bavishi, Wymam, Lees, Barrett, Gray, Firth, Emmanuel nous ont permis de compléter le modèle de base qui est présenté au tableau II.

Enfin un classement des multinationales selon leur structure organisationnelle est rendu possible du fait qu'il a été tenté. Parmi la gamme de classements possibles de structure organisationnelle d'entreprise qui a donné lieu à certaines recherches, celle proposée par Stopford, Wells Jr.

portant sur des firmes américaines donne une vision simple et complète des changements structurels survenus au cours de la multinationalisation d'une firme. Selon eux l'évolution des structures organisationnelles des multinationales montre l'existence de trois phases distinctes: avec filiales autonomes, ou division internationale, ou structure globale.

Cependant, devant la dimension gigantesque que représente le processus de multinationalisation de la firme et vu le nombre important de multinationales à observer, notre étude portera principalement sur la troisième phase qualifiée de structure globale et reproduite à la figure I. Le classement s'est effectué en 2 volets. Le 1er volet, de caractère général, consiste à établir un critère assez extensif pour permettre de rassembler un assez grand nombre de faits concrets en prenant en considération les responsabilités officielles des directeurs généraux. Le 2^{e} volet, de caractère plus sélectif, s'appuie sur un critère plus restrictif fondé sur la tendance dominante des responsabilités officielles des directeurs généraux qui sont sous l'autorité directe du président.

OPERATIONNALISATION DU MODELE RETENU

Pour rendre opérationnel le modèle (tableau II), nous devons franchir trois principales étapes. Pour mesurer le degré d'information sectorielle révélée dans les rapports annuels, la première étape consiste à présenter un nombre d'items relatifs aux différentes formes que peut prendre l'information. Selon l'échelle adoptée, elle est classée selon un ordre hiérarchique allant de la description narrative des secteurs jugés comme le niveau minimal d'information à la diffusion des dépenses en capital et des actifs sectoriels considérés comme le niveau maximal de diffusion. Pour déterminer le niveau auquel une firme de l'échantillon diffuse de l'information au sujet de ses activités internationales, la deuxième étape consiste à donner une pondération aux items de l'index de diffusion. Enfin, la troisième étape consiste à définir avec une attention particulière les termes utilisés dans l'établissement de l'index de diffusion d'information sectorielle, afin de déterminer les principaux éléments permettant de recevoir le maximum de points alloués à l'index de diffusion et recevoir une pondération jugée satisfaisante.

METHODOLOGIE

Dans cette partie nous aborderons successivement la population et l'échantillon des multinationales, l'instrument de recherche et la collecte des données.

. Population et échantillon

D'abord, nous avons cherché une population multinationale dont la caractéristique commune est la structure globale. En outre pensant qu'il pourrait y avoir une relation entre la taille des multinationales et leur structure d'organisation, nous avons pensé analyser les plus grandes. A ce titre, nous avons utilisé les travaux des professeurs J.H. Stopford, J.H. Dunning et K.D. Haberich. Leur dictionnaire intitulé "World Directory of Multinational Enterprises" (1980) comprend les 430 plus grandes multinationales industrielles du monde, (tableau III) parce qu'elles sont majoritaires à plus de 80% dans l'investissement direct à l'étranger.

De plus, le choix des pays se fera à partir de leur influence internationale (Tableau III) qui sera limitée à sa dimension économique et comptable.

L'influence comptable peut s'analyser à partir des tentatives d'uniformisation de normes comptables dans le monde. A l'heure actuelle nous pouvons souligner les efforts des associations comptables européennes, américaines et internationales.

L'influence économique se concrétise, par exemple, par des investissements étrangers. La position dominante de ses 430 multinationales est un exemple en termes d'agents principaux d'une internationalisation de la production à l'échelle mondiale. Aussi, la place des principaux pays où il y a des firmes multinationales selon les secteurs industriels est une autre donnée également importante pour mesurer l'influence économique. Le tableau III montre cet état de choses. Sommairement ces considérations justifient le choix des pays suivants: le Canada, les Etats-Unis, la France et le Royaume-Uni, et de là nous pouvons constituer notre échantillon.

. échantillon

Etant donné le caractère exploratoire de cette présente étude, notre population cible comprendra 298 multinationales (Tableau III). Une autre raison qui milite en faveur de la constitution de cette liste est le fait que nous ne connaissons pas, à priori, les multinationales qui possèdent une structure globale, critère d'acceptation pour fin d'analyse dans notre recherche exploratoire, auxquelles nous avons envoyé une lettre de demande de rapports annuels.

Enfin, pour connaître notre échantillon, nous avons fait l'enregistrement des taux de réponses et le classement par structure d'organisation. Le tableau IV montre que, sur 157 réponses de multinationales, 124 d'entre elles ont une structure globale et forment ainsi notre échantillon.

. Instrument de recherche

Afin de pouvoir vérifier notre hypothèse de recherche selon laquelle il existe une relation entre la structure d'organisation des multinationales de l'échantillon et de la diffusion de l'information sectorielle, nous avons utilisé un index de diffusion (Tableau II) comme instrument de mesure.

. Collecte des données

La source la plus importante de notre information a été constituée des rapports annuels fournis par les entreprises de notre population cible. La période que nous avons retenue pour effectuer nos observations est d'une durée d'un an et chevauche l'année 1980 et 1981.

Suite à la lecture des rapports annuels, les données ont été classées selon la structure d'organisation de la firme et selon les éléments d'information sectorielle.

Le classement des structures d'organisation des multinationales a été fait selon les critères sélectifs proposés par Stopford et Wells Jr. Schématiquement, la figure I montre la manière dont nous avons classé les multinationales de notre échantillon.

L'index de diffusion a été complété à partir des rapports annuels de chaque multinationale dans l'ordre suivant. Dans un premier temps, nous avons établi un index de diffusion avec l'assignation d'une pondération (Tableau II) en conformité avec la définition des termes pré-établis pour chacune des firmes originaires du Canada, des Etats-Unis, de la France et du Royaume-Uni. Ensuite, nous avons réexaminé chacun des index de diffusion complétés, mais dans l'ordre inverse immédiatement après la 1ère étape, et effectué certaines corrections s'il y a lieu. Comme dernière étape nous avons réexaminé, 4 semaines plus tard, tous les index afin de nous assurer de l'exactitude de la pondération attribuée.

Ceci met un terme à notre collecte des données qui nous permettra de faire le traitement, l'analyse et l'interprétation des données.

TRAITEMENT, ANALYSE ET INTERPRETATION DES DONNEES RECUEILLIES

Les données ont été transmises sur fichiers informatiques pour dégager quelques statistiques descriptives et effectuer certaines régressions mathématiques. Tout d'abord, l'observation empirique de notre échantillon confirme l'existence d'une information sectorielle. Toutefois, il

est important de connaître l'étendue de cette information. La lecture du tableau V où sont inscrites quelques statistiques descriptives permettent cette connaissance. En général, les multinationales diffusent une quelconque information, la variabilité de la diffusion de l'information se trouve aussi bien au niveau de la structure globale proprement dite (partie [a]) qu'au niveau de chacune des sous structures (partie [b]), et la variabilité de la diffusion de l'information existe également au niveau des données se rapportant aux secteurs d'activités (partie [b], colonne [2]) et aux zones d'implantation (partie [b], colonne [3]).

Cependant, ce tableau ne permet pas d'expliquer les sources de variations constatées. Il faudra tester les hypothèses de recherche se rapportant aux relations entre la structure d'organisation des multinationales originaires de ces pays, opérant dans les différents secteurs d'activités et la diffusion de l'information sectorielle.

A cet effet, nous avons utilisé un modèle de régression par étapes progressives qui calcule les corrélations partielles de chacune des variables explicatives avec la variable expliquée de telle sorte que les premières variables explicatives introduites sont celles qui contribuent le plus à réduire la variance inexpliquée

De plus nous devons intégrer, dans notre modèle de régression, l'information qualitative à l'aide de variables auxiliaires (dummy variables).

Enfin, l'introduction de variables auxiliaires dans le modèle de régression, implique le choix d'une référence. Les Etats-Unis seront choisis comme référence étant donné le nombre important de multinationales américaines de notre échantillon. La structure selon la matrice est prise comme variable de référence parce qu'elle diffuse en moyenne, compte tenu de l'échantillon, le plus d'informations comme nous montre le tableau V. Enfin, nous avons retenu la branche industrielle intitulée "Alimentation, boissons et tabac" comme variables de référence parce que cette dernière possède le plus grand nombre de multinationales dans l'échantillon (tableau III).

Maintenant nous pouvons passer à l'analyse et à l'interprétation des résultats. Toutefois nous nous limiterons à présenter au tableau VI les hypothèses de recherche, le modèle et l'hypothèse statistique pour mettre l'accent sur les résultats. Enfin nous présenterons brièvement quelques commentaires sur les hypothèses de base du modèle de régression multiple.

La partie A du tableau VI présente une vue d'ensemble du modèle de régression pour la 1ère hypothèse. Tout d'abord cette hypothèse ne peut être rejetée. Elle indique qu'il n'existe pas une relation linéaire significative entre le résultat de l'index de diffusion - en global, par secteur d'activité, par secteur géographique - et la sous structure de la multina-

tionale - par fonction, par produit, par secteur géographique. Cette variable explicative, prise individuellement, ne semble pas justifier la variabilité constatée dans les résultats de l'index de diffusion. Nous ne sommes pas en mesure de préciser, comme nous l'avions souhaitée le sens et le type d'information qui est privilégié. Nous devons ajouter à celle-ci d'autres variables telles que la nationalité, la branche industrielle dans laquelle la multinationale exerce ses activités. Ce résultat justifie l'élaboration des hypothèses subséquentes.

La partie B du tableau VI nous donne un sommaire de cette 2e hypothèse. Nous pouvons dégager les résultats suivants à partir de nos données de référence dans la régression (Etats-Unis la structure selon la matrice). En ce qui a trait au résultat global de l'index de diffusion nous avons constater deux choses: que la nationalité semble expliquer davantage la variabilité des résultats globaux de l'index de diffusion et que trois des nationalités de l'échantillon, soit les Etats-Unis, le Canada et le Royaume-Uni, arrivent en moyenne en tête de file au niveau de l'index global de diffusion. Dans le cadre de cette recherche exploratoire nous constatons le rôle prépondérant que joue la nationalité par rapport à la dynamique organisationelle. A ce propos, nous avons le bloc des pays à tradition comptable anglo-saxonne. Cette conclusion préliminaire corrobore la thèse du professeur Seidler selon laquelle nous retrouvons l'influence coloniale de l'Angleterre. Enfin, les relations de plus en plus grandes entre les associations comptables de ces trois pays peuvent également jouer un rôle important.

En ce qui a trait à l'index de diffusion, secteur d'activité, nous pouvons remarquer que globalement, la nationalité joue un rôle prépondérant dans l'explication de la variabilité constatée. Toutefois, nous constatons avec un niveau de confiance de 90% que les firmes ayant une structure géographique diffusent en moyenne 40 points sur une possibilité de 49. Bien que nous ne pouvons pas extrapoler ce résultat, nous signalons cependant qu'il indique que les multinationales à structure géographique diffusent beaucoup d'information se rapportant à leur secteur d'activité.

En ce qui a trait à l'index de diffusion- secteur géographique nous pouvons dire, qu'en moyenne, une multinationale américaine ayant une structure par matrice diffuse moins d'information par secteur géographique que par secteur d'activité. Les résultats de notre régression permettent d'affirmer que les multinationales de l'échantillon diffusent moins d'information au niveau du secteur géographique. Cette situation ne serait-elle pas occasionnée, en partie, par le fait qu'historiquement, certaines associations comptables nationales se soient penchées sur la diffusion de l'information sectorielle par secteur d'activité en premier lieu afin de répondre à un besoin national?

La partie C du tableau VI donne également un sommaire de la 3e hypothèse. Nous avons constaté ce qui suit à partir de nos données de références dans la régression. Il s'agit de la structure matricielle et de la branche industrielle intitulée "Alimentation, boissons, tabac". Nous

prendrons uniquement en considération le résultat global de l'index de diffusion et celui du secteur géographique vue leur relation significative avec les deux variables explicatives.

En voulant tester cette troisième hypothèse, nous voulions savoir si la branche industrielle dans laquelle la multinationale exerce ses activités peut constituer une voie possible d'harmonisation des normes comptables internationales de présentation de l'information sectorielle. Notre intérêt se justifiait, en partie par l'apport de l'étude du professeur Lees. Selon lui, les firmes qui dévoilent le plus d'information appartiennent à des secteurs industriels particuliers. Toutefois notre étude ne nous a pas permis d'arriver aux mêmes conclusions quant aux branches industrielles particulières. Le seul élément commun à ces deux recherches est l'existence possible de branche industrielle qui diffuse plus d'information.

La partie D du tableau VI donne une vue d'ensemble de la 4^{e} hypothèse et l'interprétation que l'on peut en faire se résume ainsi. Là encore, ce que nous constatons davantage c'est la quantité d'information sectorielle diffusée principalement par les multinationales qui exercent leurs activités dans le secteur de la métallurgie. Ce fait peut indiquer que certaines branches industrielles peuvent diffuser une information comptable différente quant à sa forme et quant au degré de détails révélés.

Enfin, nous indiquerons une autre remarque d'importance. La branche industrielle d'une multinationales peut constituer une voie possible pour amenuiser les écarts de présentation de l'information sectorielle. Dores et déjà, nous constatons une forte corrélation entre le résultat de l'index de diffusion et la branche industrielle nonobstant la nationalité de cette dernière.

En dernier lieu nous dirons quelques mots sur les hypothèses d'utilisation d'un modèle de régression multiple. Théoriquement, nous savons que certaines hypothèses de base sont associées au modèle de régression linéaire.

Dans cette recherche exploratoire, nous nous sommes attardés à l'examen graphique de l'analyse des résidus pour voir si les hypothèses de base ne sont pas violées ou s'il n'y a pas une erreur de spécification du modèle. Après cet examen, nous pouvons globalement conclure que nous n'avons pas de raisons suffisantes pour ne pas accepter le modèle spécifié.

CONCLUSION

Cette étude à caractère exploratoire peut fournir des données intéressantes dans un domaine relativement jeune. Notre conclusion portera

essentiellement sur 2 points. D'abord nous établirons les limites de cette recherche. Enfin, nous proposerons des voies possibles de recherche.

1. Limite de cette recherche

Le concept de la diffusion de l'information sectorielle présente quelques difficultés dans son application. Il s'agit bien de la révélation de toute information économique quantifiable ou autre, se rapportant aux activités internationales de la multinationale qui facilite la prise de décision des investisseurs. Le choix des investisseurs comme principaux utilisateurs des états financiers a pu occasionner un biais dans l'information comptable privilégiée au niveau des dimensions ainsi que des indicateurs corresponsants. Cette situation a pu colorer certains résultats obtenus dans l'index de diffusion.

Une autre limite réside dans le fait que pour rendre opérationnel le concept de la diffusion d'information sectorielle, nous avons utilisé l'index de diffusion de Kochanek développé à partir de la réalité américaine. Donc, le transfert du concept, c'est-à-dire sa manipulation d'une réalité nationale à une réalité internationale a pu causer certains problèmes d'objectivité.

Une troisième limite réside dans l'établissement de l'index de diffusion. Au nombre de deux, les problèmes majeurs sont: l'importance de l'item diffusé qui peut varier d'une firme à l'autre, d'une industrie à l'autre et d'une période à l'autre et le choix arbitraire dans l'assignation d'une pondération à chaque item.

Une quatrième limite concerne les conclusions que l'on peut tirer de nos modèles de régression. Elles se situent dans le contexte d'une recherche exploratoire. A ce propos, notre échantillon n'a pas été prélevé selon les normes d'échantillonnage aléatoire.

Une cinquième limite concerne l'utilisation de variables explicatives spécifiques dans le modèle de régression. Nous savons qu'il existe plusieurs variables explicatives possibles. Dans cette recherche exploratoire nous avons préféré utiliser des variables explicatives facilement identifiables.

Enfin, une dernière limite concerne l'utilisation du modèle de régression. Nous avons utilisé que des modèles de régressions linéaires. Et de plus nous n'avons pas testé les intéractions des variables explicatives du modèle soit la colinéarité entre les variables explicatives.

2. Voies possibles de recherche

La possibilité d'uniformisation des normes comptables internationales pourrait s'effectuer à partir d'associations comptables régionales telles que l'AISG, et cela dans le but de dégager un modèle comptable.

Nous pourrions entreprendre une étude longitudinale basée sur le processus de multinationalisation de la firme en prenant en compte sa structure d'organisation afin de vérifier l'évolution au niveau de la diffusion de l'information sectorielle.

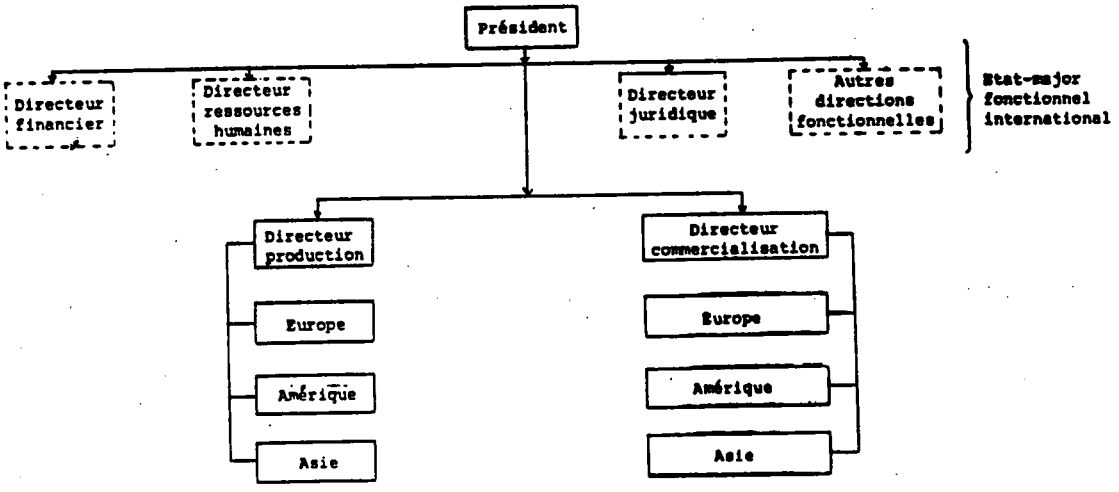
Nous pourrions utiliser un découpage plus spécifique d'une population multinationale en utilisant comme critères la taille, la nationalité, le contexte régional, la branche industrielle, par exemple.

Enfin, suite au comportement différent que semble prendre la France au plan de la diffusion de l'information sectorielle, il serait intéressant d'explorer cette voie de recherche. Défini comme étant le modèle continental dont la France est le maître d'oeuvre, il serait intéressant de connaître le comportement des multinationales originaires des pays qui ont adhéré au modèle français.

Figure 1

STRUCTURE ORGANISATIONNELLE DE L'EM
3e étape: structure globale

1.1 Structure avec directions internationales par fonction



1.2 Structure divisionnelle internationale par groupe de produits

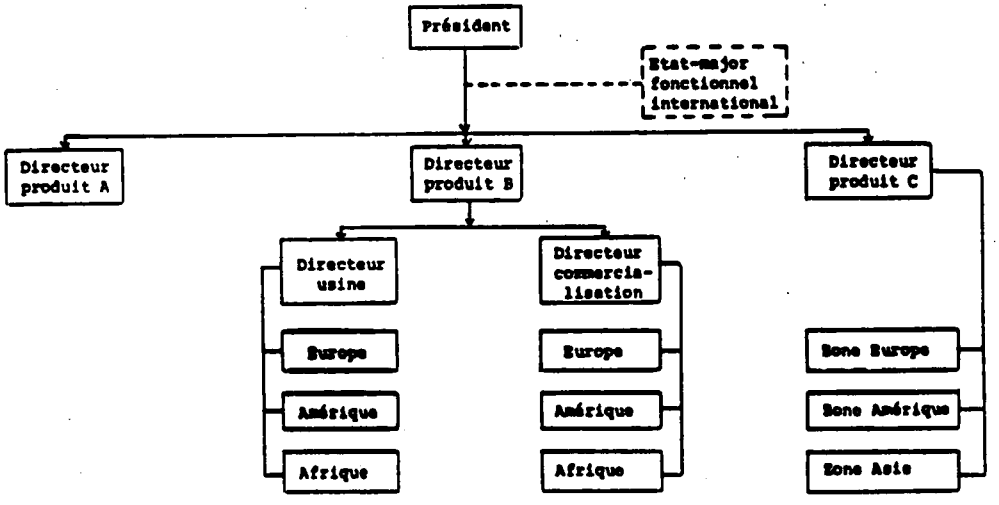
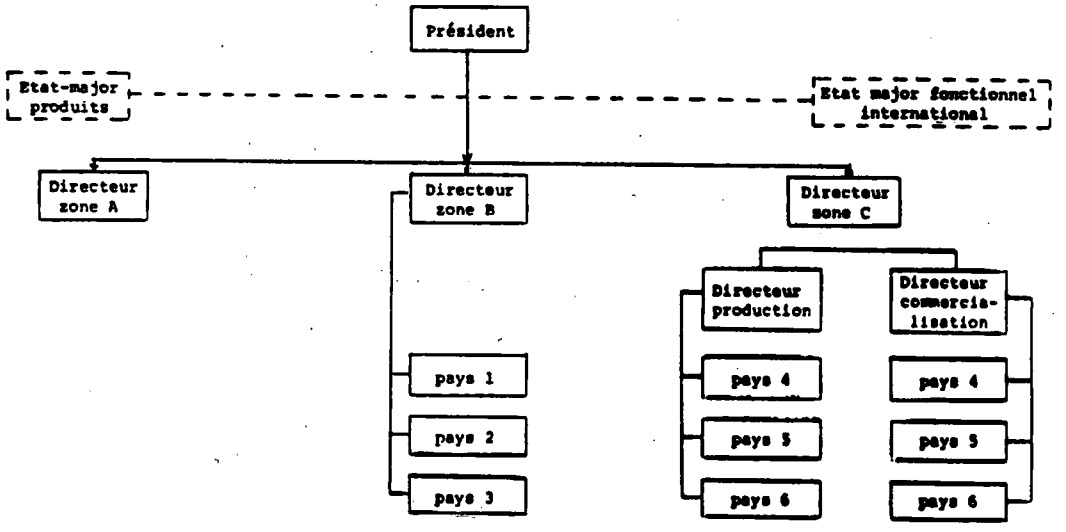


Figure 1
(Suite)

STRUCTURE ORGANISATIONNELLE DE L'EM
3e étape: structure globale

1.3 Structure par direction de zones géographiques



1.4 Structure matricielle

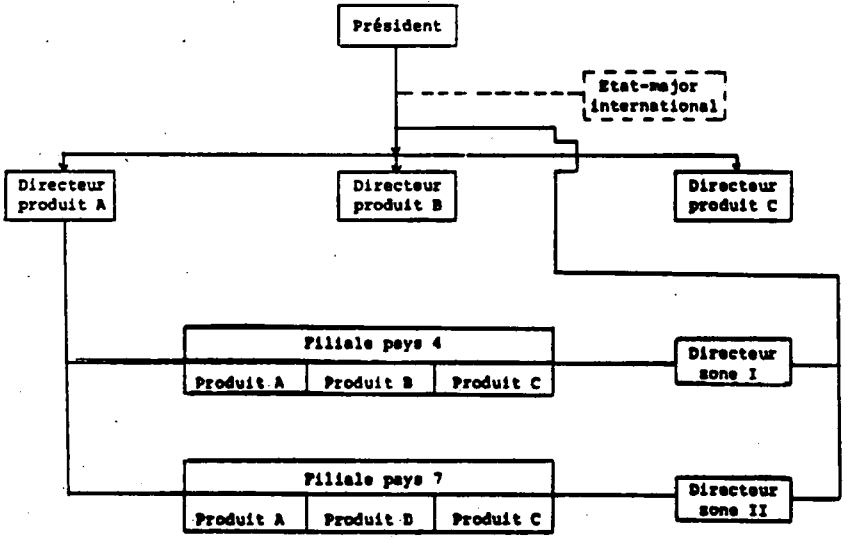


TABLEAU I

INDEX DE DIFFUSION DE L'INFORMATION SECTORIELLE SELON RICHARD KOCHANEK

Segmental Reporting Characteristics Serveyed in Annual Financial Reports and Assigned Index Numbers

Type of Segmental Disclosure	Degree of Segmental Disclosure — Assigned Weights			Maximum Score
	None	Satisfactory Partial		
Level 1, Descriptive:				
1. List of Segments	0	1	2	2
2. Segment Description	0	1	2	2
3. Segment companies	0	1	2	2
4. Segement Products	0	1	2	2
5. Future Segment Plans	0	1	2	2
6. New Acquisitions	0	1	2	2
				12
Level 2, Sgement Sales:				
Tabular ($)	0	4	10	10
Chart or Graph	0	2	8	-
Correspond with Segment Description	0	1	2	2
				12
Level 3, Segment Income:				
Tabular ($)	0	4	10	10
Basis for Income Computation	0	-	2	2
				12
Level 4, Sgement Assets:				
Segment Capital Expenditures	0	2	5	5
Segment Assets	0	2	5	5
				10
Comparison of Data: (sales & income)				
1 Year	0	-	1	
2-5 Years	0	-	2	
6 Years or longer	0	-	3	3
Maximum possible 1 year score				49
Maximum possible 4 year score (49 x 4)				196

Source: Kochanek, Richard Frank, Segmental Financial Disclosure by Diversified Firms and Security Prices, Accounting Review, Vol. XLIX, No. 2, April 1974, p. 249.

TABLEAU II

INDEX DE DIVULGATION DE L'INFORMATION SECTORIELLE ET SA PONDERATION

SECTEURS D'ACTIVITES

TYPE DE DIVULGATION SECTORIELLE	Degré de divulgation sectorielle — Poids alloués			Maximum points
	Aucun	Partielle	Satisfaisante	
1° niveau, description				
1. Liste des secteurs d'activités	0	1	2	2
2. Description des secteurs	0	1	2	2
3. Filiales appartenant au secteur d'activités	0	1	2	2
4. Produits ou services des secteurs	0	1	2	2
5. Plans futurs par secteur	0	1	2	2
6. Nouvelles acquisitions	0	1	2	2
				12
2° niveau, ventes sectorielles				
1. En argent	0	4	10	10
2. Graphique	0	2	8	-
3. Correspondance avec la description des secteurs d'activités	0	1	2	2
				12
3° niveau, bénéfices sectoriels				
1. Argent	0	4	10	10
2. Méthode de calcul	0	-	2	2
				12
4° niveau, actif sectoriel				
1. Dépense en capital engagé au cours de l'exercice	0	2	5	5
2. Valeurs comptables à la fin de l'exercice des éléments d'actifs sectoriels	0	2	5	5
				10
Comparaison des données (ventes et bénéfices)				
1 an	0	-	1	
2-5 ans	0	-	2	
6 ans et plus	0	-	3	
				3
	Maximum de points pour un an			49

SECTEURS GEOGRAPHIQUES

TYPE DE DIVULGATION SECTORIELLE	Degré de divulgation sectorielle — Poids alloués			Maximum points
	Aucun	Partielle	Satisfaisante	
1° niveau, description				
1. Liste zones géographiques	0	1	2	2
2. Description des zones	0	1	2	2
3. Filiales appartenant au secteur géographique	0	1	2	2
4. Produits ou services par zone	0	1	2	2
5. Plans futurs par zone	0	1	2	2
6. Nouvelles acquisitions	0	1	2	2
				12
2° niveau, ventes sectorielles				
1. En argent	0	4	10	10
2. Graphique	0	2	8	-
3. Correspondance avec la description des zones géographiques	0	1	2	2
				12
3° niveau, bénéfices sectoriels				
1. Argent	0	4	10	10
2. Méthode de calcul	0	-	2	2
				12
4° niveau, actif sectoriel				
1. Dépense en capital engagé au cours de l'exercice	0	2	5	5
2. Valeurs comptables à la fin de l'exercice des éléments d'actifs sectoriels	0	2	5	5
				10
Comparaison des données (ventes et bénéfices)				
1 an	0	-	1	
2-5 ans	0	-	2	
6 ans et plus	0	-	3	
				3
	Maximum de points pour un an			49

LE TOTAL DES POINTS AFFECTES AUX SECTEURS D'ACTIVITES ET AUX ZONES GEOGRAPHIQUES EST DE 98 POINTS.

TABLEAU XII

POPULATION MULTINATIONALE (430 EMs)[1] PAR PAYS ET PAR BRANCHE INDUSTRIELLE

PAYS \ BRANCHE INDUSTRIELLE	PETROLE	EQUIPEMENT INDUSTRIEL ET AGRICOLE	ALIMENTATION, BOISSONS, TABAC	Matériel de bureau	AUTOMOBILE ET EQUIPEMENT AUTOMOBILE	CONSTRUCTION AÉRONAUTIQUE	BOIS ET PAPETERIE	METALLURGIE	MATERIAUX DE CONSTRUCTION	TEXTILES, CUIR	PRODUITS CHIMIQUES ET PHARMACEUTIQUES	APPAREILLAGE ELECTRIQUE ET ELECTRONIQUE	CAOUTCHOUC	AUTRES INDUSTRIES	INFORMATION INSUFFISANTE	TOTAL
Etats-Unis	19	15	31	9	15	3	8	16	9	2	41	15	4	8	31	216
Canada		1	2				3	3				1			2	12
France	2		1		2			2	2		2	1		1	6	19
Royaume-Uni	3	2	15		3		2	7	4	2	5	4	1	1	2	51
SOUS-TOTAL	24	18	49	9	20	3	13	28	15	4	48	21	5	10	31	298
Allemagne	1	3			3			3			5	3		1	12	31
Japon					1							1			51	53
Luxembourg								1								1
Pays-Bas	1		2								2	1			2	8
Suède		4			2		2	2				2			1	13
Suisse		1	1					1	1		3	1				8
Afrique du Sud		1													2	3
Australie															2	2
Belgique	1							1			1				1	4
Italie	1			1	1						1				2	6
Norvège												1				1
Antilles néerlandaises												1		1		2
TOTAL	28	27	52	10	27	3	15	36	16	4	60	31	5	12	73	430

1 Source : J. M. Stopford, J. H. Dunning, K. O. Haberich, The World Directory of Multinational Enterprises (New York : Facts on Files Inc., 1980), Tome I, pp. x-xii; Tome II, p. 1164-1173.

TABLEAU IV

CLASSEMENT DES 157 EM SELON LEUR STRUCTURE D'ORGANISATION

PARTIE A) VUE GENERALE:		Division internationale						Globale				
Pays	Réponses	filiales autonomes	fct.	produit	géo.	autre	sous-total	fct.	produit	géog.	matricielle	sous-total
Canada	12	-		2			2	4	3	2	1	10
France	17	-		1			1	1	11	-	4	16
Royaume-Uni	36	-		4			4	-	26	4	2	32
Etats-Unis	92	-	3	23			26	5	50	3	8	66
Total:	157	-	3	30			33	10	90	9	15	124

TABLEAU V

INDEX DE DIFFUSION

STATISTIQUES DESCRIPTIVES SE RAPPORTANT AUX

124 EM DE L'ÉCHANTILLON

PARTIE A) VUE GÉNÉRALE: STRUCTURE GLOBALE

SOMMAIRE

Colonne:	TOTAL (TS) 1	SECTEUR D'ACTIVITÉ (SA) 2	SECTEUR GÉOGRAPHIQUE (SG) 3
Nombre d'observations:	124	124	124
Etendue:	74 (MAX: 94, MIN: 20)	41 (MAX: 48, MIN: 7)	44 (MAX: 48, MIN: 4)
Moyenne arithmétique:	71.9194	38.3387	33.5
Variance:	251.9447	88.3071	104.626
Ecart-type:	15.8728	9.3972	10.2287
Médiane:	76.5	42	37

PARTIE B) PAR SOUS STRUCTURE: DÉTAILS DES TROIS COLONNES CI-DESSUS

COLONNE 1:	PAR FONCTION	PAR PRODUIT	GÉOGRAPHIQUE	MATRICIELLE
Nombre d'observations:	10	90	9	15
Etendue:	54 (MAX: 88, MIN: 34)	74 (MAX: 94, MIN: 20)	36 (MAX: 91, MIN: 55)	47 (MAX: 92, MIN: 45)
Moyenne arithmétique:	63.6	71.8667	72.6667	76.6667
Variance:	484.2667	241.9371	159.75	180.2381
Ecart-type:	22.0061	15.5543	12.6392	13.4253
Médiane:	59.5	77	73	82

COLONNE 2 PAR SECTEURS D'ACTIVITÉS:	PAR FONCTION	PAR PRODUIT	GÉOGRAPHIQUE	MATRICIELLE
Nombre d'observations:	10	90	9	15
Etendue:	39 (MAX: 46, MIN: 7)	35 (MAX: 48, MIN: 13)	38 (MAX: 48, MIN: 10)	14 (MAX: 46, MIN: 32)
Moyenne arithmétique:	35.7	38.7333	33.4444	41
Variance:	177.3444	79.7933	166.0278	29.4286
Ecart-type:	13.3171	8.9327	12.8852	5.4248
Médiane:	43.5	42	39	43

COLONNE 3 PAR SECTEURS GEOGRAPHIQUES:	PAR FONCTION	PAR PRODUIT	GÉOGRAPHIQUE	MATRICIELLE
Nombre d'observations:	10	90	9	15
Etendue:	39 (MAX: 43, MIN: 4)	41 (MAX: 47, MIN: 6)	16 (MAX: 48, MIN: 32)	36 (MAX: 46, MIN: 10)
Moyenne arithmétique:	27.9	33.1889	39.2222	33.6667
Variance:	219.2111	95.4583	30.1944	109.0952
Ecart-type:	14.8058	9.7703	5.4949	10.2516
Médiane:	28.5	36	39	39

HYPOTHESES de RECHERCHE *

TABLEAU VI
PARTIE A

Première hypothèse de recherche

L'énoncé

"Il existe une relation linéaire significative entre la quantité d'information sectorielle diffusée et le type de structure globale de l'EM (fonction, produit, géographique, matricielle)."

Modèle de régression

Afin de confirmer ou d'infirmer cette hypothèse nous avons utilisé le modèle de régression linéaire suivant:

$$Y_i = \beta_0 + \beta_1 X_{41} + \beta_2 X_{42} + \beta_3 X_{43} + \varepsilon$$

Hypothèse statistique

H_0: $\beta_1 = \beta_2 = \beta_3 = 0$
H_1: $\beta_j \neq 0$, au moins un $\beta_j \neq 0$, $j = 1,2,3$.

TABLEAU VI
PARTIE B

Deuxième hypothèse de recherche

L'énoncé

"Il existe une relation linéaire significative entre la nationalité de l'EM ayant un type de structure globale et la quantité d'information sectorielle qu'elle diffuse."

Modèle de régression

Afin de confirmer ou d'infirmer cette hypothèse nous avons utilisé le modèle de régression linéaire suivant:

$$Y_i = \beta_0 + \beta_1 X_{31} + \beta_2 X_{32} + \beta_3 X_{33} + \beta_4 X_{41} + \beta_5 X_{42} + \beta_6 X_{43} + \varepsilon$$

Hypothèse statistique

H_0: $\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = 0$
H_1: $\beta_j \neq 0$, au moins un $\beta_j \neq 0$, j allant de 1 à 6.

TABLEAU VI
PARTIE C

oisième hypothèse de recherche

L'énoncé

"Il existe une relation linéaire significative entre le secteur d'activité de l'EM ayant un type de structure globale et la quantité d'information sectorielle qu'elle diffuse."

Modèle de régression

Afin de confirmer ou d'infirmer cette hypothèse nous avons utilisé le modèle de régression linéaire suivant:

$$Y_i = \beta_0 + \beta_1 X_{41} + \beta_2 X_{42} + \beta_3 X_{43} + \beta_4 X_{52} + \beta_5 X_{54} + \beta_6 X_{55} + \beta_7 X_{515} + \varepsilon$$

Hypothèse statistique

H_0: $\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = 0$

H_1: $\beta_j \neq 0$ au moins un $\beta_j \neq 0$, j allant de 1 à 7.

Ici nous testerons simultanément cette hypothèse en considérant les Y_i dans l'ordre suivant: résultat global de l'index de diffusion (Y), résultat de l'index de diffusion - secteur d'activité (X_1), résultat de l'index de diffusion - secteur géographique (X_2).

Intervalle de confiance

L'intervalle de confiance sera calculé à 90 %, à 95 % et à 99 %. Lorsque les coefficients de régression ne sont pas significatifs dans la régression multiple, ceci n'implique pas nécessairement que les variables indépendantes ne jouent aucun rôle. Ce que nous pouvons dire c'est que leurs apports par rapport aux autres variables introduites dans le modèle ne sont pas significatifs.

TABLEAU VI
PARTIE D

Quatrième hypothèse de recherche

L'énoncé

"Il existe une relation linéaire significative entre la nationalité, le type de structure ainsi que la branche industrielle dans laquelle l'EM opère et la quantité d'information sectorielle qu'elle diffuse."

Modèle de régression

Afin de confirmer ou d'infirmer cette hypothèse nous avons utilisé le modèle de régression linéaire suivant:

$$Y_i = \beta_0 + \beta_1 X_{31} + \beta_2 X_{32} + \beta_3 X_{33} + \beta_4 X_{41} + \beta_5 X_{42} + \beta_6 X_{43} + \beta_7 X_{52} + \beta_8 X_{54} + \beta_9 X_{55} + \beta_{10} X_{515} + \varepsilon$$

Hypothèse statistique

H_0 = $\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = \beta_8 = \beta_9 = \beta_{10} = 0$

H_1 : $\beta_j \neq 0$ au moins un $\beta_j \neq 0$, j allant de 1 à 10.

ALLOCATION OF CAPITAL LEASE LIABILITIES BETWEEN CURRENT AND NON-CURRENT CLASSIFICATIONS- CANADIAN REQUIREMENTS AND PRACTICE

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JUNE, 1986

The suggestions of two reviewers are gratefully acknowledged.

In a recent paper, Swieringa pointed out that there are currently no guidelines in the U.S.A. for measuring the current and non-current portions of capital lease liabilities.(1) He identified two approaches to this allocation--the present value of the next year's payments (PVNYP) and the change in present value (CPV)--and showed that the two approaches give significantly different results.(2) As a result, Swieringa concluded that

> "(g)iven the potential significance of the current and noncurrent portions of lease obligations as well as other long-term receivables and payables in classified balance sheets, perhaps the FASB should consider how these portions should be calculated and provide some guidelines." (3)

Subsequently, Richardson examined the financial reporting practice for capital lease liabilities of a number of companies reporting on the New York Stock Exchange and found that the CPV approach appears to be dominant in practice(4). Furthermore, he found that, if the reported results were adjusted to those that would be obtained under the PVNYP approach, there would be no significant effect on the ranking of these companies according to a number of commonly used financial measures and concluded that

> "...it is not clear that the FASB should expend the resources to study this problem and issue guidelines as suggested by Swieringa."(5)

Current Canadian financial reporting standards require that capital lease liabilities be reported in the financial statements with an allocation of the total obligation between current and non-current liabilities.(6) However, the CICA Handbook provides no specific statement as to the determination of the current and non-current portions of a capital lease liability. Two recommendations which relate to this issue are

> "... the amount of the obligation, recorded at the beginning of the lease term, would be the present value of the minimum lease payments..."(7)

and

> "... Lease payments would be allocated to a reduction of the obligation, interest expense and any related executory cost..."(8)

The only specific guidance is in "Examples of accounting treatment for leases by the lessee and the lessor.", found in the appendix to Section 3065 of the CICA Handbook. This appendix provides a complete analysis of two case studies furnished by the Institute's Research Staff. Although it is not stated explicitly, two methods for allocating a lease obligation between the current and non-current liabilities are presented. Example A follows the PVNYP approach, while example B follows the CPV approach.

The issue of allocating a lease obligation between current and non-current liabilities is examined in this paper for the following reasons. First, the CICA Handbook presents without comment, and therefore implicitly sanctions, two quite different approaches to this allocation. The differences between the two approaches and the information resulting from them should be evaluated. Second, a study of the relative frequency of use of the two approaches in current Canadian financial reporting is of interest in order to determine whether there is a diversity in current Canadian financial reporting practice. Third, the impact on financial statement analysis of using one approach rather than the other approach to reporting

leases is also of interest because of the potential impact on the evaluation of the performance of firms using capital leases. Finally, the question of whether the CICA Handbook should provide more specific guidance in this area should be considered.

In the next section of the paper, the information resulting from the PVNYP and CPV approaches is compared and evaluated. Then, the data from some Canadian financial statements are analyzed to determine the relative frequency of use of the two approaches and the impact on financial analysis of changing from one approach to the other. Finally some conclusions are drawn.

COMPARISON OF THE TWO APPROACHES

For simplicity in a general comparison of the two approaches, consider the case of a lease involving the annual payment of an amount P at the end of each year, an interest rate i and m years remaining in the life of the lease at the date of the current financial statements. For this case, the total obligation is the present value (PV) of the lease payments, given by

$$PV = P * A(m,i) \quad (1)$$

where A(m,i) is the present value factor for an annuity of $1.00 per year for m years at a discount rate of i% per year.

For the PVNYP approach, the current portion of the total lease liability (LCL_P) is defined to be equal to the present value, as of the balance sheet date, of the next year's lease payment (9), and may be written as

$$LCL_P = P * (1 + i)^{-1} \quad (2)$$

The non-current portion of the liability is a residual, calculated as the difference of equations (1) and (2), and is equal to $P*A(m-1,i)*(1+i)^{-1}$, the present value, as of the balance sheet date, of all lease payments beyond the following year. This information is summarized in the upper part of Exhibit I. It is interesting to note that, for this example having constant lease payments, the current liability stays constant, while the non-current liability decreases over the life of the lease using the PVNYP approach.

For the CPV approach, the non-current portion of the total lease liability is defined to be equal to $P*A(m-1,i)$, the present value, as of the end of the following year, of all lease payments beyond the following year. The current liability is a residual amount, equal to the difference of the present values of all future lease payments at the beginning and end of the year. Evaluation of this residual shows that the current portion of the lease liability under the CPV approach (LCL_C) may be written as

$$LCL_C = P * (1 + i)^{-m} \quad (3)$$

This information is shown in the lower part of Exhibit I. Note that use of this approach results in the current liability being valued at the present value, as of the balance sheet date, of the lease payment in the last year of the lease.(9)[1] Furthermore, for this example with constant lease payments, both the current and non-current liability valuations change over the life of the lease for the CPV approach. In particular, it may be noted that the current liability increases each year even though the cash flows are constant.

Exhibit I also shows the ratios of the CPV to PVNYP valuations for the current and noncurrent liabilities. The CPV approach gives a smaller current

liability and a larger non-current liability for a given lease obligation than does the PVNYP approach. This makes the use of the CPV approach preferable when it is desired to report items involving current liabilities more favorably.[2]

For the CPV approach, the current portion of the lease liability is the difference between the present value (PV) of the lease payments at the beginning (b) and end (e) of the year. If it is assumed that the lease requires a single payment P in the following year to be made one year from the date of the financial statements, the following expression for the current portion of the lease liability using the CPV approach can be derived.

$$\begin{aligned} LCL_C &= PV_b - PV_e \\ &= PV_b - (PV_b + i * PV_b - P) \\ &= P - i * PV_b \end{aligned} \qquad (4)$$

This expression for the current portion of the lease liability relates clearly to the requirement that the "lease payments be allocated to a reduction of the obligation, interest expense...".(8)

EXAMINATION OF CURRENT CANADIAN PRACTICE

Method of Analysis

In this section, the method of analysis used to determine the relative frequency of use and the difference in impact on financial statement analysis of the PVNYP and the CPV approaches is explained. Because of their relative simplicity, the data in the December 31, 1978 financial statements of Transalta Utilities Corp. (formerly Calgary Power Limited) are used as an illustration.

Transalta Utilities Corp. reported the lease of draglines requiring the minimum lease payments shown in Exhibit II. The approach used to determine the current portion is not disclosed but it can be identified by focusing on the interest rate for the lease as explained below. For the PVNYP approach, assuming that the first payment is due one year from the date of the financial statements, the current portion of the lease liability would be calculated using equation (2). Exhibit II shows that the current portion of the lease liability is $695,000. and the payment in the first year is $1,965,000. Substitution in equation (2) gives

$$695{,}000 = 1{,}965{,}000 * (1 + i)^{-1} \qquad (5)$$

which yields i = 182.7% as an estimate of the interest rate for the lease. Because this is clearly much higher than any realistic interest rate, it appears that the PVNYP approach is not being used.

For the CPV approach, again assuming that the first payment is due in one year, the reported values of $695,000. for the current portion of the lease liability, $1,965,000. for the payment in the first year and $20,144,000. for the present value of the lease can be substituted in equation (4) to give

$$695{,}000 = 1{,}965{,}000 - i * (20{,}144{,}000) \qquad (6)$$

which yields 6.30% as an estimate of the interest rate for the lease. This is a quite reasonable value.

An independent estimate of the interest rate for the lease can be

obtained by calculating the internal rate of return from the information on the lease given in Exhibit II.[3] The internal rate of return is calculated to be 6.11%. Because this agrees fairly well with the interest rate estimated assuming the CPV approach and differs very considerably from that estimated assuming the PVNYP approach, this suggests that the CPV approach was used.[4,5]

Approach Used in Canadian Financial Statements

This section examines the extent of use of the PVNYP and CPV approaches in Canadian financial statements. The financial statements of 327 larger Canadian companies available in the collection of the University Business Library were examined for disclosures on lease obligations. Eighty-three (approximately 25%) of these companies gave some disclosure on lease obligations, but only twenty provided sufficient information to carry out the analysis described above.[6] These companies and the year of the financial statement for which the analysis was done are given in Exhibit III.[7] These companies belong to a number of different industry types and were obtained from a reasonable sample of larger Canadian businesses.[8]

Two related analyses of these data were done to identify the method used to report lease obligations in the financial statements. The preferred method of analysis is based on a comparison of estimates of the average interest rates for the leases. These estimates can be calculated in three ways from the reported data as explained above. That is, the average internal rate of return, the average interest rate assuming the PVNYP approach is being used and the average interest rate assuming the CPV approach is being used were all calculated from the reported data for each company.

The results of these calculations are presented in columns 2-4 of Exhibit IV. These results show that the estimated internal rates of return agree much more closely with the interest rates calculated assuming the CPV approach than with those assuming the PVNYP approach. The former two estimates also agree reasonably closely with the reported lease interest rate information in column 5 of Exhibit IV (provided by 14 of the 20 companies). These observations are consistent with use of the CPV approach by all 20 companies in the sample.

The second method of analysis is based on a comparison of estimates of the current portion of the lease liability with the reported value. For this analysis, the first step was to estimate the internal rate of return as explained above.[9] The estimated internal rate of return was used with the reported payment in the first year to estimate the current portion of the lease liability for the PVNYP approach using equation (2). Similarly the estimated internal rate of return was used with the reported payment in the first year and the reported present value to estimate the current portion of the lease liability for the CPV approach using equation (4). These estimates and the reported current portion of the total lease liability are shown in columns 6-8 of Exhibit IV. These results are also consistent with use of the CPV approach by all 20 companies.

Another analysis of the available data can be done as follows. Equation

(2) for the PVNYP approach can be rearranged to the form

$$P = LCL * (1+i) \quad (7)$$

If the PVNYP approach is being used, a cross-sectional regression of reported values of P versus LCL should give a relationship with an intercept of zero and a slope of 1+i. Similarly, equation (4) for the CPV approach can be rearranged to the form

$$LCL/P = 1 - i * PV/P \quad (8)$$

and, if this approach is being used, a cross-sectional regression of the appropriate variables should yield a relationship with an intercept of unity and a slope of -i.

The results of the cross-sectional regression using financial data for the years 1981, 1982 and 1983 are summarized in Exhibit VI. There is considerable variability in the results because there are differences in interest rates among different companies and among different leases for a particular company. However, the results are more consistent with use of the CPV rather than the PVNYP approach.

Impact on Financial Analysis

It is widely accepted that financial statement numbers, and ratios of them, are used as an input in investment decisions. In evaluating the two approaches to reporting the current portion of lease obligations, an important question is whether the two approaches will yield financial statement numbers which differ significantly and thus have a different impact on financial analysis. Investigation of this question requires three independent decisions to be made. First, the financial statement data must be converted from the reported values (most likely based on the CPV approach as shown above) to values appropriate for the alternate (i.e. PVNYP) approach. Second, financial measures to be investigated must be selected. Finally, a means of comparing the financial measures calculated for the financial data for the two approaches must be determined.

The evidence presented above suggested that all twenty companies in the sample used the CPV approach, that is, reported values for the current portion of lease liabilities reflect use of equation (4). The values for the current portion of lease liabilities for the PVNYP approach were estimated using the reported lease payments in the first year and the estimated internal rates of return for the leases in equation (2), as explained above. The reported financial data were then simply adjusted to the values which would be appropriate for the PVNYP approach by substituting the estimated values of the current lease liabilities in column 8 of Exhibit IV for the reported values in column 6 of Exhibit IV.

Of the many possible financial measures (dollar values and ratios) that could be used in financial analysis, a number were chosen for this analysis using two criteria: they are affected by the two different approaches and they are likely to be of interest. These are: the current portion of the lease liability (LCL), the total current liabilities (CL), working capital (WC), the acid test (quick) ratio (QR) and the current ratio (CR). The first three were also examined in normalized form (LCLN, CLN and WCN, respectively), where division by total assets was used to convert them

from a dollar value to a fraction.

A simple method of using a financial measure in financial analysis is to rank the companies in order by that particular measure. Equations (2) and (3) give the following expected relationship between the current liability valuation under the PVNYP and CPV approaches.

$$LCL_C = (1+i)^{-(m-1)} * LCL_P \quad (9)$$

The observed Pearson correlation coefficient of 0.948, reported in Exhibit IV, bears out this expectation. Given this relationship, a test of the null hypothesis that there is no association between the rankings of the companies by the various financial measures under the PVNYP and CPV approaches versus the alternative hypothesis of a positive association is appropriate. The rankings of the companies by each financial measure calculated by the two approaches were compared using the Spearman rank correlation coefficient, with the results presented in Exhibit VII. Because the results are all significant at, at least, the 0.01 level, it may be concluded that the rankings of the companies by the two approaches do not differ significantly.[10] Therefore, the approach used to report lease obligations is not important if these companies are to be ranked using these chosen financial measures.[11,12]

CONCLUSION

This paper has addressed a number of issues relating to the reporting of lease obligations and leads to the following conclusions. The current practice for determining the current and non-current portions of capital lease liabilities in Canada is the same as found in a previous study of practice in the U.S.A.(4) It may be concluded that, in both countries, the CPV approach is dominant in practice, and a change to the PVNYP approach is unlikely to have a significant effect on financial statement analysis.

The explanation of the examples in Section 3065.A of the CICA Handbook should be improved to clarify that the PVNYP approach is used in the first example and the CPV approach is used in the second example. It might be argued that the CICA Handbook should provide more specific guidance on which approach should be used to report the current portion of lease obligations.[11] However, there appears to be no clear cut support for using one approach rather than the other. Moreover, it seems that there is currently uniformity in financial reporting practice (i.e. the CPV approach is used) and that the impact of changing to the PVNYP approach on financial statement analysis is probably relatively immaterial. Consequently, it does not appear that the CICA needs to consider the issue of these alternatives.

REFERENCES

1. Robert J. Swieringa"When Current is Noncurrent and Vice Versa!", The Accounting Review, Vol. LIX, No. 1, January 1984, pp. 123 - 130.

2. Swieringa, p. 124.

3. Swieringa, p. 130.

4. A.W. Richardson, "The Measurement of the Current Portion of Long-Term Lease Obligations--Some Evidence from Practice", The Accounting Review (October 1985), pp 744-752.

5. Richardson, p. 752.

6. CICA Handbook 3065.22 &.23.

7. CICA Handbook 3065.16.

8. CICA Handbook 3065.18.

9. Swieringa, p. 129.

10. Swieringa, p. 128.

FOOTNOTES

1. If it is assumed that the lease payments are made at the beginning of each year, the same generalizations hold. That is, for the PVNYP approach, the current portion of the lease liability is simply P, whereas for the CPV approach, it is $P^*[1+A(m-1,i)] - P^*[1+A(m-2,i)] = P^*(1+i)^{-(m-1)}$.

2. "... for companies with lease obligations extending beyond one year, the use of the "present value of the next year's payments" approach results in larger amounts being reported as current liabilities, lower net working capital amounts and lower current and acid test financial ratios.". (9) For the simplified cases considered here, the difference between the calculated current portion of the liability for the PVNYP and the CPV approaches is about 17% of the annual lease payment for a 5 year lease with a discount rate of 5%. The percentage difference increases as both the lease life and interest rate increase.

3. It was assumed that the reported payment stream consists of one payment of $1,965,000. and 4 payments of $1,861,000. as given, followed by 13 payments of $1,861,000. and one of $182,000 (a total of $33,784,000. as given). The present value of $20,144,000. and the assumed payment pattern yield an internal rate of return of 6.11%. Use of an interest rate of 6.11% yields a current lease liability of 1,965,000. - 0.0611 * (20,144,000.) = $734,000. which agrees fairly

well with the reported value of $695,000. Alternatively, use of an interest rate of 6.30% gives a present value of $19,852,000. for the lease payments described above, which agrees fairly well with the reported value of $20,144,000.

4. All these calculations were repeated with the assumption that the first lease payment was due in six months, rather than one year, and the remaining payments were due at one year intervals following the first payment. These calculations gave estimates of the interest rate for the lease of 699.4% for the PVNYP approach and 6.62% for the CPV approach, and an estimated internal rate of return of 6.54%. The results under this assumption are also consistent with the CPV approach being used.

5. The current portion of the lease liability is calculated to be $\$1,965,000.*(1.0611)^{-1} = \$1,851,850.$ for the PVNYP approach using the estimated internal rate of return of 6.11%. This is considerably different from the reported value of $695,000.

6. According to the fifteenth edition of Financial Reporting in Canada, a total of 123 Canadian firms disclosed some information on capital leases in 1982.

7. The same analyses as in this and succeeding sections were done using two successive years of data for nineteen of these companies and using a total of 43 company-years of data for the twenty companies. The results obtained were substantially the same as reported here.

8. The collection included approximately 90% of the 200 public corporations in Canada with the largest sales in 1983 as determined by the Financial Post.

9. Note that the internal rate of return is estimated from reported data without an assumption as to the approach used.

10. For each of the eight financial measures chosen, there is less than 1% chance of erroneously concluding that there is a positive relationship between the rankings of the companies in the sample on the basis of financial statement numbers computed by the CPV and PVNYP approaches.

11. All the above calculations for the sample of twenty companies were repeated for the change in assumptions described in footnote 4. These results are reported in Exhibits V and VIII and lead to the same conclusions as reported here.

12. Experimentation with an illustrative example of a five year lease confirmed the following expectations. (1) The assumption of annual lease payments at year end resulted in lower interest rates than the assumption of lease payments earlier in the year. (2) The assumption of annual lease payments at the middle of the year resulted in interest rates which did not differ significantly from those obtained for the assumption of

monthly interest payments at month end. Therefore, further analysis as to the sensitivity of the results to the assumed timing of lease payments for the sample of companies was not carried out.

13. Swieringa has stated his preference for the PVNYP approach.(10)

EXHIBIT I

COMPARISON OF VALUATIONS FOR THE TWO APPROACHES[1]

	Total Liability [2]		Current Liability [3]		Noncurrent Liability
Present Value of Next Year's Payments Approach	$P*A(m,i)$	-	$P*(1+i)^{-1}$	=	$P*A(m-1,i)*(1+i)^{-1}$

	Total Liability [2]		Noncurrent Liability [3]		Current Liability
Change in Present Value Approach	$P*A(m,i)$	-	$P*A(m-1,i)$	=	$P*(1+i)^{-m}$

RATIO OF CPV TO PVNYP VALUATION

Current Liability	Noncurrent Liability
$(1+i)^{-(m-1)}$	$(1+i)$

(1) P = annual payment at the end of each year
m = number of years remaining in lease at the date of the financial statements
i = interest rate

(2) $A(m,i) = [1-(1+i)^{-m}]/i$ = present value factor for an annuity ofm payments of $1.00 per period at a discount rate of i per period.

(3) see text for description of basis of valuation

EXHIBIT II

SCHEDULE OF MINIMUM LEASE PAYMENTS FROM THE FINANCIAL STATEMENTS OF TRANSALTA UTILITIES CORP AT DECEMBER 31, 1978

	(thousands of dollars)
1979	$ 1,965
1980	1,861
1981	1,861
1982	1,861
1983	1,861
later years	24,375
Total	33,784
Less amount representing interest	13,640
Present value	20,144
Less current portion	695
Non-current portion	$19,449

EXHIBIT III

COMPANIES USED IN THE ANALYSIS

1.	Acklands Ltd.	1980
2.	Air Canada	1983
3.	Alberta Power Ltd.	1983
4.	B.F. Goodrich	1981
5.	Bombardier Inc.	1982
6.	Cara Operations Ltd.	1983
7.	CIL Inc.	1982
8.	Consumers Distributing Ltd.	1983
9.	Controlled Foods Ltd.	1983
10.	CP Hotels Ltd.	1982
11.	Data Crown Inc.	1981
12.	Dominion Stores Ltd.	1983
13.	Dylex Ltd.	1983
14.	Goodyear Canada Ltd.	1982
15.	Grafton Group Ltd.	1983
16.	Loblaws Co. Ltd.	1983
17.	Sobeys Stores Ltd.	1983
18.	Texaco Canada Inc.	1981
19.	Transalta Utilities Corp.*	1982
20.	York Russel Inc.	1982

* Formerly Calgary Power Ltd.

EXHIBIT IV

INTEREST RATES AND CURRENT LIABILITIES FOR CAPITAL LEASE OBLIGATIONS
(Assuming payments at year end)

COMPANY	INTEREST RATES (%)				CURRENT LIABILITIES ($)		
	IRR	CPV	PVNYP	REPORTED	REPORTED	CPV	PVNYP
1	10.00	10.09	114.23	NR	246	248	479
2	8.34	7.64	56.96	7.6	20943	19854	30340
3	9.21	7.55	214.42	7.62	770	409	2217
4	10.05	9.35	118.75	NR	144	131	286
5	11.29	10.11	220.71	7.625-12	420	312	1210
6	10.12	10.93	127.72	10.3	451	494	933
7	16.73	16.73	662.15	17.5	938	940	6125
8	13.14	12.38	100.93	12.8	2686	2519	4770
9	12.92	13.60	387.84	NR	74	88	320
10	7.52	7.58	18.90	NR	529	530	585
11	6.03	6.52	7.09	9.75-14	3553	3572	3589
12	15.52	15.25	1342.01	15.0	488	373	6092
13	13.62	17.34	74.84	9.95-17.0	7873	9137	12115
14	8.39	8.16	84.37	8	435	425	740
15	14.48	12.98	138.31	9.7-26	770	647	1603
16	14.85	12.92	162.20	12.6	6466	4898	14762
17	9.22	11.12	44.40	12	446	480	590
18	9.41	7.75	38.67	NR	2661	2441	3373
19	8.28	7.87	287.31	6.4 & 9.4	969	823	3466
20	16.73	16.52	300.00	NR	58	56	199
Mean	11.29	11.12	225	-	2546	2419	4690
Standard deviation	3.21	3.44	305	-	4834	4663	7220
Standard error of mean	0.72	0.77	68	-	1081	1043	1615

	Correlation Coefficients	
	Pearson	Spearman
INTEREST RATES		
IRR, CPV	0.924	0.908
IRR, PVNYP	0.563	0.648
CURRENT LIABILITIES		
Reported, CPV	0.995	0.967
Reported, PVNYP	0.964	0.899
CPV, PVNYP	0.948	0.836

COMPANY See Exhibit III
IRR estimate from internal rate of return
CPV estimate from change in present value approach
PVNYP estimate from present value of the next year's payments approach
REPORTED from financial statements; average or range for interest rate; dollar value for lease current liability
NR not reported

EXHIBIT V

INTEREST RATES AND CURRENT LIABILITIES FOR CAPITAL LEASE OBLIGATIONS
(Assuming payments at mid year)

COMPANY	INTEREST RATES (%)				CURRENT LIABILITIES ($)		
	IRR	CPV	PVNYP	REPORTED	REPORTED	CPV	PVNYP
1	11.46	11.11	358.94	NR	246	237	499
2	9.80	8.55	146.35	7.6	20943	19147	31369
3	9.88	7.99	888.57	7.62	770	379	2310
4	11.24	10.21	378.52	NR	144	127	299
5	12.74	10.88	928.58	7.625-12	420	261	1269
6	11.33	12.08	418.55	10.3	451	487	973
7	18.31	18.43	5708.78	17.5	938	978	6572
8	15.29	14.06	303.73	12.8	2686	2447	5026
9	14.18	14.82	2279.86	NR	74	86	338
10	10.15	9.88	41.38	NR	529	526	599
11	11.60	12.49	14.69	9.75-14	3553	3571	3602
12	17.00	16.56	20693.88	15.0	488	314	6506
13	17.42	21.48	205.68	9.95-17.0	7873	8996	12703
14	9.53	8.94	239.92	8	435	411	766
15	16.62	14.55	467.93	9.7-26	770	618	1699
16	16.81	14.36	587.50	12.6	6466	4671	15687
17	11.65	13.48	108.50	12	44	473	609
18	11.00	8.97	92.29	NR	2661	2427	3502
19	8.90	8.30	1400.06	6.4 & 9.4	969	773	3597
20	18.87	18.47	1500.00	NR	58	54	213
Mean	13.19	12.78	1838	-	2546	2349	4907
Standard deviation	3.28	3.83	4620	-	4834	4512	7510
Standard error of mean	0.73	0.86	1033	-	1081	1009	1679

	Correlation Coefficients	
	Pearson	Spearman
INTEREST RATES		
IRR, CPV	0.918	0.956
IRR, PVNYP	0.384	0.421
CURRENT LIABILITIES		
Reported, CPV	0.994	0.967
Reported, PVNYP	0.960	0.899
CPV, PVNYP	0.942	0.836

COMPANY See Exhibit III
IRR estimate from internal rate of return
CPV estimate from change in present value approach
PVNYP estimate from present value of the next year's payments approach
REPORTED from financial statements; average or range for interest rate; dollar value for lease current liability
NR not reported

EXHIBIT VI

RESULTS OF CROSS-SECTIONAL REGRESSIONS

PVNYP APPROACH: $P = LCL * (1+i)$

Year	Number of Companies	Intercept(1)	Slope(1)	R^2
1981	10	1576(1.93)	0.739(1.33)	0.08
1982	16	1578(2.03)	1.606(12.01)	0.91
1983	10	1918(1.87)	1.541(11.18)	0.93

CPV APPROACH: $LCL/P = 1 - i * PV/P$

Year	Number of Companies	Intercept(1)	Slope(1)	R^2
1981	10	0.928(7.82)	-0.0803(-4.01)	0.63
1982	16	0.767(6.46)	-0.0674(-3.19)	0.38
1983	10	0.758(5.20)	-0.0678(-2.44)	0.36

(1) t values in parentheses

EXHIBIT VII

SPEARMAN CORRELATION COEFFICIENTS FOR SELECTED FINANCIAL MEASURES

Measure[1]	Coefficient[2]	
	Assuming payments at: year end	mid year
LCL	0.899	0.899
LCLN	0.887	0.881
CL	0.998	0.998
CLN	0.991	0.991
WC	0.998	0.998
WCN	1.000	0.998
QR	1.000	1.000
CR	0.998	0.998

[1]See text for definition of financial measures.
[2]For each financial measure, the Spearman correlation coefficient was computed between the rankings of companies for that measure calculated by the CPV and PVNYP approaches to measuring the current portion of the lease obligation. The equation for the Spearman correlation coefficient r_s is $1 - 6\sum d^2/(n(n^2-1))$ where d is the difference between the rankings for the two approaches and n is the number of companies in the sample.

Classification Techniques for Accounting Research

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Classification Techniques for Accounting Research

ABSTRACT

This paper describes the assumptions and characteristics of statistical techniques used for classifying observations into discrete categories. The discussion is restricted to techniques that can be used with more than two categories. The techniques include multiple discriminant analysis, probit analysis, logit analysis, and classification trees.

Classification Techniques for Accounting Research

The development of a model to classify observations into discrete categories is the primary goal of research studies in a variety of accounting topics. These topics include: (i) accounting method choice, (ii) bank loan classification, (iii) bankruptcy prediction, (iv) bond ratings, and (v) lobbying positions on accounting standards.[1] Each study uses an algorithm to perform the classification step. There are a number of techniques that can be used as the classification algorithm. This paper introduces and describes techniques for classifying observations among multiple categories (i.e., more than two categories). The techniques are:[2]

1) multiple discriminant analysis
2) McKelvey & Zavoina (MZ) n-chotomous probit
3) Walker & Duncan (WD) ordinal logit
4) multinomial logit
   4A) Nerlove & Press (NP) polytomous logit
   4B) McFadden conditional logit
5) classification trees

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[1] Examples of studies for each subject include: (i) accounting method choice - Bowen, Noreen and Lacey [1981], Zmijewski and Hagerman [1981]; (ii) bank loan classification - Dietrich and Kaplan [1982], Marais, Patell and Wolfson [1984]; (iii) bankruptcy prediction - Altman [1968], Ohlson [1980]; (iv) bond ratings - Pinches and Mingo [1973], Kaplan and Urwitz [1979]; (v) lobbying positions - Watts and Zimmerman [1978], Dhaliwal [1982].

[2] There are other classification techniques that are not discussed. Least squares regression has major theoretical weaknesses for classification problems. Multinomial probit is computationally impractical for more than two categories. Chi-square automatic interaction detection (CHAID) has been rarely used and is not readily available. Theil [1969, 1970] proposes a version of logit analysis for use when each vector X_n of observation characteristics is repeated. The Theil technique cannot be used with unique observations. The techniques discussed in this paper have been used frequently in accounting research and are easily accessible.

The discussion of classification techniques in this paper differs from the discussion in most statistics or econometrics textbooks or previous accounting articles in five ways: (i) it is restricted to techniques for more than two categories;[3] (ii) all four common classes of techniques (discriminant analysis, probit, logit, and classification trees) are discussed while other sources only consider subsets of the four techniques; (iii) differences between logit techniques are described;[4] (iv) problems encountered by accounting researchers in using techniques are noted; and (v) a list of computer packages implementing the techniques is provided (see Table 3).

The remainder of this paper is divided into seven sections. Notation is introduced in chapter 1. Sections 2 through 6 discuss the five statistical techniques. Section 7 contains a summary of the techniques.

1. Notation

The classification techniques are described in terms of a general framework. A classification technique contains two compo-

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[3] Most textbooks ignore the problems that result when generalizing classification techniques for two categories to multiple categories. Category ordering becomes an important issue and computation may become too complex to be practical even on main-frame computers.

[4] Many textbooks and accounting articles ignore the differences between logit techniques (for example, Hanushek and Jackson [1977], Martin [1977], Ohlson [1980], and Pindyck and Rubinfeld [1981]).

nents: (i) a scoring function, and (ii) a decision rule. The scoring function transforms the explanatory variables of an observation into a score. The decision rule uses the score to assign the observation to a category.

Assume that there is a sample of N observations, labelled 1, ..., N, drawn randomly from a population. Assume that there are M categories, labelled 1, ..., M, and K explanatory variables. Let X_n be the 1xK vector of explanatory variables for observation n (n = 1, ..., N) and let X be the NxK matrix of explanatory variables for the sample of N observations. Let Y_n be the observed category label for observation n ($Y_n \in \{1, ..., M\}$) and let Y be the Nx1 vector of observed category labels. Let y = F(X) be the scoring function for the classification technique and let C = c(y) be the decision rule that assigns the vector y of scores into an Nx1 vector C of (predicted) category labels. Each element of C is a member of the set {1, ..., M} of category labels.

2. Multiple Discriminant Analysis

Multiple discriminant analysis (MDA) uses linear combinations of the explanatory variables to discriminate among categories. This procedure is discussed in many multivariate statistics textbooks (for example, Johnson and Wichern [1982], Green [1978], and Eisenbeis and Avery [1972]) and is implemented in a number of computer procedures.[5] Unfortunately this popularity has been accompa-

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[5] Table 3 contains a non-exhaustive bibliography of computer pro-

nied by inconsistent terminology and differences in assumptions, derivation, and implementation.[6] General forms of both linear and quadratic MDA are described in this section. MDA has been used frequently in accounting research including Altman [1968], Edmister [1972], Pinches and Mingo [1973], and Dhaliwal [1982].

The MDA procedure assumes that categories are unordered and thus the vector Y of observed categories is measured on a nominal scale.[7] The explanatory variables are assumed to be measured on an interval scale. It is assumed that the characteristics X_n of any observation in category m (i.e., with $Y_n = m$) have a multivariate normal distribution with expected value μ_m and covariance matrix Σ_m, where μ_m is a 1xK vector and Σ_m is a KxK matrix. The population means μ_m (m = 1, ..., M) are assumed to differ between (among) groups. Linear MDA assumes that the covariance matrices Σ_m for the M categories are identical (i.e., $\Sigma_1 = \ldots = \Sigma_M = \Sigma$) and quadratic MDA assumes that the covariance matrices differ.

The scoring function, y = F(X), for MDA consists of a series of

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cedures implementing the techniques.

[6] For example, programs may use forward selection, backward elimination or complete stepwise selection of parameters to determine significant parameter vectors or a program may calculate all (significant and insignificant) parameter vectors. Classification of observations may be done using a nearest neighbour technique, a generalized distance technique, or a discriminant score technique.

[7] A nominal scale of measurement is a scale in which numbers are used only as category labels. In an ordinal scale of measurement the relative order of the numbers has meaning. In an interval scale of measurement both the relative order of measurements and the size of the interval (in a difference sense) between measurements are meaningful.

linear functions of the explanatory variables. These functions are called discriminant functions. The scoring function contains at most D = min(M-1,K) discriminant functions. Each discriminant function is a linear combination of the K explanatory variables. Let λ_d be the Kx1 vector of parameters for the d^{th} discriminant function, where d = 1, ..., D, and let $\lambda = (\lambda_1 \ldots \lambda_D)$ be a KxD matrix of parameters.[8] Let Z_{dn} be the discriminant score for observation n using the d^{th} discriminant function and let Z_d be the Nx1 vector of discriminant scores Z_{dn} as n = 1, ..., N. The scoring function is:

$$Z_d = X\hat{\lambda}_d \qquad \text{for } d = 1, \ldots, D \tag{2.1}$$

where $\hat{\lambda}_d$ is the estimate of λ_d obtained from the sample of N observations.[9] The first set of parameters λ_1 are chosen so that the ratio of the variance of $Z_1 = X\lambda_1$ among the actual categories to the variance of Z_1 within categories is maximized. In general, the parameters λ_d (d = 2, ..., D) are chosen to maximize the ratio of among category variance to within category variance subject to the constraint that λ_d is uncorrelated to the first d-1 parameter vectors.

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[8] Some versions of MDA use a subset of the K explanatory variables in the discriminant function. The subset varies across the D discriminant functions. The criterion for selecting variables is usually based on some measure of a variable's ability to discriminate among categories. Similarly, some versions of MDA eliminate statistically insignificant discriminant functions. The elimination of individual variables or discriminant functions may have a major impact on the classification accuracy of a model (see Tables 2-16 and 2-19 in Eisenbeis and Avery [1972]).

[9] The symbol ^ is used to denote an estimate of the parameter.

A general decision rule, C = c(y), for MDA is based on minimizing the expected probability of misclassifications. The decision rule for linear MDA assigns observation n to category m* if:

$$(X_n\hat{\lambda} - \hat{\mu}_{m*}\hat{\lambda})\ (\hat{\lambda}'\hat{\Sigma}\hat{\lambda})^{-1}\ (X_n\hat{\lambda} - \hat{\mu}_{m*}\hat{\lambda}) \qquad (2.2)$$
$$\leq\ (X_n\hat{\lambda} - \hat{\mu}_m\hat{\lambda})\ (\hat{\lambda}'\hat{\Sigma}\hat{\lambda})^{-1}\ (X_n\hat{\lambda} - \hat{\mu}_m\hat{\lambda}) - 2\ \ln(\xi_{m*,m})$$
$$\text{for } m = 1, \ldots, M,\ m \neq m*$$

where the variable $\xi_{m*,m}$ is an adjustment for the prior probability of category membership and cost of classification errors and $\ln(\xi)$ is the natural logarithm of ξ. The decision rule for quadratic MDA is more complex since the covariance matrices differ. Observation n is assigned to category m* if:

$$(X_n\hat{\lambda} - \hat{\mu}_{m*}\hat{\lambda})\ (\hat{\lambda}'\hat{\Sigma}_{m*}\hat{\lambda})^{-1}\ (X_n\hat{\lambda} - \hat{\mu}_{m*}\hat{\lambda}) \qquad (2.3)$$
$$\leq\ (X_n\hat{\lambda} - \hat{\mu}_m\hat{\lambda})\ (\hat{\lambda}'\hat{\Sigma}_m\hat{\lambda})^{-1}\ (X_n\hat{\lambda} - \hat{\mu}_m\hat{\lambda})$$
$$+\ \ln\ |\hat{\Sigma}_m\hat{\Sigma}_{m*}^{-1}|\ -\ 2\ \ln(\xi_{m*,m})$$
$$\text{for } m = 1, \ldots, M,\ m \neq m*$$

The researcher determines misclassification cost and prior probability of category membership based on knowledge of the research problem. If the prior probabilities are uniform across categories and all classification errors are equally costly then ξ in equations (2.2) and (2.3) equals one and the final term ($2\ \ln\xi$) is zero.

MDA assumptions are frequently violated in accounting research.[10] In many studies, the explanatory variables do not have

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[10] Altman et al. [1981] and Eisenbeis [1977] discuss problems

a multivariate normal distribution. For example, binary dummy variables (which have a binomial distribution) or variables with skewed distributions are used.[11] The assumption of equal misclassification costs in unrealistic in many studies (for example, misclassifying a bankrupt firm as non-bankrupt is more costly than the opposite error). Most studies that use linear MDA do not test for equality of covariance matrices.

These assumption violations can affect research results. Studies of the robustness of MDA have found that classification accuracy can be sensitive to violations of the underlying assumptions and the sensitivity depends on the nature and extent of assumption violations. Research has also found that the relative classification accuracy of linear and quadratic MDA is affected by assumption violations. The effect of assumption violations on the results of previous accounting research studies is difficult to determine without replicating the studies.

In summary, the assumptions underlying MDA and its use as a classification technique are:

i) the observed response variable Y is measured on a nominal scale;

ii) the explanatory variables X are measured on an interval

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incurred in applying MDA to business and finance research.

[11] Examples of binary dummy variables include existence of a management compensation plan [Watts and Zimmerman, 1978; Dhaliwal, 1982] and subordinate status of a bond issue [Pinches and Mingo, 1973; Belkaoui, 1980]. Examples of variables with skewed distributions include total assets [Belkaoui, 1980; Dhaliwal, 1982) and sales [McKee, Bell and Boatsman, 1984; Watts and Zimmerman, 1978].

scale;

iii) each discriminant function has a different vector λ_d of parameters and there are at most D = min(M-1,K) functions;

iv) the characteristics of observations in group m have a multivariate normal distribution with mean μ_m and covariance matrix Σ_m (Σ in linear MDA);

v) the cost of misclassifications may be equal or unequal.

3. McKelvey & Zavoina N-Chotomous Probit

The n-chotomous probit procedure developed by McKelvey and Zavoina [1975, hereafter MZ] uses the cumulative normal distribution to calculate a probability distribution for category membership. It is assumed that there exists a natural ordering among the categories. N-chotomous probit has been used in a number of accounting studies including Hagerman and Zmijewski [1979], Kaplan and Urwitz [1979], and Marais, Patell and Wolfson [1984].

McKelvey and Zavoina assume that the categorical nature of the observations arises from limitations in the data collection process. The response variable of theoretical interest (call it W) is a continuous variable measurable on an interval scale. It is not possible to observe W because of measurement difficulties, and instead, an ordinal version of W, called Y, is observed.

MZ assume that the theoretical response variable W is a random variable satisfying the linear model $W = X\beta + U$ (W and U are Nx1

vectors, and X has dimension Nx(K+1)).[12] It is assumed that the explanatory variables X are measured on an interval scale or are dichotomous nominal variables.[13] MZ assume that the error term U has a multivariate normal distribution with expectation 0 and covariance matrix $\sigma^2 I$ (i.e., $U \simeq MVN(0,\sigma^2 I)$, I is the NxN identity matrix, which is equivalent to assuming U is i.i.d. $N(0,\sigma^2)$).

Each element of the theoretical response vector W is a continuous variable with a range of $-\infty$ to $+\infty$. A response W_n for observation n can be viewed as a point on the real number line. The observed response Y_n is a discrete variable with range 1, ..., M. It is assumed that the theoretical variable W_n is transformed into the observable variable Y_n by a partition of the real number line into M mutually exclusive intervals (numbered 1, ..., M). The variable Y_n has value m if W_n is contained in interval number m. The scoring function and decision rule for MZ n-chotomous probit are derived from assumptions on W, Y, and U and are defined in terms of the β parameters from the linear model and the boundary values for the M intervals. The derivation implicitly assumes that all misclassifications are equally costly.

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[12] In this paper, when the parameter vectors β (or θ) are defined to be (K+1)x1 vectors then these vectors include an intercept term β_o (θ_o). When β (θ) is Kx1 then the β (θ) vector of parameters does not include an intercept term. The number of columns in the X matrix is adjusted (by adding a column of 1's as the first column in X) according to the presence or absence of an intercept term in the β (θ) vector.

[13] Assume, without loss of generality, that a dichotomous nominal variable has values 0 or 1.

Assume that there are M+1 interval boundaries $\eta_0, \eta_1, \ldots, \eta_M$ satisfying:

1) $\eta_0 = -\infty$, $\eta_M = +\infty$

2) $\eta_1, \ldots, \eta_{M-1}$ are real numbers

3) $\eta_0 \leq \eta_1 \leq \ldots \leq \eta_M$

An observation n, $1 \leq n \leq N$, is contained in interval (category) m, $1 \leq m \leq M$, if and only if $\eta_{m-1} < W_n \leq \eta_m$. This expression can be rewritten as a function of the error term U_n.

$$\begin{aligned} W_n \in \text{interval m} \quad \text{iff} \quad & \eta_{m-1} < W_n \leq \eta_m \\ \equiv \quad & \eta_{m-1} < X_n\beta + U_n \leq \eta_m \\ \equiv \quad & \frac{\eta_{m-1} - X_n\beta}{\sigma} < \frac{U_n}{\sigma} \leq \frac{\eta_m - X_n\beta}{\sigma} \end{aligned}$$

A probability distribution for interval membership is obtained from the assumption that $U \sim MVN(0, \sigma^2 I)$:

$$\Pr(W_n \in \text{interval m}) = \Phi\left(\frac{\eta_m - X_n\beta}{\sigma}\right) - \Phi\left(\frac{\eta_{m-1} - X_n\beta}{\sigma}\right) \qquad (3.1)$$

where Φ is the cumulative normal distribution. MZ assume that $\sigma = 1$ and $\eta_1 = 0$ resulting in the probability distribution:

$$\Pr(W_n \in \text{interval m}) = \Phi(\eta_m - X_n\beta) - \Phi(\eta_{m-1} - X_n\beta) \qquad (3.2)$$

MZ use a maximum likelihood method to estimate the M+K-1 parameters $(\eta_2, \ldots, \eta_{M-1}; \beta_0, \ldots, \beta_K)$ in the model.

The scoring function is the linear expression $y = X\hat{\beta}$. The decision rule uses the interval boundaries to assign the elements of y to categories. An observation n is assigned to category m by

the rule:

$$n \in \text{category } m \quad \text{iff} \quad \hat{\eta}_{m-1} < y_n \leq \hat{\eta}_m$$

The scoring function and decision rule can also be used to determine probability distributions for category membership for new observations. Define P_{ms} to be the predicted probability that observation s falls in category m. Then

$$P_{ms} = \Phi(\hat{\eta}_m - X_s\hat{\beta}) - \Phi(\hat{\eta}_{m-1} - X_s\hat{\beta}) \qquad (3.3)$$

$$\text{for } m = 1, \ldots, M$$

The category prediction technique has the property that the predicted category may not be the category with the greatest predicted probability because the intervals $(\eta_m - \eta_{m-1})$ are of uneven size.

The MZ n-chotomous probit procedure assumes that there is a natural ordering among categories. This may be a difficult assumption to satisfy in some research problems. Zmijewski and Hagerman [1981] hypothesize that firms follow an income strategy when choosing accounting methods. They examine four dichotomous accounting choices (depreciation, inventory valuation, recognition of investment tax credit, and period of amortization for past service pension costs) leading to 16 possible combinations of accounting choices. Elliott and Kennedy [1985] provide evidence that the individual choices have different income effects over time and across companies, and thus it is not possible to order the combinations. Lilien and Pastena [1982] consider the combined effect on the income of oil and gas firms of two related account-

ing choices. The decisions are the choice between full cost and successful efforts accounting and the choice of procedures used to implement the selected method. There does not exist a natural ordering of the four categories that result from the two choices because it is impossible to determine the relative impact on income of the two decisions or determine if the income effect is consistent across firms.

The major assumptions of the MZ n-chotomous probit model are:

i) the observed response variable Y is measured on an ordinal scale;

ii) the explanatory variables X are measured on an interval scale or are dichotomous nominal variables;

iii) the β parameters are identical for all categories and the η parameters act as interval boundaries;

iv) the error term U is multivariate normal with mean 0 and covariance matrix $\sigma^2 I$;

v) all misclassification errors are equally costly.

4. Walker & Duncan Ordinal Logit

Walker and Duncan [1967, hereafter WD] develop a logistic procedure for use with ordered categories. The logistic cumulative distribution function is used to determine the probability of category membership. I am not aware of any accounting research studies that have used this procedure with more than two categories.[14]

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[14] The WD ordinal logit technique and NP polytomous logit tech-

Walker and Duncan propose a model in which the response variable Y represents levels of some observable response. An example used by WD is the classification of individuals as free of coronary heart disease, having mild heart disease or having severe heart disease. WD assume that the observed response variable Y is measured on an ordinal scale with values 1, ..., M and the explanatory variables X are measured on an interval scale or are dichotomous (0,1) nominal variables. It is assumed that there are two vectors of parameters; β is a Kx1 vector corresponding to the K explanatory variables and ν is a (M-1)x1 vector of intercepts.

Walker and Duncan assume that the probability distribution across levels can be modeled using the cumulative logistic distribution. WD choose the logistic distribution rather than the normal distribution because it is mathematically and computationally more convenient. The probability that observation n is in level m or a lower level is defined to be:

$$\Pr(Y_n \leq m) = [1 + \exp(-\nu_m - X_n\beta)]^{-1} \quad \text{for } m = 1, \ldots, M-1 \qquad (4.1)$$

$$\Pr(Y_n \leq M) = 1$$

This cumulative probability distribution can be rewritten as a probability distribution for each level. The probability distribution for the M levels is:

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nique (for unordered categories) are equivalent in the two category case. Martin [1977], Ohlson [1980], and Mensah [1983] use logit analysis with two categories.

$$
\begin{aligned}
\Pr(Y_n = 1) &= \Pr(Y_n \leq 1) \qquad (4.2)\\
&= [1 + \exp(-\nu_1 - X_n\beta)]^{-1}\\
\Pr(Y_n = m) &= \Pr(Y_n \leq m) - \Pr(Y_n \leq m-1) \qquad \text{for } m=2,\ldots,M-1\\
&= [1 + \exp(-\nu_m - X_n\beta)]^{-1} - [1 + \exp(-\nu_{m-1} - X_n\beta)]^{-1}\\
\Pr(Y_n = M) &= 1 - \Pr(Y_n \leq M-1)\\
&= 1 - [1 + \exp(-\nu_{M-1} - X_n\beta)]^{-1}
\end{aligned}
$$

The parameter vector β is identical for all levels and the parameter ν_m differs across the M levels. The M+K-1 parameters (ν_1, ..., ν_{M-1} and β_1, ..., β_K) of the model can be estimated using a recursive weighted least squares technique or a maximum likelihood technique.

The scoring function, $y = F(X)$, is based on equations (4.2) and the estimated values for ν and β. It produces a set of M scores for each observation. The scores form the probability distribution for category membership for the observation. Let $y_n = \{y_{1n}, \ldots, y_{Mn}\}$ be the set of scores for observation n where $y_{mn} = \Pr(Y_n = m)$ as defined in equations (4.2) after substituting $\hat{\nu}$ and $\hat{\beta}$ for ν and β. The decision rule, $C = c(y)$, assigns an observation to the category having greatest probability.[15] An observation n is assigned to category m* if

$$y_{m^*n} > y_{mn} \qquad \text{for } m = 1, \ldots, M,\ m \neq m^*.$$

The MZ n-chotomous probit technique and the WD ordinal logit technique differ in derivation and probability distribution, but

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[15] WD ignore the issue of misclassification costs. This results in an implicit assumption of equal costs.

are quite similar in other respects. Both techniques assume that the response categories are ordered and the different categories result from a single process. Each technique includes M+K-1 unknown parameters. The probability distribution for category membership is calculated using regions in the appropriate cumulative distribution (see equations 3.2 and 4.2). The β vector is identical for all categories and the remaining parameters define the categories. Thus the probability distribution for category membership is a function of the η's (interval boundaries) in the MZ probit technique and the ν's (intercepts) in the WD ordinal logit technique. In summary, the two techniques have similar strengths and limitations. The WD ordinal logit technique and the MZ n-chotomous probit technique are appropriate for the same types of accounting research problems.

The major assumptions underlying the WD ordinal logit model are:

i) the response variable Y is measured on an ordinal scale;

ii) the explanatory variables X are measured on an interval scale or are dichotomous nominal variables;

iii) the β parameters are identical for all levels and the ν parameters act as intercepts;

iv) the probability of an observation falling in level m, or a lower level, is given by the cumulative logistic distribution;

v) all misclassification errors are equally costly.

5. Multinomial Logit

The multinomial logit technique (MNL) assumes that the probability of category membership is given by the multinomial logistic distribution and the categories are unordered. The response variable Y is assumed to be measured on a nominal scale and the explanatory variables are measured on an interval scale or are dichotomous (0,1) nominal variables. The probability distribution P_{mn} is a function of both the characteristics of observations and the attributes of categories. Let X_n be the 1x(K+1) vector of characteristics of observation n and let A_{mn} be the 1xL vector of attributes of category m as perceived by observation n.[16] There are M parameter vectors θ_m (m = 1, ..., M, with dimension (K+1)x1) associated with observation characteristics and one vector δ, (dimension Lx1) associated with the category attributes. The probability P_{mn} that observation n is in category m is defined to be:

$$P_{mn} = \frac{e^{X_n\theta_m + A_{mn}\delta}}{\sum_{h=1}^{M} e^{X_n\theta_h + A_{hn}\delta}} \qquad m = 1, \ldots, M \qquad (5.1)$$

The MNL technique is a general version of two separate tech-

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[16] The development of the MNL technique frequently involved problems of individual choice and thus the terminology assumes that observations are individuals. The technique can be applied to observation of inanimate objects. An early application of the MNL technique involved choice by individuals of modes of transportation (for example; car, bus, or train) for a given trip. Examples of attributes in a transportation problem include cost of a transit mode and time taken for trip, and examples of characteristics include income and age of an individual.

niques, the Nerlove and Press polytomous logit technique [Nerlove and Press, 1973, hereafter NP] and the McFadden conditional logit technique [McFadden, 1973, 1982]. NP assume that the choice probabilities P_{mn} are functions of observation characteristics only. The probability distribution P_{mn} is given by:

$$P_{mn} = \frac{e^{X_n\theta_m}}{\sum_{h=1}^{M} e^{X_n\theta_h}} \qquad m = 1, \ldots, M \qquad (5.2)$$

McFadden assumes that the probability distribution P_{mn} is a function of category attributes only. The probability distribution P_{mn} is given by:

$$P_{mn} = \frac{e^{A_{mn}\delta}}{\sum_{h=1}^{M} e^{A_{hn}\delta}} \qquad m = 1, \ldots, M \qquad (5.3)$$

These techniques are discussed in sections 5A and 5B respectively. Additional discussion of the more general MNL technique appears in section 5C.

The McFadden conditional logit technique is used by Dietrich and Sorensen [1984] to predict merger targets. The NP polytomous logit / WD ordinal logit technique is used for two categories by Martin [1977], Ohlson [1980], and Mensah [1983].[17] I am not aware of any accounting research studies that have used the MNL technique with more than two categories.

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[17] As was noted earlier, the WD ordinal logit and NP polytomous logit techniques are equivalent in the two category case.

5A. Nerlove & Press Polytomous Logit

The polytomous logit technique proposed by Nerlove and Press [1973] assumes that the probability of category membership for an observation is described by a logistic distribution based on observation characteristics only. NP assume that characteristics differ across the set of observations while category attributes are constant for all observations.[18] The θ vector of parameters varies across categories to reflect different weightings of observation characteristics for each choice (i.e., the impact of a characteristic on the probability of category selection varies across categories). The probability distribution for category membership is given in equations (5.2).

In order to estimate the θ_m parameter vectors in equations (5.2), set $\theta_M = 0$. The probability distribution becomes:

$$P_{mn} = \frac{e^{X_n\theta_m}}{1 + \sum_{h=1}^{M-1} e^{X_n\theta_h}} \qquad m = 1, \ldots, M-1 \qquad (5.4)$$

$$P_{Mn} = \frac{1}{1 + \sum_{h=1}^{M-1} e^{X_n\theta_h}}$$

A maximum likelihood procedure is used to estimate the (K+1)(M-1)

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[18] As an example, consider the transportation mode problem introduced in the previous footnote. Income and age are characteristics that differ across individuals and affect the choice. Cost and trip time are category attributes that are assumed to be the same for a given mode for all individuals, and thus do not affect the choice.

parameters.[19]

The scoring function, $y = F(X)$, is based on equations (5.4) after substituting $\hat{\theta}_m$ for θ_m. The score for an observation is a set $\{y_{1n}, \ldots, y_{Mn}\}$ of M estimated probabilities where $y_{mn} = P_{mn}$. The decision rule, $C = c(y)$, assigns an observation to the category with the highest score (i.e., greatest estimated probability). Observation n is assigned to category m* if

$$y_{m^*n} > y_{mn} \qquad \text{for } m = 1, \ldots, M,\ m \neq m^*.$$

5B. McFadden Conditional Logit

The conditional logit technique proposed by McFadden [1973, 1982] assumes that the probability of category membership is described by a logistic distribution based on category attributes. McFadden assumes that attributes vary across categories and observation characteristics are the same for all categories.[20] The δ vector of parameters is identical for all categories and measures the effect of category attributes on choice probabilities. The probability distribution for category membership is given by equations (5.3).[21]

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[19] The MNL technique implicitly assumes that all misclassification errors are equally costly.

[20] Continuing the transportation mode example, the cost and trip time attributes differ between modes and affect the choice, but the income and age characteristics do not affect the decision.

[21] Equations (5.3) represent a simplified version of the McFadden conditional logit technique. McFadden assumes that the number of categories can vary across observations. Each observation has

McFadden models the probability P_{mn} explicitly as a conditional probability of the form $P_{mn} = Pr(Y_n=m|X_n)$. P_{mn} is interpreted as the conditional probability that observation n is in category m (with associated perceived attributes A_{mn}) given that observation n has characteristics X_n. It should be noted that the probabilities of category membership in the MZ n-chotomous probit, WD ordinal logit and NP polytomous logit techniques are also conditional, although it is not stated explicitly. In each case, the probability P_{mn} is implicitly conditional on the characteristics of the observation (X_n) and the category considered (m).

In order to estimate the δ parameter vector in equations (5.3) set $\delta_1 = 1$. The probability distribution becomes:

$$P_{mn} = \frac{e^{A_{mn}\delta}}{\sum_{h=1}^{M} e^{A_{hn}\delta}} \qquad \begin{matrix} m = 1, \ldots, M \\ \delta_1 = 1 \end{matrix} \qquad (5.5)$$

The normalized δ vector (containing L-1 elements) is estimated using a maximum likelihood technique.

The scoring function and decision rule are similar to the function and rule for the NP polytomous logit technique. The scoring function is given by equations (5.5) with δ replaced by $\hat{\delta}$ and results in a set of M scores $y_{mn} = P_{mn}$. The decision rule is to

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some subset of the M categories available. The probability distribution for category membership is conditional on the set of categories available to the observation. McFadden also assumes that each element A_{mn} in equations (5.3) can be either a category attribute or a function of a category attribute and an observation characteristic. This additional complexity is ignored to simplify the discussion.

assign an observation to the category with the highest score.

The McFadden conditional logit technique can be used to predict category membership and construct probability distributions for new observations. It can also be used to examine the effect on choice probabilities of the introduction of new categories. Let A_{M+1n} be a vector of attributes for a new category, labelled M+1, as perceived by observation n. A probability distribution P_{mn} (m = 1, ..., M+1) for category membership across the M+1 categories results from substituting A_{M+1n} into the scoring function, equations (5.5), with δ replaced by $\hat{\delta}$.

5C. Additional Comments on MNL

The MNL technique combines the NP polytomous logit and McFadden conditional logit techniques. It allows for characteristics that vary across observations and attributes that vary across categories within a single problem.

The parameter estimation procedure, scoring function and decision rule for the MNL technique follow directly from the NP polytomous logit and McFadden conditional logit techniques. It is assumed that $\theta_M = 0$ and $\delta_1 = 1$ resulting in the probability distribution:

$$P_{mn} = \frac{e^{X_n\theta_m + A_{mn}\delta}}{e^{A_{Mn}\delta} + \sum_{h=1}^{M-1} e^{X_n\theta_h + A_{hn}\delta}} \qquad \begin{matrix}\delta_1 = 1 \\ m = 1, \ldots, M-1\end{matrix} \qquad (5.6)$$

$$P_{Mn} = \frac{e^{A_{Mn}\delta}}{e^{A_{Mn}\delta} + \sum_{h=1}^{M-1} e^{X_n\theta_h + A_{hn}\delta}} \qquad \delta_1 = 1$$

The scoring function for MNL is based on equations (5.6), with θ_m and δ replaced by $\hat{\theta}$ and $\hat{\delta}$, and produces a set of M scores y_{mn} for observation n. The decision rule is to assign an observation to the category with the highest score.

The MNL technique has the property of independence of irrelevant alternatives (IIA). The IIA property states that the odds P_{mn}/P_{jn} of observation n choosing category m instead of category j ($j \neq m$) are independent of the presence of other categories. That is, the odds ratio

$$\frac{P_{mn}}{P_{jn}} = \frac{e^{X_n\theta_m + A_{mn}\delta}}{e^{X_n\theta_j + A_{jn}\delta}} \qquad (5.7)$$

is identical for all subsets of the M categories. The IIA property affects the probability distribution of categories when the categories are distinct (i.e., category definitions do not change when a category is added or deleted). If two distinct categories are similar then the probability distribution given in equations (5.6) does not describe the true probability distribution [Maddala, 1983, p. 62, summarizing Debreu, 1960].

The relevance of the IIA property for accounting research can be illustrated with two examples. The IIA property is relevant when studying management's choice of depreciation methods. Three common depreciation methods are straight-line (SL), sum-of-the-years digits (SOYD) and declining balance (DB). These methods are distinct and their definitions do not change if one method is eliminated. To illustrate the effect of the IIA property, suppose that management is indifferent between the two accelerated methods (SOYD and DB) and indifferent between SL depreciation and accelerated depreciation. This leads to the conditional probabilities:

$$\Pr(\text{SOYD}|\text{SOYD},\text{SL}) = .50$$
$$\Pr(\text{SL}|\text{SOYD},\text{SL}) = .50$$
$$\Pr(\text{SOYD}|\text{SOYD},\text{DB},\text{SL}) = .25$$
$$\Pr(\text{SL}|\text{SOYD},\text{DB},\text{SL}) = .50$$

The relative odds of SL and SOYD being chosen depend on the presence of DB. The odds of SL and SOYD are 1:1 if DB is not available and 1:2 if DB is available. This is inconsistent with IIA as IIA requires that the relative odds of SL and SOYD be constant regardless of the presence of DB.

The IIA property is not relevant to research on bond ratings. The size and definition of rating categories varies depending on the number of categories. The introduction of an additional category changes the size and definition of existing categories. It is not possible to compare new and old categories and thus the IIA property is irrelevant.

The existence of the IIA property restricts the applicability of the MNL technique (and thus the NP polytomous logit and McFad-

den conditional logit techniques) for accounting research. The MNL technique must be applied carefully to research problems in which the categories are distinct, but can be ignored when categories are dependent.

The major assumptions underlying the MNL technique are:

i) the response variable Y is measured on a nominal scale;

ii) the explanatory variables are measured on an interval scale or are dichotomous nominal variables;

iii) the θ parameters (associated with observation characteristics) vary across categories and the δ parameters (associated with category attributes) are constant across categories;

iv) the probability distribution for category membership follows a logistic distribution;

v) all misclassification errors are equally costly;

vi) the probability distribution for category membership satisfies the axiom of independence from irrelevant alternatives.

6. Classification Trees

Classification trees (CT) is a nonparametric technique that uses recursive binary partitions of the explanatory variables to classify observations. The technique is part of the classification and regression trees procedure developed by Breiman et al. [1984, hereafter BFOS]. The CT technique has been used by Marais, Patell and Wolfson [1984], Elliott and Kennedy [1985], and Frydman, Altman and Kao [1985].

BFOS assume that the N observations are drawn randomly from some distribution Ψ on $\chi x\Gamma$ where χ is the space of measurement vectors (i.e., the set of all possible vectors X_n of measurements on K explanatory variables) and Γ is the space of category names (i.e., the set $\{1, \ldots, M\}$ of possible values for Y_n). BFOS assume that explanatory variables are measured on a nominal or ordinal scale and the response variable is measured on either a nominal or ordinal scale. It is assumed that the prior probability distribution for class membership $\pi(m)$ $(m = 1, \ldots, M)$ is known or is estimated from the data.

The CT technique generates a tree-like structure to classify observations. An example of a classification tree is given in Figure 1. A tree consists of a series of nodes (labelled $t_1, \ldots, t_{13}$ in Figure 1), branches connecting nodes and binary splits of the nodes. Node t_1 is called a root node and is the base of the tree. Node t_1 is partitioned into nodes t_2 and t_3 using a splitting rule based on one of the explanatory variables.[22] The binary partitioning process continues recursively until a tree is generated. The square boxes in Figure 1 represent terminal nodes (t_5, t_6, t_8, t_9, t_{11}, t_{12}, t_{13}) and the circles are nonterminal nodes. Each terminal node is assigned to a category, which is shown below the node.[23] The tree construction process is described in BFOS and

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[22] For example, splitting rule 1 could be: allocate observations with $X_3 \leq 10$ to node t_2 and observations with $X_3 > 10$ to node t_3. The partition can also be based on linear combinations of explanatory variables.

[23] In Figure 1, assume M = 6 categories. Two terminal nodes can be assigned to the same category (i.e., nodes t_8 and t_{11} are

summarized in Marais, Patell and Wolfson [1984].

Figure 1 should appear about here

The scoring function, $y = F(X)$, is the set of splits, branches and nodes making up the classification tree. The terminal nodes represent the set of possible scores. The score for observation n is determining by passing the observation down the tree from the root node t_1 to a terminal node. The decision rule, $C = c(y)$, uses the category of the terminal node to assign observations to categories. For example, if observation n is assigned to terminal node t_5 in Figure 1 ($y_n = t_5$) then observation n is classed as category 6.

The classification accuracy of the CT technique has been compared to the accuracy of other techniques. Marais, Patell and Wolfson [1984] compare it to the MZ n-chotomous probit technique and BFOS, Frydman, Altman and Kao [1985], and Elliott and Kennedy [1985] compare the CT technique to multiple discriminant analysis. Each study has concluded that the classification accuracy of the CT technique is at least as good as the accuracy of the other techniques.

In summary, the major assumptions of the CT technique are:

i) the response variable Y is measured on either a nominal or ordinal scale;

ii) the explanatory variables can be measured on a nominal or

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assigned to category 3) and some categories may not be assigned to any terminal nodes (i.e., there are no nodes for category 2).

ordinal scale;

iii) a set of splitting rules are determined instead of estimating parameters;

iv) observations are drawn randomly from some distribution Ψ on $\chi x \Gamma$;

v) misclassification costs may be equal or unequal.

7. Summary

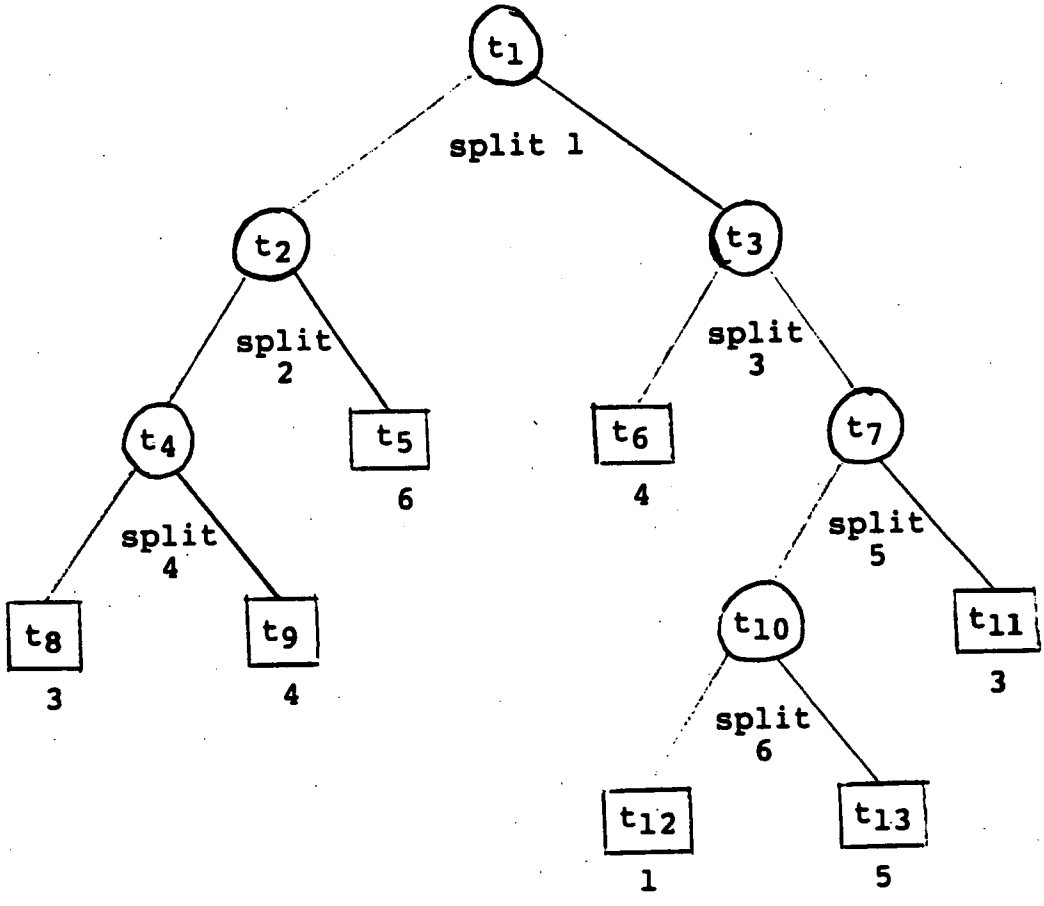
This paper examines statistical techniques that can be used in accounting research problems involving classification of observations into discrete categories. The techniques are summarized in Tables 1 and 2. Table 1 summarizes assumptions of the techniques. Table 2 classifies the techniques by the measurement scales required for the response and explanatory variables. A non-exhaustive bibliography of computer procedures to implement the techniques is given in Table 3.

Researchers should choose a classification technique having assumptions that match the characteristics of the research problem. Unfortunately, technique assumptions are violated to some degree in most research problems. There is some research on the effects of assumption violations on the classification accuracy of the multiple discriminant analysis technique, but limited research on the other techniques. Some research studies have compared the relative performance of pairs of techniques in particular research settings, but these results are difficult to generalize (for example, Marais, Patell and Wolfson [1984] and Casey and Bartczak

[1985]). I am currently examining technique robustness and its impact on accounting research.

Figure 1

Example of a CT



Notes:

i) Square boxes represent terminal nodes and circles represent nonterminal nodes.

ii) The numbers shown below the terminal nodes are category numbers. Assume that there are M = 6 categories.

Table 1

Summary of Assumptions (i)

	MDA	MZ Probit	WD Logit
1) Measurement scale for response variable	nominal	ordinal	ordinal
2) Measurement scale for explanatory variables	interval	interval nominal (0,1)	interval nominal (0,1)
3) Parameters			
-name and (dimension)	λ_d (Kx1) at most D vectors where D=min(M-1,K)	β ((K+1)x1) $\eta_2,\ldots,\eta_{M-1}$	β (Kx1) $\nu_1,\ldots,\nu_{M-1}$
-number to estimate	$\leq$ DxK	M+K-1	M+K-1
-comments	λ vary across discriminant functions	β identical across categories; η interval boundaries	β identical across categories; ν intercepts
4) Distribution assumptions	observation X_n in category m $\sim$MVN(μ_m,Σ_m) [$\sim$MVN(μ_m,Σ) for linear MDA]	U $\sim$ MVN(0,I)	$Pr(Y_n \leq m)$ given by cumulative logistic distribution
5) Cost of Misclassifying observations	equal or unequal	equal	equal
6) Other			

Notes:

i) MDA = multiple discriminant analysis, MZ probit = McKelvey and Zavoina n-chotomous probit, WD logit = Walker and Duncan ordinal logit, MNL = multinomial logit, NP logit = Nerlove and Press polytomous logit, McFadden = McFadden conditional logit, CT = classification trees

Table 1 (Continued)

Summary of Assumptions

	MNL NP logit	MNL McFadden	MNL Combined
1) Measurement scale for response variable	nominal	nominal	nominal
2) Measurement scale for explanatory variables	interval nominal (0,1)	interval nominal (0,1)	interval nominal (0,1)
3) Parameters -name and (dimension)	θ_m ((K+1)x1) m=1,...,M-1	δ (Lx1)	θ_m ((K+1)x1) m=1,...,M-1 δ (Lx1)
-number to estimate	(K+1)(M-1)	L-1	(K+1)(M-1) + (L-1)
-comments	θ varies across categories	δ identical across categories	θ varies and δ identical across categories
4) Distribution assumptions	$Pr(Y_n = m)$ given by logistic distribution	$Pr(Y_n = m)$ given by logistic distribution	$Pr(Y_n = m)$ given by logistic distribution
5) Cost of Misclassifying observations	equal	equal	equal
6) Other	IIA property (ii)	IIA property (ii)	IIA property (ii)

Notes (continued):

ii) IIA = independence of irrelevant alternatives

Table 1 (Continued)

Summary of Assumptions

	CT
1) Measurement scale for response variable	nominal ordinal
2) Measurement scale for explanatory variables	nominal ordinal
3) Parameters -name and (dimension)	set of splitting rules
-number to estimate	not applicable
-comments	
4) Distribution assumptions	observations drawn from some distribution ¥
5) Cost of Misclassifying observations	equal or unequal
6) Other	

Table 2

Measurement Scales (i)

Response Variable (iii)	Explanatory Variables (iii) Nominal	Ordinal	Interval
Nominal	CT	CT	MDA MNL (ii)
Ordinal	CT	CT	MZ probit (ii) WD logit (ii)
Interval	none	none	none

Notes:

i) MDA = multiple discriminant analysis, MZ probit = McKelvey and Zavoina n-chotomous probit, WD logit = Walker and Duncan ordinal logit, MNL = multinomial logit, CT = classification trees

ii) Explanatory variables can include dichotomous (0,1) nominal variables

iii) Classification techniques may be used on a higher measurement scale, but the additional information in the measurement will not be used.

Table 3

Computer Procedures (i)

Statistical Technique	Computer Procedure	Reference
MDA	SAS procedures DISCRIM, NEIGHBOR	SAS Institute Inc. [1982]
	MANOVA in SPSS^X	SPSS Inc. [1983]
	P7M in BMDP-79	Dixon and Brown [1979]
MZ Probit	MZ Probit	McKelvey and Zavoina [1971,1975]
WD Logit	SAS procedure LOGIST (ii)	Harrell [1983]
MNL	SAS procedure MLOGIT	Smith [1980]
CT	CART	Breiman et al. [1984]

Notes:

i) MDA = multiple discriminant analysis, MZ probit = McKelvey and Zavoina n-chotomous probit, WD logit = Walker and Duncan ordinal logit, MNL = multinomial logit, CT = classification trees

ii) The WD ordinal logit technique is modified slightly in the LOGIST computer procedure developed by Harrell [1983]. Harrell reverses the inequality signs in equations (4.1) (i.e., $\leq$ becomes $\geq$) and labels the levels 0 through M-1. Equations (4.1) become $\Pr(Y_n \geq m) = [1 + \exp(-\nu_m - X_n\beta)]^{-1}$ for $m = 1,\ldots,M-1$ and $\Pr(Y_n \geq 0) = 1$. The same parameters appear in the WD ordinal logit procedure and the Harrell procedure. The same parameter estimates will result from the two procedures except the signs will be reversed.

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INTERNATIONAL ACCOUNTING IN THE ACCOUNTING CURRICULUM:

Summary of presentation

Introduction

When I first considered the possibility of offering a course in international accounting, there were two general topics that immediately sprang to mind: (1) harmonization of accounting standards and (2) translation of foreign currency transactions and operations. These are the topics that seem to attract many professional accountants' interest and that have received the most discussion in the professional literature in Canada. Also I was concerned that there would not be enough substantive material to fill a separate course.

I soon found out how naive I was on both counts. The two topics that sprang to mind are just the tip of the proverbial iceberg; there are enough topics and material to easily fill two separate courses, not just one. If anything, I tried to cram too much material into the course. But more on that problem later.

The Faculty of Administrative Studies (FAS) at York is essentially a graduate Faculty. About 80% of the teaching is in the MBA programme, with only 20% in a small third and fourth year BBA programme. One of the more popular programmes within the MBA is the programme in International Business Studies. For some time, the director of the international programme had been asking the Accounting area to mount an international accounting course, at least on an experimental basis. In the Winter term of 1984-85, we did offer such a course for the first time. I developed and taught the course. This presentation is a description of our experience with that course. The paper will deal with the the following:

- the rationale for having such a course in the accounting curriculum,
- the topic or subject areas that the course can cover,
- the results of our experience and changes that we will make in the future, and
- the more important course materials that are available to those who wish to develop such a course.

There is nothing authoritative about this presentation; it reflects the experience of one instructor in one university in one term. (A second offering of the course was planned for this summer but has been postponed to a later term.)

Rationale for an International Accounting Course

Canada is a major international trader. Business dealings in two or more currencies are common, and dealings with foreign businesses is the norm. It has been estimated that over one half of our business activities are controlled by non-Canadians. Many of the businesses that are under Canadian control deal extensively in foreign markets, either as buyers or as sellers. Many of our resource industries deal in products that are traded world-wide in U.S. dollars. Many of our larger corporations go frequently to the U.S. capital markets (and sometimes to those in Europe). Neither managers nor accountants can escape the impact of international operations on Canadian business enterprise. The odds are that a manager or accountant will be working for (or have as a client) a business that is foreign controlled or one that is Canadian controlled but that has foreign business operations. Managers can ignore the international business scene only at their peril. Accountants, who provide information for decision-making by managers and other stakeholders, therefore must be cognizant of the accounting implications of international business activities.

Given the large body of knowledge currently existing in accounting, and given the importance of developing professional skills among accounting students, the creation of yet another course may seem a case of course overload. But the responses to the course by the students indicated quite the opposite. The point of view that is engendered by a separate international accounting course is quite different from that developed in domestically-oriented courses. In addition, it permits the students (and the instructor) to step back from the necessarily narrower focus of conventional financial or managerial accounting courses to take a broader look at the many factors that influence the development of accounting, both financial and managerial.

As was mentioned above, the initial request for the course came from the International Business Programme. The course was officially offered at the MBA level, but enrollment was also made available to fourth-year BBA students. About half of the students who enrolled were actually accounting majors rather than international business students. The mix of students created some problems in that their backgrounds varied considerably, resulting in varying abilities to deal with some of the accounting issues. In general, however, the mixture of backgrounds enriched the course.

Topic Coverage

There no doubt are other ways in which to categorize the topics that may be included in a course in international accounting, but I would group the topics into four general areas of focus, based on the users and uses of the accounting information:

1. international capital markets

2. accounting and control in multinational enterprises

3. accounting as a tool in the accomplishment of national objectives

4. international auditing and auditing standards

Specific topics frequently have a bearing on two or more of these focus areas. For example, the international harmonization of accounting standards is a topic that affects all four areas. Nevertheless, I like to use this type of categorization because it keeps focus on the end uses of the information.

Some accountants may wish to include international taxation as a separate topic. My preference, however, is to treat taxation as one of the issues confronting multinational corporations and as one of the important areas affecting nations' abilities to achieve their national goals.

The first of my arbitrary groupings, the international capital markets, does have as its primary focus the standardization or harmonization of accounting standards among nations. This is an area in which Canada has played a significant role. The harmonization of standards makes life easier for the professional accountant in international practice, but one of the primary goals of harmonization is to facilitate the international capital markets. As the capital markets become increasingly internationalized, it becomes much more important for the players in this market to be able to read financial statements of companies from different nations, whether those companies are multinational or uninational. On the surface, harmonization will assist the readers.

The issue is actually more complicated, because the harmonization of measurement and reporting cannot reflect the underlying environmental realities of the business environment in each country. For example, harmony may be achieved in reporting the capital structures of Canadian and Japanese businesses, but harmonization cannot explain the radical difference in debt:equity ratios as between the two countries. The nature of the relationship between banks and their clients is quite different in Japan than it is in Canada, and how can accounting standards reflect that substantive difference?

A study of harmonization must include a study of the influence of the many environmental factors that underlie national accounting standards. These factors include the influence of language, economic environment, the role of government, social structures, political processes, population size and diversity, and state of industrial development, to name a few. There are a number of empirical analyses that have attempted to identify the more important of these factors and their influence on the development of accounting standards. Some of these papers are cited in the accompanying course outline.

Multinational enterprises (MNE) also are affected by the lack of harmonization in accounting standards. MNEs must report the results of their activities in each country in which they operate in accordance with the legislation governing corporations in each country. When these reporting requirements are not compatible, it is expensive and frequently difficult to prepare different reports using different reporting standards.

More importantly, the difference in reporting standards can lead to serious problems of goal congruence for the managers of subsidiaries in foreign countries. The subsidiary managers may be evaluated by the parent company in terms of their contribution to overall corporate performance (as measured by accounting standards in the home country) while they will also

be evaluated by local stakeholders in terms of measurements based on local accounting standards. This problem is exacerbated when there are shares being held by equity participants in the host country.

Managers of MNEs must also cope with the interrelated problems of exchange rate fluctuations, interest rate variations between countries, and disparate inflation rates. There is an interesting (although small) empirical literature on the relationship between interest rates, inflation rates, and exchange rates that gives some valuable insights into the problem of foreign currency translations (and that suggests that we have not yet satisfactorily resolved that problem).

MNEs frequently transfer goods and services across national borders, which raises the general issue of international transfer pricing. Transfer pricing is strongly affected by tax considerations, but it may also have a direct impact on the evaluation of foreign business units and managers, as well as on exposure to exchange rate risk. Thus financial reporting, managerial accounting, and tax policy all interact to an even greater extent in the international context than they do in a domestic context.

National goals are an important factor in the establishment of accounting standards in many countries, especially in those less well developed. An excellent example is that of Egypt, whose reporting structure is on a value-added basis that ties directly into the system of national macro-economic accounts. The contribution of an enterprise can therefore be evaluated directly in relationship to the national goals, rather than indirectly as tends to be the case in Western industrialized nations. National governments frequently are major users of the financial statements of businesses that operate within their borders, and harmonization will not be achieved if it means weakening the ability of national leaders to evaluate the performance of business in helping to achieve national goals.

International auditing standards is an area of concern not only for auditors, but also for multinational enterprises and for the international capital markets. Other issues in international auditing include professional independence, self-regulation, professional qualifications, politicization, and enforcement of standards. The general area of international auditing was not included in the York course, partially due to lack of time and partially due to lack of expertise on my part. An instructor with greater competence in auditing could well choose to include this topic and perhaps drop another.

Results and Probable Changes:

The course outline that was used in the first offering of the course is attached as Appendix A. The course met for a single session of three hours each week for 13 weeks. In addition, there were two short (90 minutes) midterm tests and a research paper. Because it was a small class (13 students) and because the success of the course depended upon active discussion of the assigned articles and cases, class participation was included as a significant portion of the final mark.

The course materials consisted of the textbook by Choi and Mueller, a small volume of articles on managerial accounting, and 21 articles from the academic and professional literature. The course attempted to deal with

most of the major international issues in both financial and managerial accounting. In retrospect, the course probably had too much material and too many readings for maximum effect. The temptation was to cram everything into the course, because there are so many interesting issues!

The course was well accepted by the students. The ratings for the course (Appendix B) were well above average. While the instructor felt that the course was overcrowded, the students seem not to have agreed as the responses for level of difficulty, level of complexity, and pace were in the midpoint of the scoring range. One student commented that one aspect that he/she liked best about the course was that there was "not much work to do". Other comments were:

- "Very satisfied. Provided a good introduction to the issues involved in international accounting."

- "Acted as a good review of past accounting courses plus provided a new perspective for viewing the subject."

- "Thanks for a very informative, entertaining and well-prepared course. I enjoyed its presentation format and hope that other students may enjoy it in the future."

- "Course is most interesting and sets accounting into an important international setting. The studies compliment general accounting studies very well."

The intent of the research paper was to get the students to delve more deeply into any one of the topics that was discussed in the course. Secondary research was expected and generally received. One exception, however, was an excellent piece of original empirical and conceptual research into the structure of accounting standards in Hong Kong. The paper borrowed some methodology from prior research into "families" of accounting standards (e.g., the family of countries that use U.S.-based accounting standards as opposed to U.K.-based standards), and then developed a theory to explain the nature of Hong Kong accounting standards based on the speculative environment of Hong Kong. The paper was presented in April at the 1986 International Seminar on Accounting at the University of Illinois.

When we next offer the course, I would alter some of the readings. If the Choi and Mueller text is used, then I may not use any of Professor Choi's articles because the essence of the articles is, for the most part, well captured in the textbook. I also would not use the volume of managerial accounting readings. Although the articles are good and interesting, we did not have adequate time to explore their ramifications adequately in class. Finally, I would like to use more extensive cases, especially in management accounting, to help emphasize the complexity and interrelationships of the issues.

Course Materials

The attached course outline is only one possible model for such a course, although it does have the advantage that it has been prepared from a Canadian viewpoint and thus includes material of particular relevance to

our students. Other samples of course outlines can be found in the annual compendium of accounting course outlines.

A very incomplete list of major available materials is given below. Hopefully it will be of some help to other instructors who are interested in developing a course on international accounting.

Textbooks:

International Accounting by Choi and Mueller (Prentice-Hall 1984). This is the book with which I am most familiar because I have used it in class. It is a first-rate text, written by two of the leading researchers in international accounting. The book does an excellent job of integrating the results of recent research into the text so that the reader has a good understanding of the important issues as well as the research that has been undertaken to find answers to a few of the many questions that abound in the area. The book contains helpful reference lists at the end of each chapter, and contains assignment material consisting of questions, exercises and short cases of varying quality. The book is quite neutral in tone avoids the attitude that "the American way is the right way". There are few answers in international accounting and Choi and Mueller don't pretend that there are answers when there are not.

International Accounting and Multinational Enterprises by Arpan and Radebaugh (Second edition; Wiley 1985). Another book by two active researchers in the field, this one is slimmer than Choi and Mueller (364 pp. as compared to 512pp.) but covers similar ground. It too contains extensive and helpful bibliographies for each topic area and contains study questions and cases. Although I have not yet used this book, it seems to attempt less integration of some of the empirical research material than does the Choi and Mueller volume, but supplementary readings can supply that additional dimension. This book too avoids being parochial in its outlook.

International Accounting and Reporting by Evans, Taylor and Holzman (Macmillan, 1985). I am less familiar with this recent book than with the two preceding. The senior author has done a considerable amount of writing in the areas of foreign currency translation and foreign exchange risk. The book has somewhat similar topic coverage to the two preceding and also contains reference lists, study questions and exercises, and cases. The book also seems quite international in its viewpoints; Canadian and U.K. approaches to problems are given particular attention. It has two chapters (out of 13) on taxation that take a U.S. view, however. The book is devoted mainly to three topics: (1) a comparison of accounting and reporting in 12 different countries (with some attention given to consolidation policies) and a discussion of the harmonization process (3 chapters); (2) foreign exchange, translation and risk management (4 chapters); and (3) investment analysis, financial planning and control in multinational corporations. There also is one chapter on international auditing.

Comparative International Accounting by Nobes and Parker (Oxford: Philip Allan Publishers Limited 1981). This book from the U.K. focuses primarily on a discussion and comparison of financial reporting in North America and Europe. There are separate chapters on North

America, France, West Germany, the Netherlands, and Britain and Australia (together), followed by chapters on the research on classification of accounting systems and on accounting in developing countries. Three chapters then follow on specific issues: consolidation accounting, inflation accounting, and foreign currency translation. The text concludes with two chapters on harmonization, one on accounting standards and one on corporate income taxes. Reference lists are provided, but there is no assignment material. This would seem to be a worthwhile book to use if the emphasis of a course was to be on comparative accounting.

International Accounting, H.Peter Holzer, editor (Harper and Row 1984). In this book, each chapter is written by a different author. There are two primary topic areas, multinational enterprises (6 chapters) and a comparison of financial reporting in many different counties (11 chapters). The MNE section generally takes a U.S. view. The international comparisons are very broad, however, and include Japan, the socialist countries, and developing countries. All chapters include a bibliography, most include questions, and a few include short cases.

Accounting Problems of Multinational Enterprises by Elwood L.Miller (Lexington Books: D.C.Heath and Company, 1979). This is by far the best book on the accounting problems of MNEs that I have yet run across. The other books generally attempt to deal with issues in a way that relates to all parties affected, an approach which adds breadth but lacks depth. By focusing on the MNE, Miller brings a depth of understanding that is unique in this listing of textbooks. Its only drawback is a lack of assignment material; an instructor would have to obtain assignment material (if any is desired) from other sources (with copyright permission, of course!).

Other Books of Interest:

Except for one, the following books are all edited volumes containing contributions from various authors. All are worthwhile. Their focus is clearly indicated by the titles.

The Multinational Corporation: Accounting and Social Implications, Centre for International Education and Research in Accounting (University of Illinois, 1977).

Managerial Accounting: An Analysis of Current International Applications, Centre for International Education and Research in Accounting (University of Illinois, 1984).

The Impact of Inflation on Accounting: A Global View, Centre for International Education and Research in Accounting (University of Illinois, 1979).

Multinational Accounting: A Research Framework for the Eighties, Frederick D.S.Choi (ed.) (UMI Research Press 1981).

The Internationalization of the Accountancy Profession: A Collection of Views by Leading International Accountants, edited by W.John Brennan (CICA, 1979).

Comparative International Auditing Standards, edited by Belverd E. Needles, Jr. (American Accounting Association, 1985). This volume discusses auditing standards in ten countries, including Mexico, Japan, Jordan and Kuwait in addition to the major countries of North America and Europe.

Notable Contributions to the Periodical International Accounting Literature, 1975-78 (American Accounting Association 1979). This is a collection of 15 articles that previously appeared in various journals, selected by the International Section of the AAA. There are three broad topic areas: accounting issues of multinational enterprises (5 articles); descriptive and comparative accounting (7 articles); and international accounting standards (3 articles). An excellent collection.

Annotated International Accounting Bibliography, 1972-1981 by Agami and Kollaritsch. This is an invaluable guide to the periodical literature. It should be on the shelf of anyone interested in the issues of international accounting.

As has already been noted, there are extensive reference lists in the material listed above, including the last volume whose sole function is to provide an annotated bibliography. Therefore, I will refrain from adding yet another list of articles as possible references. The course outline (Appendix A) includes the readings that I chose to assign; others could have been chosen and some doubtless would have been chosen had a different text been used.

One final note: the International Section of the AAA is in the process of assembling a comprehensive listing of case materials that are available in international accounting. When issued, this will be a valuable contribution to the teaching of international accounting.

APPENDIX A

YORK UNIVERSITY

Faculty of Administrative Studies

ACTG 6950, WINTER 1985

INTERNATIONAL ACCOUNTING

Instructor: T.H. Beechy
Room 321 ASB
667-3741

Secretary: Mrs. Teresa Colavecchia
Room 330 ASB
667-3741

INTRODUCTION

This course is intended to provide an overview of the problems of accounting in an international context. There are two major categories of problems. The first consists of problems that arise as a result of different financial reporting standards in different countries. Variations in external reporting requirements have an impact not only on transnational companies, but also on the international capital markets. Therefore, differing accounting standards are significant even for a company that operates in only one country because its reported financial results are compared to results reported by other companies operating under different reporting standards in other countries.

The second category of problems consists of the difficulties of managing effectively in an international environment. Companies that operate in more than one country must not only abide by the reporting standards in each country, but must also attempt to report the results of their overall international operations in a meaningful manner and in a single currency. This need has significant impact on the evaluation of performance of foreign subsidiaries and their managers.

In this course, we will look at the broad range of accounting problems that arise in the international environment, for both external and internal reporting.

COURSE MATERIALS

There are two required books, both available in the bookstore:

1. F.D.S. Choi and G.G. Mueller, International Accounting; Prentice-Hall, 1984.

2. Center for International Education and Research in Accounting, Managerial Accounting: An Analysis of Current International Applications, University of Illinois, 1984.

An additional textbook which students may find helpful is the following:

J.S. Arpan and L.H. Radebaugh, Internal Accounting and Multinational Enterprises, Wiley, 1981.

Cases are assigned from this book in the last few weeks of the course, and are indicated in the course outline as AR.

Accounting students may find also the following reference source to be useful:

T.H. Beechy, Canadian Advanced Financial Accounting; Holt, Rinehart & Winston of Canada, 1985; Chapters 15-18.

In addition, there will be articles from the accounting literature that are covered by the course material fee and that will be handed out.

GRADING

The final course grade will be determined as follows:

Midterm examination 1	20%
Midterm examination 2	20
Research paper	40
Class participation	20
	100%

TOPIC OUTLINE

January 7: Introduction to course

January 14: Dimensions of international accounting
Read: CM, Chapters 1 and 12
Walters, "From National to International Standards: Can the FASB Bridge the GAAP?" (FASB Status Report, March 12, 1984)
Gaertner and Rueschhoff, "Cultural Barriers to International Accounting Standards" (CA Magazine, May 1980)
Turner, "The Need for International Harmony in Accounting Standards" (CA Magazine, January 1985)

Class discussion:
CM, Chapter 1: Question 1-6; Exercises 1-1 and 1-4; Case

January 21: Conceptual bases for international accounting
Read: CM, Chapter 2
da Costa and Bourgeois, "International Accounting Models: An Empirical Investigation" (CAAS 1977 Conference Proceedings)

Choi, "European Disclosure: The Competitive Disclosure Hypothesis" (Journal of International Business Studies, Fall 1974)

Class discussion:
CM, Chapter 2: Questions 2-4 and 2-5, Exercises 2-1 and 2-3

January 28: Differences in national accounting practices
Read: CM, Chapter 3
Choi and Bavishi, "International Accounting Standards: Issues Needing Attention" (Journal of Accountancy, March 1983)
Gray, Shaw and McSweeney, "Accounting Standards and Multinational Corporations" (Journal of International Business Studies, Spring/Summer, 1981)
Al Hashim, "Social Accounting in Egypt" (International Journal of Accounting Education and Research, Spring, 1977)

Class discussion:
CM, Chapter 3: Exercise 3-5; Case

February 4: Foreign currency translation
Read: CM, Chapter 4
CICA Handbook section 1650

Reference: (optional) Beechy, Canadian Advanced Financial Accounting, Chapter 16, pp.491-503

Class discussion:
CM Chapter 4: exercises 4-1, 4-2, 4-4 and 4-5
What are the major differences between the recommendations of FASB Statement #52, as described in the text, and CICA Handbook section 1650?

February 11: Foreign currency translation
Read: Patz, "The State of the Art in Translation Theory" (Journal of Business Finance and Accounting, 1977)
Aliber and Stickney, "Accounting Measures of Foreign Exchange Exposure: The Long and Short of It" (Accounting Review, January 1975)
Alleman, "Why ITT Likes FAS 52";
Wojciechowski, "Du Pont Evaluates FAS 52"
(both from Management Accounting, July 1982)

Reference: Beechy, Chapter 17

Class discussion: CM questions 4-1, 4-2, and 4-9
Evaluate the arguments of Alleman and Wojciechowski in light of the discussions of Patz and of Aliber and Stickney
Case: Hi-Tech Industries Ltd. (Beechy)

February 15: Midterm exam 1

February 18: Inflation
Read: CM, Chapter 5
Graham, "Inflation accounting - a worldwide view" (International Accounting Bulletin, July 1983)
Fleming, "Accounting for Inflation in Brazil" (CA Magazine, April 1974)
Philips Electronics Industries Ltd. (from Rosen, Current Value Accounting and Price-Level Restatements; CICA, 1972)

Reference: Beechy, pp.476-478

Class discussion: CM Chapter 5, Case (Jayson Enterprises); Royal Dutch Petroleum Co. (AR)

February 25: Reading week

March 4: Consolidation of foreign operations
Read: CM, Chapter 6
Walker, "International Accounting Compromises: The Case of Consolidation Accounting" (Abacus, December 1978)

Class discussion: Matterhorn AG (AR)

March 11: International financial statement analysis
Read: CM, Chapters 7 and 8
Morley, "The Value Added Statement: A British Innovation" (CA Magazine, May 1976)
deVos, "Value Added Tax" (CA Magazine, October 1974)

Class discussion: CM, Exercise 7-4 and 7-5, Chapter 8 Case

March 18: Managing risk exposure
Read: CM, pp.365-390
Keyserlingk and Tetley, "Management Controls of Investments in an International Development Bank (MA, pp.23-39)
Simke, "Managing Foreign Exchange Risk Successfully" (CA Magazine, July 1983)

Reference: Beechy, pp.503-516

Class discussion: CM, Exercise 10-1

March 25: Management information systems and performance evaluation
Read: CM, pp.390-424
Radebaugh, "The Impact of a Strengthening Dollar, Weak World Economy, and New Accounting Standard on Performance Evaluation of Foreign Operations" (MA, pp.53-70)
Neuhauser, "Analyzing Management Information Systems of Multinational Companies: an External Auditor's View (MA, pp.41-52)
Gray and Morris, "Comprehensive Controls for Multinational Corporations" (MA, pp.107-124)

Class discussion: CM, Q10-10, Exercise 10-4, Exercise 10-5; Autoparts Inc. (AR)

March 29: Midterm exam 2

April 1: Performance evaluation

Read: Vobroucek, "Reshaping Corporate Information Flows Using Cost-Effective Financial Systems" (MA, pp.71-81)
Donaldson and Pai, "Management and Performance Evaluation: An International Perspective" (MA, pp.1-22)
Ings, "The Function of the Managerial Accountant in Planning and Control" (MA, pp.125-137)

Class discussion: CM, Chapter 10 Case;
Niessen Apparel Inc. (AR)

April 8: Transfer pricing and taxation

Read: CM, Chapter 11
Hogg, "A Canadian Tax Overview of Transfer Pricing" (CA Magazine, December 1983)
Beach's columns of June 6, 1983 and November 5, 1984 (Financial Times of Canada)
Bernstein, "Unitary Taxation, an Unfair Burden for Canadian Multinationals" (CA Magazine, October 1984)

Class discussion: CM, Q11-10, Exercise 11-2
Tustian Enterprises, Ltd. (Beechy)

THE FACULTY OF ADMINISTRATIVE STUDIES

COURSE EVALUATION RESULTS - WINTER 1985

COURSE: ACTG695A
PROFESSOR: BEECHY

QUESTION		KEYWORDS	RESPONSES								FOR THIS SECTION			FOR THIS AREA			FOR CLASS YEAR		
			0	1	2	3	4	5	6	7	TOTAL	MEAN	STD. DEV.	TOTAL	MEAN	STD. DEV.	TOTAL	MEAN	STD. DEV.
II	10.	THE COURSE IS (EASY-DIFFICULT)	0	0	0	1	8	1	0	0	10	4.00	0.44	502	5.02	0.95	1195	4.29	0.25
	11.	LEVEL OF COMPLEXITY OF MATERIAL (LOW-HIGH)	0	0	0	1	8	1	0	0	10	4.00	0.44	501	4.97	0.96	1197	4.31	0.99
	12.	PACE FOR COVERING COURSE (SLOW-FAST)	0	0	0	0	9	1	0	0	10	4.10	0.29	502	5.14	1.12	1192	4.29	0.98
	13A	TEXT AND READINGS (NOT HELPFUL-HELPFUL)	0	0	0	0	1	4	3	2	10	5.60	0.90	499	4.99	1.32	1157	4.66	1.41
	13B	LECTURES (NOT HELPFUL-HELPFUL)	0	0	0	0	0	4	4	2	10	5.80	0.74	500	4.45	1.62	1190	5.06	1.44
	13C	CLASS DISCUSS. (NOT HELPFUL-HELPFUL)	0	0	0	0	0	3	4	3	10	6.00	0.77	500	4.33	1.61	1190	4.87	1.43
	13D	ASSIGNMENTS (NOT HELPFUL-HELPFUL)	0	0	0	0	2	4	2	2	10	5.40	1.00	499	5.02	1.39	1154	5.09	1.36
	14.	COURSE ORGANIZATION (POOR-EX)	0	0	0	0	2	2	4	2	10	5.60	1.01	501	4.61	1.31	1194	4.91	1.31
	15.	COURSE INTEREST (POOR-EX)	0	0	0	0	0	2	6	2	10	6.00	0.63	500	4.73	1.51	1196	5.34	1.29
	16.	CLEAR OBJECTIVES (POOR-EX)	0	0	0	0	1	0	7	2	10	6.00	0.77	501	4.72	1.51	1195	4.96	1.40
	17.	ACHIEVES OBJECTIVES (POOR-EX)	0	0	0	0	0	3	5	2	10	5.90	0.68	494	4.50	1.47	1190	4.87	1.38
	18.	CONTRIBUTES TO KNOWLEDGE (POOR-EX)	0	0	0	0	0	1	7	2	10	6.10	0.53	501	5.13	1.32	1195	5.36	1.27
	19.	CONTRIBUTES TO MGT. ABILITY (POOR-EX)	0	0	0	0	1	3	4	2	10	5.70	0.89	495	4.66	1.57	1182	4.81	1.41
	20.	CONTRIBUTES TO APPLICATIONS (POOR-EX)	0	0	0	1	2	2	4	1	10	5.20	1.15	487	4.06	1.51	1175	4.51	1.51
	21.	COMPARED TO OTHERS THIS IS (POOR-EX)	0	0	0	0	2	2	4	2	10	5.60	1.01	500	4.40	1.46	1195	4.93	1.38
III	22.	INSTRUCTOR PRESENTS MAT CLEARLY (POOR-EX)	0	0	0	0	0	3	5	2	10	5.90	0.68	502	4.38	1.52	1195	5.11	1.27
	23.	INSTRUCTOR IS INTERESTING (POOR-EX)	0	0	0	0	0	3	4	3	10	6.00	0.77	502	4.73	1.60	1196	5.35	1.34
	24.	INSTRUCTOR IS WELL PREP & ORG (POOR-EX)	0	0	0	0	1	2	5	2	10	5.80	0.86	501	4.78	1.53	1195	5.33	1.32
	25.	INSTRUCTOR KNOWS THE SUBJECT (POOR-EX)	0	0	0	0	0	0	6	4	10	6.40	0.47	501	5.76	1.21	1192	6.01	1.05
	26.	INSTRUCTOR DEMOS APPLICATIONS (POOR-EX)	0	0	0	0	0	3	3	4	10	6.10	0.82	502	5.49	1.36	1195	5.87	1.16
	27.	INSTRUCTOR SHOWS INTEREST/RESPEC (POOR-EX)	0	0	0	0	0	1	6	3	10	6.20	0.59	501	5.67	1.23	1194	5.93	1.08
	28.	SENSITIVITY TO STUDENTS (POOR-EX)	0	0	0	0	1	2	5	2	10	5.80	0.86	501	4.32	1.57	1191	5.16	1.37
	29.	OPP FOR QUESTIONS,DISCUSSIONS (POOR-EX)	0	0	0	0	1	0	5	4	10	6.20	0.86	501	5.38	1.26	1192	5.76	1.15
	30.	AVOIDS BEING SIDETRACKED (POOR-EX)	1	0	0	0	1	0	7	1	9	5.88	0.73	498	4.43	1.54	1178	4.90	1.35
	31.	HELPFUL TO STUDENTS (POOR-EX)	0	0	0	0	1	3	3	3	10	5.80	0.97	489	4.64	1.44	1165	5.15	1.29
	32.	COMMENTS AND FEEDBACK (POOR-EX)	0	0	0	0	2	3	4	1	10	5.40	0.90	492	3.96	1.63	1121	4.59	1.60
	33.	ACCESSIBILITY (POOR-EX)	0	0	0	1	1	4	3	1	10	5.20	1.07	477	4.57	1.42	1139	5.00	1.37
	34.	GRADES FAIRLY (POOR-EX)	0	0	0	0	0	1	8	1	10	6.00	0.44	495	4.49	1.41	1126	5.10	1.26
	35.	RETURNS GRADED WORK QUICKLY (POOR-EX)	0	0	0	2	3	3	1	1	10	4.60	1.19	498	4.55	1.63	1126	5.11	1.41
	36.	COMPARED TO OTHERS THIS INST IS (POOR-EX)	0	0	0	0	0	3	5	2	10	5.90	0.68	497	4.61	1.45	1193	5.25	1.29
IV	8.	NON-CLASS HOURS PER WEEK SPENT ON THIS COURSE									10	5.3	2.9	493	9.3	4.3	1180	6.1	3.7
	9.	AVG NON-CLASS HOURS PER WEEK SPENT ON ALL COURSES									10	7.2	4.0	486	7.6	3.0	1157	6.5	3.7

DEVELOPING A BUSINESS NEEDS-ORIENTED INTRODUCTORY UNDERGRADUATE FINANCIAL ACCOUNTING COURSE

(Hand-outs of draft course content)

Michael Gibbins

University of Alberta

Centre for the Advancement of
Professional Accounting Education
Department of Accounting
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DRAFT COURSE CONTENT

FOR

ACCOUNTING 202 : INTRODUCTION TO FINANCIAL ACCOUNTING

FOR DISTRIBUTION AT THE ANNUAL CONFERENCE
CANADIAN ACADEMIC ACCOUNTING ASSOCIATION

Winnipeg, Manitoba
May 29, 1986

ACCOUNTING 202 : INTRODUCTION TO FINANCIAL ACCOUNTING

A : DECISION MAKING AND USE OF ACCOUNTING INFORMATION: WHAT DO WE SEE AROUND US?

A1: Decision making and accounting are all around us (2 hours)

Learning Objective: Awareness of information and decision making.

Business/environment issues	Related accounting issues	Accounting responses: concepts	Accounting responses: applications
Information is for decision making. Many decisions, decision makers ("users") and information "needs". Variety of ways of "modelling" decisions and information roles.	Accounting is information and serves users' needs. The world is full of "accounting" information.	Accounting responds to its environment.	Examples of accounting information. Illustrative annual report Examples of accounting and business information.

A2: More about users of accounting information (5 hours)

Learning objective: Understanding that use is complex; simple comparative analysis.

Business/environment issues	Related accounting issues	Accounting responses: concepts	Accounting responses: applications
Users: investors, creditors, management, regulatory agencies, etc. Decision components: objectives, information, constraints. Investment for a return: evaluation of performance and of alternative choices. Practical issues: risk, relative return, time value of money. Differences among enterprises.	Preparers: the roles of the accountant (information provider, advisor, analyst, communicator). Auditors: adding credibility to information. Financial analysis: performance, position, liquidity, solvency. Cost/benefit considerations in producing information.	Accounting's assumptions about users. Investment: accounting valuation. Return: accounting income, cash flow, interest. Consistency, comparability. Independence, objectivity.	Examples of interest and "present value" calculations. Simple comparative "ratios". Illustrative annual report Comparative figures. Multi-year summaries. Graphs and other condensations.

B : HOW DID WE GET TO WHERE WE ARE : THE PARALLEL DEVELOPMENT OF BUSINESS AND FINANCIAL ACCOUNTING. (5 hours)

Learning Objective: Understanding and description of accounting's evolution.

Business/environment issues

Changes in business enterprises over time.
Evolution of complexity: size, social demands, technology, internationalization.
Evolution of ownership structure; capital markets.
Separation of management and ownership; "agency" problems.
Other influences: inflation, growth of regulatory bodies, social expectations of corporate responsibility.

Related accounting issues

Accounting's picture must change as the enterprise and its needs change.
Perspectives on how accounting meets changing needs: capital market theory, agency theory.
Development of the accounting profession.
Accounting's role in regulation and the regulation of accounting.

Accounting responses: concepts

Assumptions about accounting's use: economic decision making; stewardship.
Measurement assumptions: dollar unit, continuity, conservatism, disclosure, economic entity.
Transaction basis; historical cost accounting.
Accounting's definitions: assets, liabilities, equities, income.
"Generally Accepted Accounting Principles".

Accounting responses: applications

Recognition of accounting transactions.
Double entry: "debits" and "credits".
Accounting equation: Assets = Liabilities + Equities.
Statement format: balance sheet, income statement, statement of changes in financial position.
Components of the "cost" of an asset (e.g. inventories, long term assets).

Illustrative annual report

Information about company's activities in its environment.
Resources and financial structure.
Example balance sheet transactions.
Auditor's report.

C : A CLOSER UNDERSTANDING OF FINANCIAL ACCOUNTING AS IT EXISTS TODAY.

C1: Record keeping and control (2 hours)

Learning objective: Understanding of how accounting records generate data.

Business/environment issues

Demand for records and evidence.
Management control.
Development of computer systems.

Related accounting issues

Accounting's data result from its particular "transactional" filter.
Role of "bookkeeping" vs. accounting.
Internal control.
Records cost money: how many do you need?

Accounting responses: concepts

Transactional records: event, evidence, objectivity, dollar basis.
Accounting control and its relation to physical control and insurance.

Accounting responses: applications

Books of original entry: journals, synoptics.
General journal, ledger, "trial balance".
Supporting source documents.
Cash control.
Inventory control: "perpetual", "retail" and "periodic" systems.

Illustrative annual report

Management's responsibility for the financial statements and internal control.
Cash and inventory control examples.

C2: Periodic reports (8 hours)

Learning objective: Understanding and application of the basic accrual accounting model.

Business/environment issues

Demand for timely information.
Business events are part of a continuous, complex cycle.
Financial reporting is management's responsibility.

Related accounting issues

How to "cut off" recording of an event that is not yet a completed transaction?
How to "allocate" to various periods an event that spans more than one?
How to make estimates when cut-offs and allocations are required?
How to aggregate, organize and present data into meaningful information?
How frequently to report information?

Accounting responses: concepts

Accrual accounting: going beyond the transactional record.
Modelling economic processes:
- revenue generation;
- expense and liability incurrence;
- asset consumption;
- revenue-expense matching;
- cost of goods sold:
- cost flow assumptions;
- conservatism.

Necessarily arbitrary allocations.
Balance sheet as residual of income estimation process.
Accounting policy choice: fairness, consistency, relevance, materiality, comparability, cost/benefit, disclosure vs. adjustment.

Accounting responses: applications

Adjusting journal entries.
Revenue recognition: critical events, revenue and accounts receivable.
Expense recognition: matching, accruals and prepaids, capitalization, amortization, depreciation, bad debts and cost of goods sold.
Contra accounts.
Inventory costing.
Depreciation methods.
Lower of cost or market.
Disclosure of accounting policies.

Illustrative annual report
Examples of above applications, concepts and policy choices.

C3: Current complexities (4 hours)

Learning objective: Awareness of issues; simple derivation of consolidated figures and cash flow information.

Business/environment issues

Today's business environment is very complex: large enterprises, complex transactions, mergers and acquisitions, international dealings.
Tension between necessity to summarize data and to disclose detail.
Importance of cash flow and liquidity.

Related accounting issues

How to contain enormous complexity in one set of accounting statements?
How to "adjust" the results of the accrual accounting model to show cash flow information?

Accounting responses: concepts

Intercorporate investment: assumptions about the economic and managerial entity; purchase vs. pooling.
Intangible assets and goodwill.
Contingencies and commitments.
Segment reporting.
Foreign currency translation.
Statement of changes in financial position: purpose and basis of derivation.

Accounting responses: applications

Intercorporate investment: cost basis, equity basis, consolidation.
Consolidation: combining accounts, intercompany eliminations, goodwill, minority interests in income and equity.
Statement of changes: derivation of figures in 4 categories: operations, working capital adjustments, financing, investing.

Illustrative annual report
Examples of above applications and concepts.

D : BACK TO DECISION MAKING : A CLOSER UNDERSTANDING OF THE USE OF FINANCIAL ACCOUNTING INFORMATION.

D1: Performance evaluation (4 hours)

Learning objective: Ability to analyze financial results and evaluate performance and position.

Business/environment issues

Return to the decision making issues raised in Module A: see the items listed under Segments A1 and A2.

Intelligent analysis and evaluation require a thorough understanding of the enterprise, its circumstances and its plans, as well as of the decision-maker's goals and preferences.

Analysis of individual enterprises or by individual users is limited in its usefulness by the existence of sophisticated markets, access to the same information by other analysts and cost/benefit considerations.

Related accounting issues

Intelligent analysis and evaluation require an understanding of the nature of the accounting information (developed in Modules B and C).

What tools can be provided within the accounting model to facilitate analysis and evaluation?

Accounting information can be and is formatted and presented in order to facilitate analysis and evaluation.

Accounting responses: concepts

Ratio, trend and per-share analysis.

Evaluation of performance and of position (including liquidity and leverage) are related.

"Investment" measure: asset valuation alternatives exist.

"Return" measure: cash vs. income; normal and abnormal income; income corrections and adjustments.

Accounting responses: applications

Principal performance, position, liquidity and solvency ratios.

"Scott formula".

Income and retained earnings statements format: extraordinary items, error corrections, prior period adjustments.

Example alternative asset valuations.

Supplementary financial information: notes, "segment" data, multi-year summaries, etc.

Illustrative annual report

Examples of above applications and concepts.

D2: Effects analysis (2 hours)

Learning objective: Ability to identify likely financial statement effects of accounting policy alternatives.

Business/environment issues

As we have seen, there are differences among enterprises and among decision makers on many dimensions.

Any enterprise is also likely to change over time.

Related accounting issues

No one accounting method will be satisfactory for all enterprises, users or time periods, therefore, choices among accounting policies are necessary and may change.

How can users be made aware of policy choices and changes?

How can users identify the effects of choices or changes?

Accounting responses: concepts

Accrual accounting provides choices.

Fairness, consistency, relevance, materiality, comparability, disclosure.

Accounting policy choices affect both performance (income) and position (balance sheet).

Accounting responses: applications

Revenue recognition and accounts receivable, inventories, depreciation, expense capitalization, expense accruals.

Illustrative annual report

Identification of chosen policies and alternatives.

Auditor's report.

E : AN EVALUATION OF THE CURRENT STATE OF FINANCIAL ACCOUNTING AND A LOOK AHEAD.

(3 hours)

Learning objective: Evaluation of financial accounting's strengths and limitations.

Business/environment issues

The environment continues to change and business continues to evolve.
Major social and economic forces are acting on the business system of which accounting is a part.

Related accounting issues

Is accounting responding to society's and users' expectations and needs?
What is good information? What might accounting do differently?
What use is being made of concepts or analyses from other fields (e.g. economics, psychology)?
What are accounting's current major controversies?
What are the likely effects on accounting of the economic, social and technological changes going on all around us?
How can an individual 202 Accounting 202 student make sense out of it all?
Is there a conceptual framework for financial accounting?
What role does academic research play in the development of accounting concepts and applications?

Accounting responses: concepts

Alternatives do exist to address the limitations of generally accepted accounting principles.
Evaluation of alternatives: relevance, reliability, objectivity, cost/benefit.
Role of the auditor: expertise and independence.
Role of accounting and auditing standards.
Special purpose reports, projections, non-financial accounting.
Is there a conceptual framework for financial accounting?
What role does academic research play in the development of accounting concepts and applications?

Accounting responses: applications

Current value accounting, price-level adjusted accounting, social accounting.
Controversial areas: pensions, income taxes, etc.
Critical comments from the business and academic press.

Illustrative annual report

Illustrations of above concepts and applications.

SmartAccount II

The Centre for the Advancement of Professional Accounting Education at the University of Alberta is developing a computerized educational tool to aid in the teaching of Financial Accounting. This tool, SmartAccount II, has many features which help students understand the accounting process. It is an evolution from the Centre's first such tool, "SmartAccount", introduced in September 1985.

What is SmartAccount II? For the neophyte accounting student it is a screen oriented financial statement simulator. For this student, the results of simple or complex "what if" questions are immediately presented on the financial statements appearing on the screen of the microcomputer. In this role, SmartAccount II is designed for the student who wants to use accounting statements, not do them.

For the more advanced student, SmartAccount II may be used as an accounting system - one which incorporates many of the features of a commercial system without the complexities associated with many of these systems.

SmartAccount II has been designed to meet specific educational objectives in accounting: it allows students to work with accounting statements early in their introductory course (or in any other accounting or business courses) and develop an understanding of how the statements respond to events and of why accounting policy choices are important.

By presenting a "path" of each event's effects on the statements and by automatically generating the balance sheet and income statement plus the statement of changes in financial position and ratio analyses (all in response to design specifications provided by the student), SmartAccount II allows the student to focus on report design, analysis of effects and reporting implications of events and policies, rather than on the underlying mechanics.

Features:

The following represents a partial list of SmartAccount II's features and advantages that are pertinent in teaching Financial Accounting:

0. The student gets his own copy of SmartAccount II and can run it on any suitable computer, in a lab or anywhere else.

1. SmartAccount II has a screen orientation similar to some of the popular spreadsheets. This means that a student can immediately see the financial statements he is creating - they do not necessarily have to be printed off first.

2. SmartAccount II works in real time. Unlike many commercial systems, the results of a transaction - whether the transaction is balanced or not - may be immediately seen on the statements on the screen. A cumbersome posting of transaction batches is not required. This aids dramatically in the student's ability to see what the results of a transaction are. Any numbers on the statements which have changed as a result of the transaction will be highlighted on the screen to provide a "path" of the transaction's effects.

3. The visual orientation of SmartAccount II makes the building of exercises and scenarios by students and their instructors an easy and fast experience. Essentially, a set of financial statements can be typed onto the screen - and then used to do "what if" analysis or record further events.

4. Analysis of financial statements is important and SmartAccount II provides a series of ratios to aid in this process. An instructor or a student may add additional formulas just as you might put formulas into a spreadsheet.

5. SmartAccount II is meant to be a productivity aid to the student when he is working through problems and exercises. To accomplish this goal, the product will be as easy to use as possible. There will not be a complex layering of menu options and context-sensitive help will be available at all times.

6. SmartAccount II can be used as a financial statement simulator or, if it is desired, it can be used as a financial accounting system. Fiscal periods can be closed out and an audit trail can be imposed on the transactions which are entered into the system.

7. SmartAccount II not only portable from one financial accounting course to another, but it may also be used in accounting information systems courses. Students may be asked to create their own extensions to SmartAccount II by writing modules in Turbo Pascal. These modules can be executed from within SmartAccount II and they may be used to add even more features.

8. SmartAccount II will initially be available for use on IBM PC's and compatibles. At the University of Alberta, there are many Apple Macintoshes and the hope is that SmartAccount II will soon be available on this and other types of machinery.

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HOMAGE TO SANTA ROSALIA
or
WHY ARE THERE SO MANY KINDS OF ACCOUNTING ASSOCIATIONS ?*

The accountancy profession is composed of a number of distinct associations. Some factors encouraging and limiting the diversity of accounting associations are identified and the significance of distinct associations within accountancy is discussed.

The professions have traditionally been regarded as homogeneous communities of practitioners sharing a common identity, beliefs and perspective on the professional task. Accountancy has always stood in contrast to this model. Carr-Saunders and Wilson (1933), in the first academic survey of the professions, noted that accountancy was distinguished from other professions by the diversity of competing associations which existed. Since that time sociologists have also identified informal segments within the accounting profession. These segments have been defined in various ways. Hastings and Hinings (1970) demonstrated that Chartered Accountants in industry and public practice develop distinct constellations of values. Siegel (1977) found that accountants were segmented by functional specialization. Montagne (1974) found that CPA's working in large and small firms had distinctly different concepts of the professional role. Finally, Rosenberg et al (1982) found that accountants working in centralized and decentralized contexts tend to develop different perspectives on their professional identity. Informal segments have also been identified in other professions (Bucher and Strauss, 1961) but the existence of formally organized associations remains the most distinctive and important form of segmentation in accountancy.

There have been many formally organized segments which have come and gone during the development of the accountancy profession. In England,

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* with apologies to G.E.Hutchinson 'Homage to Santa Rosalia or why are there so many kinds of animals?' American Naturalist (V93 1959) pp.145-159

G.E. Hutchinson, a noted ecologist, found himself one day at a small church on Monte Pellegrino, Sicily. The church had been erected on the site of the discovery of the skeleton of a woman, encrusted by a stalactite, wearing a cross and twelve beads. The skeleton was identified as Santa Rosalia. In a small pond in front of the sanctuary, Hutchinson found two species of waterbugs and began to wonder why two species and not twenty, or none at all ? His answer was to suggest that a balance existed between forces encouraging the diversity of species and forces limiting that diversity. In homage to Santa Rosalia he adopted her as the patron saint of population studies.

the work of Stacey (1954), Howitt (1966), Winjum (1972) and Jones (1980) provide a comprehensive description of the development of English accountancy. The interaction among various accounting bodies such as the Institute of Chartered Accountants, the Society of Accountants and Auditors, and the Society of Incorporated Accountants and Auditors among others, played an important role in that development. In America, the work of Edwards (1960), Carey (1969), and Previt and Merino (1979) recount a similar pattern of development involving accounting bodies such as the American Association of Public Accountants, the Institute of Accountants and the National Association of Certified Public Accountants. In Canada, the work of Mann (1975a,b) and Richardson (1984, 1985) describe the formation and development of numerous segments including the Institute of Chartered Accountants, the Society of Management Accountants and the Certified General Accountants Association. Finally, the American Institute of Certified Public Accountants (1975) provides data on thirty countries which indicate that, as of 1973, there were, on average, 2.5 nationally organized professional accounting associations per country (N.B. this figure excludes regional groups affiliated with a national body and groups which do not engage in training and accreditation).

The existence of many kinds of accounting associations can not be doubted but the nature of the forces which create and limit this diversity, and its significance is moot. In recent papers there have been a number of cryptic statements but little real analysis of the phenomena. For example, Bucher and Strauss (1961:40) suggested that emergent groups and movements exist in even the most established professions and are 'the focal points of social change.' Rosenberg et al (1982:124) suggest that the 'process of change and resolution of segment conflict may itself be a significant determinant of the nature of accounting practices'. Child and Fulk (1982:181) speculate that segmentation may 'enhance the potential for intraoccupational conflict and so threaten existing patterns of control.'

The purpose of this paper is to suggest some dimensions for analysis of the phenomena. Specifically, taking a population ecology perspective, factors which encourage and limit the diversity of accounting associations are identified and the significance of this diversity is discussed. Data from a study of the evolution of accountancy in Canada is used to identify these factors. The changes in the numbers of accounting associations which these factors are intended to explain are shown in Figure 1.

Figure 1 about here

Factors Encouraging Diversity

The stance adopted in this paper is that accountancy is a profession and, therefore, the question of why professional associations should exist at all is not addressed. Given this assumption, the research questions are why there should be more than one association of accountants in Canada and what factors limit the number of associations. It is suggested that the diversity of accounting associations tends to increase

under three general conditions: (1) isolation (legislative boundaries, self-contained markets and limited communication), where associations emerge to serve physically or legally isolated markets; (2) resource abundance (economic growth), where the demand for accounting services, and the range of services demanded, grows faster than the capacity of existing associations to meet those demands; and, (3) specialization (functional and ideological differences), where associations develop to meet specific needs of clients or practitioners. Examples of the effects of each of these conditions are provided below.

Legislative Boundaries

The British North America Act which established Canada's federal system of government gave the provinces exclusive jurisdiction over education. Since an important role of professional associations is to provide (or at least evaluate) the education of individuals aspiring to the profession, it would seem obvious that associations must form in each province. This legislation in itself, however, does not require the creation of separate accounting associations. It is possible for associations to conduct activities which span provincial borders but the legislation does provide a means for individuals or groups to challenge the operations of associations not incorporated within a given province. For example, the Institute of Chartered Accountants of New Brunswick gained legislation in 1935 restricting the use of the CA designation to members of the ICANB. This forced members of other Institutes wishing to practice in New Brunswick to register with the ICANB and ensured the viability of the fledgling Institute in that province (Hudson, 1966: 31).

The early associations frequently aspired to operate on, at least, a national scale and often operated in several provinces. The ICAO, for example, originally formed with the intention of seeking recognition as the Institute of Chartered Accountants of the Dominion of Canada and a draft version of the Charter of the DACA (now CICA) referred to the Association as an Association of Chartered Accountants of North America. These aspiration, however, were restricted by the jurisdictional limits of the governments from whom associations sought charters and by court challenges.

There are associations, or federations of associations, which continue to operate across provincial boundaries, for example, in the maritimes the education programs of the CGAs and CAs are conducted by pan-provincial bodies. But these types of bodies exist only at the pleasure of the provincial associations. Legislative boundaries, therefore, are a major factor encouraging the creation of accounting associations. In Canada, at the present time, there are at least forty-four accounting associations (Land, 1984:287; two associations not listed by Land are included in this number), thirty-three of these are provincial or territorial bodies associated with one of the three national accounting bodies.

Self-Contained Markets

Even if there were not legislative boundaries to contend with, the physical separation and distinct orientations of the major market centers in Canada made it necessary and practical for accounting associations to develop and operate independently. This force was evident as the national bodies attempted to create uniformity in standards and structure among the provincial associations. The DACA, for example, began consulting with the provincial associations in 1919 to achieve some degree of standardization of entry requirements, education and practice. Although some success was achieved it was recognized that local customs and conditions had to be respected (Winters, 1921:142). Similarly, in 1947, the Society of Industrial and Cost Accountants of Canada (now Society of Management Accountants of Canada) called on their member associations to adopt a name consistent with the title of the national association. This created problems among the provinces: the praire provinces, for example, objected to the word 'cost' in the title as this was not relevant to their business environment, and Quebec objected to the title because it did not emphasize the management aspects of accounting.

The importance of self-contained markets is still evident in the branch structure of provincial associations. These branches allow the profession to provide service to communities which is sensitive to local needs. Although current branches of associations do not aspire to independent professional status, the potential of these units may be seen in the history of the Ontario CGA association. In 1949, the CGAAO officially rescinded its charter and most of its members joined the Cetified Public Accountants' Association of Ontario. The Toronto branch of the CGAAO, however, refused to join and in spite of the recommendation of the association's executive continued to provide basic member services. In 1957, this group succeeded in re-establishing the CGAAO charter and reorganizing the association as a force in accountancy in Ontario.

Limited Communication

The first accounting associations were formed in Canada during the late 1800's. Although the trans-Canada railway had just been completed, communication among various parts of the country was limited. This made co-ordination of activities very difficult and associations would arise independently of each other and, in some cases, without knowledge that other associations existed. The Chartered Accountants' (CA) associations in Ontario and Quebec, for example, held their inaugural meetings within weeks of each other but apparently without communication between them. The Ontario Institute, although forming after the Quebec Institute, originally organized as an 'association of accountants for the Dominion of Canada' but formed more realistic aspirations by the time they applied for incorporation (Creighton, 1984:2).

As late as 1919, the Dominion Association of Chartered Accountants discovered that a group of accountants had successfully achieved incorporation as the Institute of Chartered Accountants of Prince Edward Island without any contact with the existing Institutes, and without any

CAs in their membership. It was another three years before this group affiliated with the Dominion association. A few years later, an association known as the Society of Independent Accountants and Auditors of Edmonton was created, only coming to the attention of other accounting bodies when they began advertising on behalf of their members. Even accounting firms could not maintain links spanning the breadth of the continent. The firm of Clarkson & Gordon, for example, dispatched J.F.Helliwell from Toronto to Vancouver in 1897 to operate the firm there but by 1907 this arrangement was terminated due to the difficulties of co-ordination and Helliwell continued in practice with other local accountants (Crate, 1970).

Economic Growth

The number of accounting associations tends to increase during periods of increasing economic activity. In these periods the opportunities for accountants, in terms of both the number of opportunities of a given type and the range of opportunities, increase and, historically, the members of existing accounting associations have been unable to move to exploit them (for example, due to limits on the number of articling students each existing member could supervise), leaving room for new entrants to the profession. The periods after each of the two World Wars, during which there was a marked increase in economic activity, saw a rapid increase in the number of accounting associations (see Figure 1). The effect of economic growth on the formation of accounting associations may also be seen in the extent to which the formation of provincial associations followed the economic development of regions of Canada.

The proximal causes of major changes in the range of services demanded from accountants were the introduction of bankruptcy laws during the late 1800's which required 'official managers' (Mann, 1976), the development of tax laws and cost-plus contracts during the First World War, and the introduction of disclosure requirements in Companies laws in 1907 in Ontario and 1917 Federally. Jones (1980) provides a remarkable set of data on the changing tasks of an English accounting firm which shows similar shifts from bankruptcy to tax and audit work. The most recent shift, evident in Jones' (1980) data, and the activities of accounting firms, is the growing importance of management consulting. Although professional associations of management consultants are not regarded as part of the accounting profession, it may be noted that Quebec CAs were instrumental in the creation of the Canadian Association of Management Consultants (Collard, 1980: 82-83).

Functional Differences

A major factor distinguishing one accounting association from another is the aspect of accounting practice on which the association and its members focus their attention. The distinction between public and cost accounting, for example, has lead to the creation of separate accounting

associations (Allan, 1982). The CGAs have suggested a three-way division of labour in the profession between management accounting, financial accounting and auditing. More generally, associations have developed to provide a forum for the discussion of special interests such as the Canadian Association of Petroleum Production Accountants and the Canadian Insurance Accountants Association.

It may be noted that the specialization of accounting associations in particular aspects of accounting is more a matter of official rhetoric than an accurate description of the activities of members. The CICA committee to study specialization, for example, recently concluded that there was de facto specialization among CAs and that this must be recognized internally in order to decrease the need for CAs to rely on 'outside organizations' and to prevent the 'fragmentation of the profession' (CA Magazine, July 1982).

Ideological Differences

Several Canadian accounting associations have formed, or resisted mergers, largely as a result of differing ideologies about the nature of professional practice and the role of accounting associations. Several key dimensions of the ideological differences among associations may be given: (1) is accounting an occupation or profession ? The Accredited Public Accountants of Ontario, for example, opposed the regulation of the profession in 1950 on the grounds that accountancy was an occupation not a profession and, therefore, was not in need of regulation.; (2) should accounting associations serve established practitioners or focus on those aspiring to join the profession ? The Canadian Branches of the Financial Executives Institute, for example, were created by ex-members of the Canadian Society of Cost Accountants and Industrial Engineers who resigned after the Society decided to offer a designation and focus on training accountants rather than continue its emphasis on established practitioners.; (3) should accounting training be restricted to particular courses or should accountants be free to gain their education as they see fit subject only to demonstrating their competence on an examination ? The Guild of Industrial, Commercial and Institutional Accountants, for example, formed to provide a body to represent graduates of correspondence school programs after the majority of associations switched to university-based programs (Ross and Brown, 1978).; and, (4) should experience in public practice or industry count equally towards the requirements for an accounting designation ? The CGAs and CPAs both formed with the premise that experience in industry is equal in quality to experience in public practice.

In Quebec, separate accounting associations also formed to accommodate French and English speaking accountants although these have subsequently merged (Collard, 1980).

Factors Limiting Diversity

The diversity of accounting associations is limited through: (1) competitive exclusion (institutional and interfirm competition) where one or more associations are able to prevent other associations from gaining access to markets or legislative privileges; (2) convergent evolution (professionalization) where the similarity of standards and structures of associations removes the rationale for separate existence; and (3) environmental homogeneity (standards) where the demand for consistent standards of accounting practice limits the diversity which can exist among associations.

Competition

Competition in accountancy occurs at two levels. There is competition at the level of accounting firms, and at this level, to the extent that members of one association have greater competitive success than members of another, one association may be driven out of the market. There is also competition at an institutional level. At this level accounting associations compete for the right to practice as accountants and to define the nature of the field. Associations who enjoy a privileged position at an institutional level may be able to defend their domain by ensuring that other associations do not gain Charters or legislative privileges. Some specific examples include the unsuccessful attempt by the Institute of Chartered Accountants, Finance and Actuaries [sic] to gain a Federal Charter in 1901, and the unsuccessful attempts by the Accredited Accountants Association of British Columbia to incorporate in 1973, 1974, 1977 and 1979.

The competition among associations has frequently resulted in mergers among associations. These mergers tend to cluster around legislative initiatives and represent compromise solutions to unsuccessful attempts by one group to gain legislative advantages over others. Some early examples of mergers include: the Independent Accountants of Montreal and the General Accountants Association in 1919 (Bentley, 1930:11); the Institute of Chartered Accountants of British Columbia and the Society of Public Accountants of British Columbia in 1921 (Affleck, 1980:10); and, the Institut des Comptables et Auditeurs and the Association of Accountants of Montreal in 1921 (Collard, 1980:32). More recently, in 1983, the Institute of Accredited Public Accountants and the Certified General Accountants of Ontario merged and other merger talks are on-going.

Professionalization

Many of the factors encouraging diversity are neutralized as each association increases the degree of professionalism of their structures and procedures. Richardson (1985) has demonstrated the remarkable degree of homogeneity in both the pattern and content of the development of professionalism in accounting associations. As the policies of accounting

associations converge the rationale for separate existence decreases and the possibility of merger is more likely.

The largest merger of accounting associations in Canada to date, between the Institute of Chartered Accountants of Ontario and the Certified Public Accountants Association of Ontario, came about in part because of the convergence in their development. Both associations had developed university affiliated educational programs of similar length and content, and required experiential training before writing an examination to qualify for their designation. Each had equivalent rights under Ontario law to train and qualify accountants for public practice. In addition, each association was supported by a growing network of public accounting firms. The degree of overlap between these associations eventually led to their agreement to merge.

Accounting Standards

A similar force towards convergence is the development and institutionalization of a common set of accounting standards which all accountants, regardless of professional affiliation, must use in their practice. In Canada, Lanfranconi (1981) has noted that the standard setting authority of the Canadian Institute of Chartered Accountants exceeds that of the Financial Accounting Standards Board in the United States. By virtue of the adoption of the CICA Handbook as the authoritative guide to accounting standards in the Canada Business Corporations Act and by Provincial Securities Commissions, the CICA has de facto control over the practice of public accountants regardless of professional affiliation. This type of centralized control reduces the ability of associations to maintain an independent posture. The move by the CGA to establish a separate standard setting body must be considered, in part, as an attempt to maintain the integrity of their position in the profession.

In management accounting a similar trend towards standard setting is also developing. The SMAC released their first 'management accounting guideline' in 1984. These documents do not have the same legal status as accounting and auditing standards but may develop in that direction.

The Significance of Diversity in the Accounting Profession

The degree of diversity within the profession has been a matter of considerable concern among associations but there does not appear to be conclusive evidence on either its costs or benefits. Arguments have been put forward, for example, that the consumer is unable to differentiate among the 'products' offered by various associations and, therefore, may not select the best service for their needs. It has also been argued that consumers can discriminate such that alternative associations (and their 'products') can segment the market providing services at a level appropriate to each segment (e.g. Lazar et al, 1979).

Since the development of accountancy (as a technology) is, at least in Canada, in the hands of the profession, some concern has been raised about possible duplication of services resulting in inefficiencies in the production of knowledge. It has also been suggested that the fragmentation of resources among associations may prevent the profession from undertaking certain research and development projects (cf. the CICA Taskforce 2000 report). On the other hand, there is evidence that competition among associations has been a key factor driving the profession to the level of standards which currently exist (Richardson, 1984).

The question which also must be raised is whether or not the existence of separate associations versus a single (or reduced number) of associations is that significant to practitioners. A major function of distinct associations has been to provide a forum for practitioners with particular professional interests to express and advance these interests. But where there has been a reduction in the number of associations, the practitioners involved have typically been absorbed by some other association. The interests represented, thus, still exist but their concerns are now dealt with internally. The debates in the Ontario Institute of Chartered Accountants between large and small firms or between members in public and private practice are reflections of this internalization of diverse interests (Creighton, 1984).

It would appear that more work on the dynamics of competition among associations, on consumer/market reactions to the existence of multiple associations and on the ability of 'umbrella' organizations to adequately respond to the interests of the diverse groups which they contain is needed before the significance of diversity and the trend towards decreasing diversity of the accounting profession can be assessed.

Discussion

The number of accounting associations in Canada may be seen as the outcome of opposing forces favouring and limiting diversity. These forces are summarized in Figure 2.

Figure 2 about here

Increasing diversity is favoured by factors which create 'niches' or domains in which associations may operate. The existence of self-contained local markets, legislative boundaries and functional differences each served to isolate domains to which associations could adapt and through specialization increase their chances for survival. Limited communication also served to increase the diversity of associations by reducing the opportunities for competition and co-operation, allowing associations to form and develop independently. The diversity of accounting associations also increased during periods of heightened economic activity when opportunities were created which the members of existing associations did not exploit. It is in these periods

of opportunity that different ideological positions are formulated and given expression through formal associations.

The diversity of accounting associations has been limited through competition at both the firm and institutional level. Competition at the institutional level has often taken the form of mergers which reduce the number of associations while allowing the individuals involved to continue their practices. Professionalization serves to reduce the diversity of associations by creating convergence of structure and procedures which reduces ideological differences, increases the lines of communication and enhances the prospects of merger. Finally, the diversity of accounting associations is reduced by the demands of society for consistent standards of accounting and auditing practice. The need to establish such standards creates a political process which encourages interaction among associations, and acts as a centralized form of control over accountants regardless of their professional association.

The balance between the forces for and against diversity in accountancy has been shifting over the history of the profession. Initially the balance clearly favoured increasing diversity but since the Second World War the balance has tilted the other way. The general trend towards the professionalization of accountancy and the demand for consistent standards of practice, even to the extent of spanning national borders, would indicate a general pattern of decreasing diversity in the accounting profession. The reduction in the number of accounting associations, however, merely means that the interests which those associations represent will be internalized by some association and the political functions which they performed will be retained.

Figure 1: The Emergence of Accounting Associations in Canada

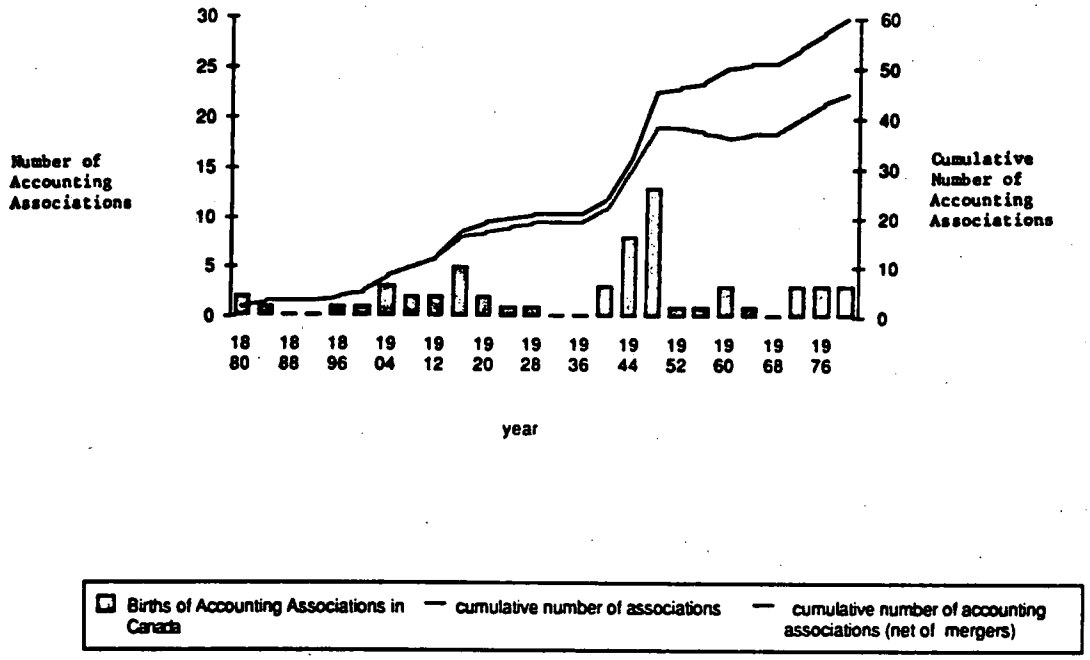
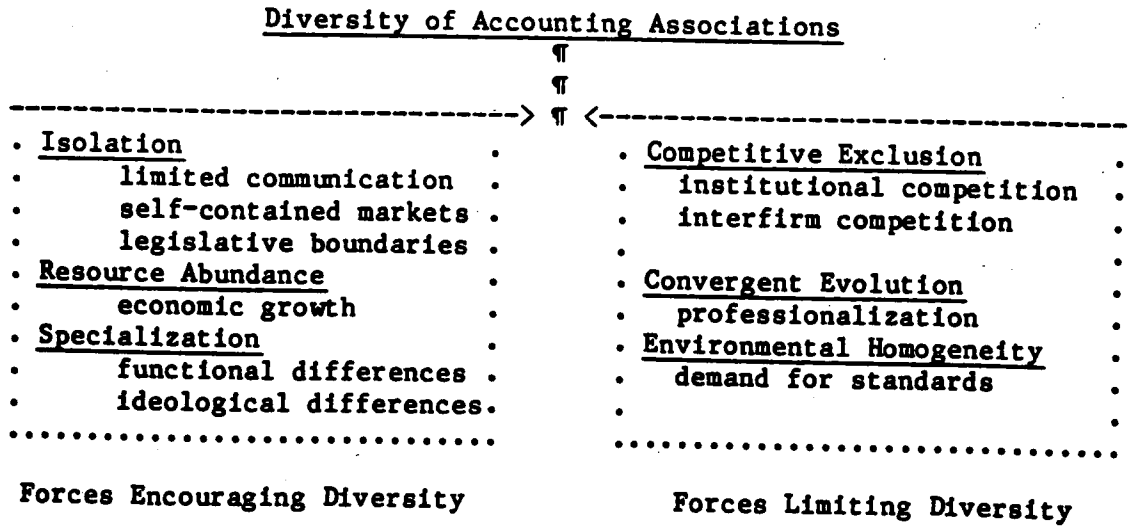


Figure 2: The Balance of Forces Encouraging and Limiting Diversity



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A REPRESENTATIONAL MODEL OF AUDIT JUDGMENT IN EVALUATING CONTROLS

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A REPRESENTATIONAL MODEL OF AUDIT JUDGMENT IN EVALUATING CONTROLS

INTRODUCTION

The past ten years have seen a major thrust into the study of judgment formation. An important subset of this effort has been the examination of auditor judgment with respect to internal control evaluation and audit program planning tasks. Ideally the study of judgment would be able to assess the quality or accuracy of decisions. In order to do this, criterion values must be available - that is, some measurement standard must exist in the environment by which the decisions may be gauged. For instance, we can evaluate the quality of the weatherman's predictions against subsequent climatic conditions. However, for many decisions in auditing there is no distal variable in the environment by which to gauge. For instance, how can one assess

- the optimal sample size
- the optimal audit procedures
- or even whether or not the proper audit opinion was rendered?

This means that often only the right side of the Lens Model is examined via correlational analysis (i.e. consistency instead of accuracy is examined.) This type of research is labeled policy capturing (Slovic, Fischhoff & Lichenstein, 1977). Judgement consistency is important because it has been asserted that it is positively correlated with accuracy and also because it is considered to be a necessary condition for expertise (Ashton, 1979). Three types of consistency have been investigated:

1. Judgment stability = the agreement over time by the same individual using the same information.
2. Judgment consensus = the agreement among different individuals using the same data at the same time.
3. Judgment insight = the agreement between the individual's self reported judgment process and an objective description derived from mathematical or statistical techniques.

All three types of judgment consistency are potentially important in auditing. Different judgments made by different auditors faced with the same set of circumstances, as well as inconsistent judgments made by the same auditor over time may influence the cost and/or quality of audit work performed. Subject to cost-benefit constraints, it is a worthwhile objective to reduce such inconsistencies.

Audit Judgment

The work of independent auditors involves two basic activities - evidence collection and evidence evaluation. Of the two, the evaluation phase is more subjective and difficult. One of the characteristics that distinguishes the expert auditor from the layman is this ability to evaluate evidence, which is often described as the exercise of "professional" judgment. The constant need to display professional judgment is one of the major problems experienced by the auditing profession. On the one hand, the litigative nature of this environment demands high standards of uniformity, accuracy and consistency. On

the other hand, the formation of professional judgment does not lend itself easily to codification. It cannot be taught quickly. It cannot always be explained or replicated. To gain additional insight into the art of decision making is a worthwhile research objective. There are many benefits which may accrue from such study. These include:

1. improving the basic understanding of the process
2. improving decisions
3. assisting the training function
4. increasing firm-wide consistency in audit approach
5. discovering common traits shared by experts

Perhaps the most immediate application of academic research on audit judgment will come in the form of decision aids. There are three basic options by which decisions may be improved (Libby,1981). These are:

1. improving the information set
2. re-educating the decisionmaker in how to optimally process this information
3. replacing (or assisting) the decisionmaker with a model (bootstrapping)

This last category has been very successful in some situations. Linear models, of which the Lens Model is one example, have proved consistently superior to clinical judgments in situations where the relationship between the cue variables and the criterion is conditionally monotonic (Dawes, 1979). These decision aids perform so well because they eliminate the random variance portion of judgment. There have been attempts to institute decision aids in audit sampling decisions. The development of a similar model for internal control evaluation would be a welcome accomplishment.

Normative Auditing Theory

Evaluation of internal control is only one step in the audit chain leading to the expression of an opinion on the financial statements. Figure 1 shows a normative model of the audit process.
This model is derived from the Professional Standards of the American Institute of Certified Public Accountants.[1] The Standards do not provide a summary flowchart such as this, but the section references in Figure 1 form the basis for this depiction. Although many variations of Figure 1 exist in auditing textbooks and in journal articles (e.g. Arens & Loebbecke 1976, p.198), an attempt has been made here to maximize the fidelity of this representation by using the Standards themselves as the only referent.

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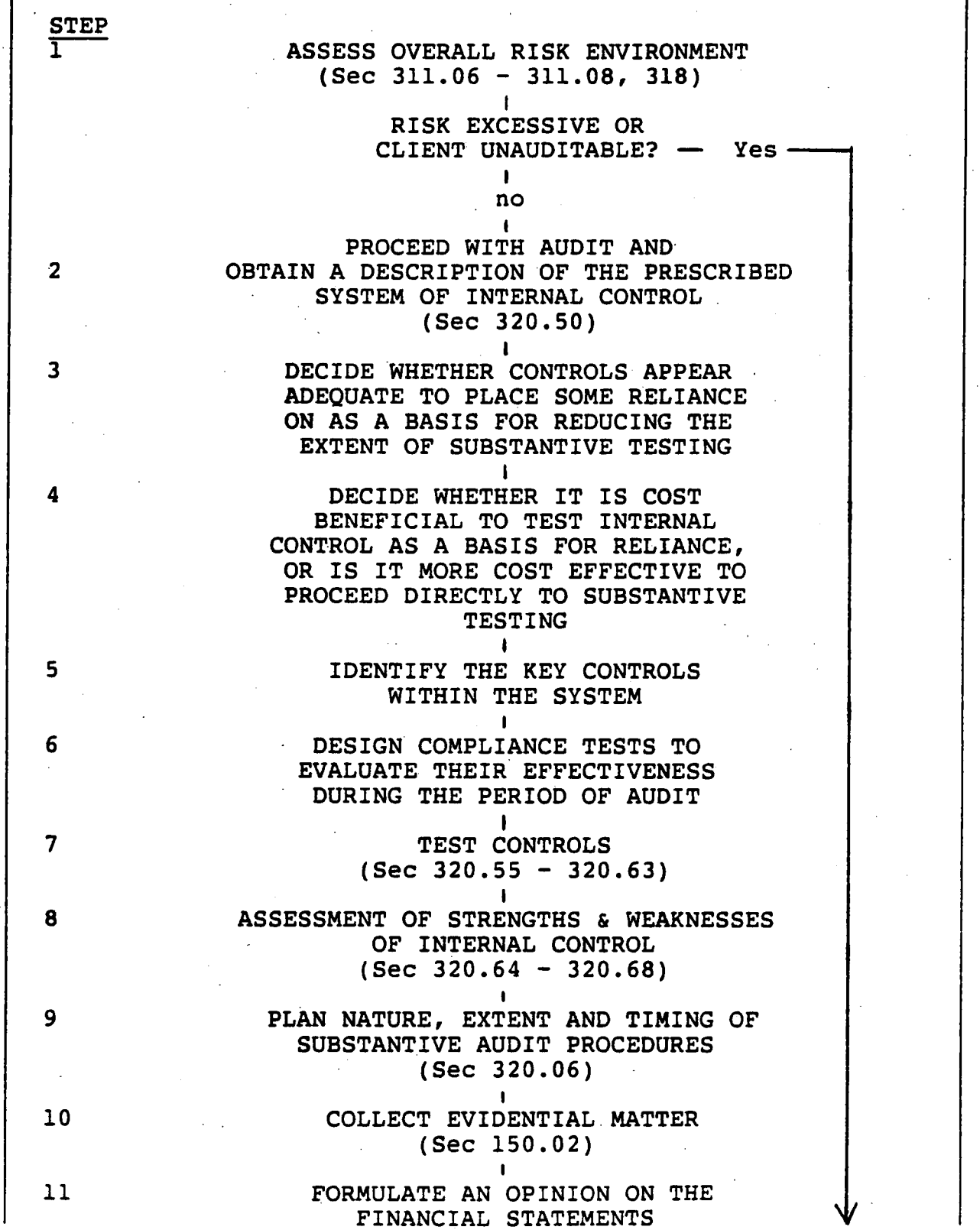
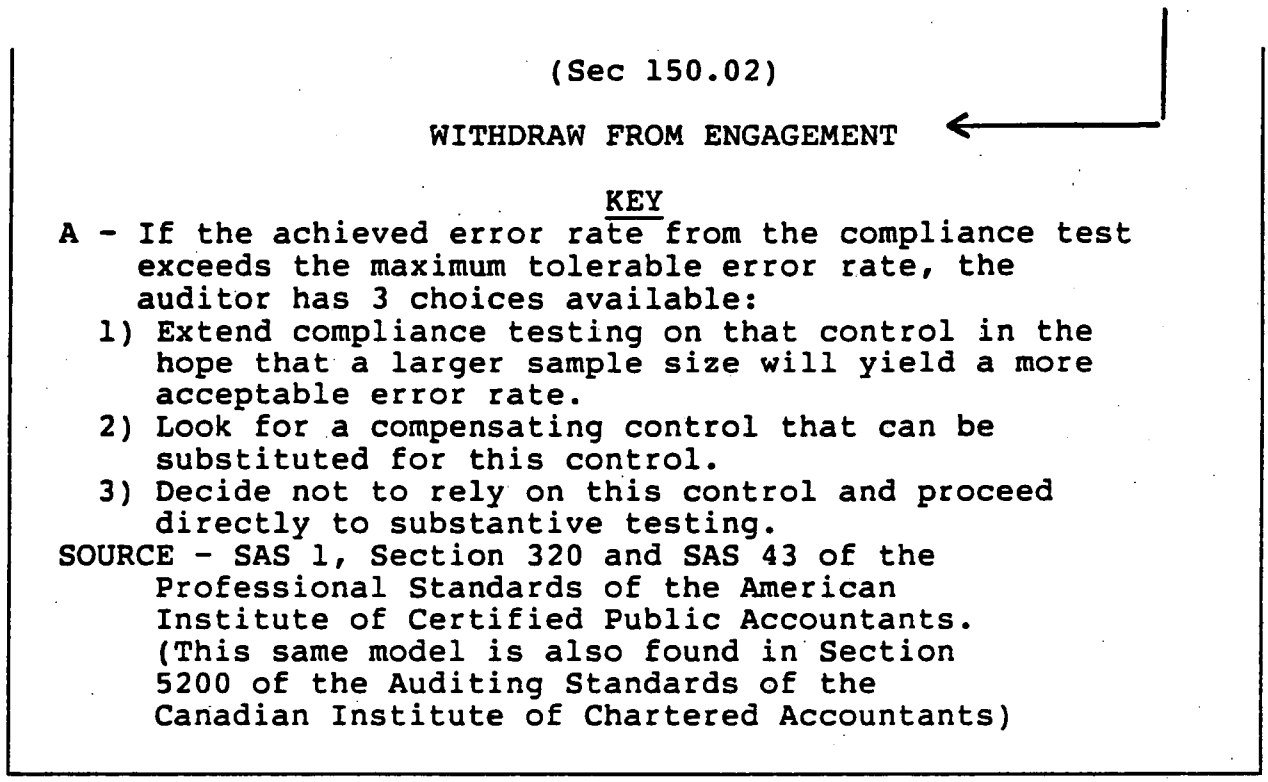
[1] Source- AICPA Professional Standards, Volume 1, AV Section 150, Section 320 (Fieldwork standards 2 and 3, Reporting standard 4)

Table 1: A Normative Model of the Audit Process





The first step in Figure 1 refers to the need to obtain an overall understanding of the client, industry and overall economic conditions before commencing the audit. AU Section 311.06 - .08 comments on this need

> .06 The auditor should obtain a level of knowledge of the entity's business that will enable him to plan and perform his examination in accordance with generally accepted auditing standards. That level of knowledge should enable him to obtain an understanding of the events, transactions and practices that in his judgment, may have a significant effect on the financial statements. The level of knowledge customarily possessed by management relating to managing the entity's business is substantially greater than that which is obtained by the auditor in performing his examination. Knowledge of the entity's business helps the auditor in
>
> 1. Identifying areas that may need special consideration.
>
> 2. Assessing conditions under which accounting data are produced, processed, , reviewed and accumulated within the organization.
>
> 3. Evaluating the reasonableness of estimates, such as valuation of inventories, depreciation, allowances for doubtful accounts and percentage of completion on long term contracts.
>
> 4. Evaluating the reasonableness of management representations.
>
> 5. Making judgments about the appropriateness of the accounting principles applied and the adequacy of disclosures.

.07 The auditor should obtain a knowledge of matters that relate to the nature of the entity's business, its organization and its operating characteristics. Such matters include, for example, the type of business, types of products and services, capital structure, related parties, locations, and production, distribution and compensation methods. The auditor should also consider matters affecting the industry in which the entity operates, such as economic conditions, government regulations, and changes in technology as they relate to his examination. Other matters, such as accounting practices common to the industry, competitive conditions, and, if available, financial trends and ratios should also be considered by the auditor. .08 Knowledge of an entity's business is ordinarily obtained through experience with the entity or its industry and inquiry of personnel of the entity. Working papers from prior years may contain useful information about the nature of the business, organizational structure, operating characteristics, and transactions that may require special consideration. Other sources an auditor may consult include AICPA accounting and audit guides, , industry publications, financial statements of other entities in the industry, textbooks, periodicals and individuals knowledgeable about the industry.

Steps 2 through 8 of Figure 1 are part of a single related process called the evaluation of internal control. Section 320.50 says with respect to this process

.50 The study to be made as the basis for the evaluation of internal control includes two phases: (a)knowledge and understanding of the procedures and methods prescribed and (b) a reasonable degree of assurance that they are in use and are operating as planned. These two phases of study are referred to as the review of the system and tests of compliance, respectively. Although these two phases are discussed separately, they are closely related in that some portions of each may be performed concurrently and may contribute to the auditor's evaluation of the prescribed procedures and of the compliance with them.

Step 2 pertains to the first phase, which is a review of the system. The nature of this review per Section 320.51 - .53 is

.51 The review of the system is primarily a process of obtaining information about the organization and the procedures prescribed by the client to form the basis for tests of compliance and for evaluation of the system. The information required for this purpose ordinarily is obtained through discussion with appropriate client personnel and reference to documentation such as procedure manuals, job descriptions, flowcharts and decision tables. from such sources, some auditors follow the practice of tracing one or a few of the different types of transactions involved through the related documents and records maintained. This practice may be useful for the purpose indicated and may be considered as part of the tests of compliance as discussed in this section. .53 Information concerning the system may be recorded by the auditor in the form of answers to a questionnaire, narrative memoranda, flowcharts, decision tables or any other form that suits the auditor's needs or preferences.

Step 3 is perhaps the least well defined and thus least understood of the procedures in Figure 4. Only a brief reference to this evaluation is made in Section 320.54

.54 Upon completion of the review of the system, the auditor should be able to make a preliminary evaluation assuming satisfactory compliance with the prescribed system, and it is usually desirable to do so at this time.

The confusion arises as to whether a "preliminary evaluation" implies some degree of aggregated judgment. No specific guidance on this is provided but paragraphs .65, .67 and .68 provide some additional insight.

.65 A conceptually logical approach to the auditor's evaluation of internal control, which focuses directly on the purpose of preventing or detecting material errors and irregularities in financial statements, is to apply the following steps in considering each significant class of transactions and related assets involved in the audit

1. Consider the types of errors and irregularities that could occur.

2. Determine the accounting control procedures that should prevent or detect such errors and irregularities.

3. Determine whether the necessary procedures are prescribed and are being followed satisfactorily.

4. Evaluate any weaknesses - i.e., types of potential errors and irregularities not covered by existing control procedures - to determine their effect on (1) the nature, timing or extent of auditing procedures to be applied and (2) suggestions to be made to the client.

.67 This suggested approach emphasizes the possibilities for and controls against, *particular types of errors and irregularities* concerning particular classes of transactions and related assets. Controls and weaknesses affecting different classes of transactions are not offsetting in their effect. For example, weaknesses in cash receipts procedures are not mitigated by controls in cash disbursements procedures; similarly, weaknesses in billing procedures are not mitigated by controls in collection procedures. The auditor's review of the system of accounting control and his tests of compliance should be related to the purposes of his evaluation of the system. For this reason,*generalized or overall evaluations are not useful for auditors because they do not help the auditor decide the extent to which auditing procedures may be restricted.*[2] On the other hand, the auditor ordinarily would confine his evaluation to broad classes of transactions, such as disbursements and sales; he would not ordinarily evaluate separately procedures that result in entries to particular accounts and he usually would not apply his procedures differently within a class of transactions. For example, disbursements may be examined by selecting from all disbursements without considering the accounts to which the disbursements are charged, and in his examination the auditor would be concerned with validity and approval of supporting documents without regard to the nature of the documentation or the particular individual authorized to approve the disbursement. There may be circumstances, however, in which a more narrow evaluation may be appropriate because control over a class of transactions may

2. Emphasis added.

> be good except as to certain transactions within the class, and it may be more efficient to extend auditing procedures as to only those kinds of transactions. For example, control of cash disbursements may be good except for disbursements for advertising, and it may be more efficient to extend procedures relating to advertising disbursements than to extend procedures relating to all cash disbursements. .68 The auditor's evaluation of accounting control with reference to each significant class of transactions and related assets should be a conclusion as to whether the prescribed procedures and compliance therewith are satisfactory for his purpose.

Paragraph .65 is phrased in terms of *specific* errors, weaknesses and controls. This position is reiterated at the start of paragraph .67. The most important statement in this discussion is that generalized or overall evaluations are not useful for auditors because they do not help the auditor decide the extent to which auditing procedures may be restricted. This would appear to preclude any type of aggregated judgment. But as we read on there is discussion about evaluation with respect to classes of transaction. How broad a range does "class" encompass? An answer to this might be found by referring back to the primary stated purpose of the study of internal control which is to establish a basis for reliance thereon in determining the nature, extent and timing of audit tests (Section 320.06). Since the evaluation of internal control leads to the design or modification of audit tests, such evaluation would seem most useful if it encompassed the same range of transactions as the audit tests themselves. But most audit tests are quite specific and narrow in scope, so it is argued that aggregated (global) judgments have little utility in the audit program planning function.

Burns & Loebbecke (1975) discuss this issue of a preliminary evaluation in their development of a computer model. The example provided of examining a raw materials inventory consists of identifying specific errors and impacts (their Table 2). Also their step by step computer approach to evaluation is couched in terms of specific controls and weaknesses.

Perhaps the best argument in favor of considering the preliminary evaluation as an aggregated judgment comes from SAS 39 (AICPA, 1981) which deals with audit sampling and risk. A quantification of audit risk is required according to the following formula:

$$UR = IC * AR * TD$$

IC represents a global internal judgment for that class of transactions with great impact on the degree of substantive testing performed. This raises some interesting questions which have not been addressed in the literature. What is the mechanism for performing this aggregation to get IC (Gaber & Lemon, 1983)? For instance, if an internal control questionnaire shows forty yes answers and five no's, how is this translated into a global judgment? What is the threshhold for changing this evaluation? What confidence can auditors place on such overall judgments? Is this strictly a heuristic process? If no formal mechanism exists for consistently performing such aggregations, should they be required of auditors? This appears to be a promising avenue for future research.

Given that aggregated judgments are required for statistical sampling, how does this integrate with the previous discussion? The answer may be that global judgments have usefulness in determining the extent of audit tests but not in the nature or timing of such tests.

Step 5 in the Figure 1 indicates that the auditor is concerned only with the key controls in the system. There are many controls in the client system which are inconsequen-

tial in terms of financial statement impact. Also, the auditor is only interested in internal accounting controls and not in administrative controls.

The 6th and 7th step in Figure 1 refer to the compliance testing phase of the audit. The controls which have been described to the auditor as being in effect must be tested to verify they are actually in place and are working as described before any degree of reliance can be placed on them.

Step 8 is the most important step in the evaluation of internal control because this assessment forms the basis for linking internal control to audit program planning. The key attribute of this assessment is that it should relate specific controls and weaknesses to specific audit tests.

Step 9 is referred to as audit program planning. Since it is not feasible to test 100% of the client's transactions, substantive audit procedures are performed on a test basis. The evaluation of internal control forms the basis for the nature, timing and extent to which these tests may be restricted. Finally, Steps 10 and 11 represent the culmination of the audit process and lead to the expression of an opinion on the financial statements.

Models Used in Prior Research on Audit Consensus

Steps 2 through 8 in Figure 1 depict the process referred to as the evaluation of internal control. The model[3] used in most internal control studies examining auditor consensus is much more abbreviated[4] and is shown in Figure 2.
A major issue raised in this research study is whether this is a faithful representation of the decision process auditors undertake with respect to internal control evaluation. If it is not, there is little basis for these studies generalizing as to auditor expertise.

It is suggested that this model may not be a faithful representation for two reasons. First, auditors make a complete study of internal control before proceeding to the program planning and evidence collection phases of the audit. Even within particular subsystems the number of cues (controls) processed may run into the hundreds. Providing the auditor with only a small number of cues is not likely to provide this person with a reasonable understanding of the system. There may be some degree of arbitrariness in formulating an overall judgment caused by using such a fragmentary data set.[5] There-

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[3] These studies make no explicit reference to the decision model used by auditors because as Lens studies no presumption is made as to process. The Lens methodology is strictly an input-output modeling relationship. Figure 2 is a simplified abstraction meant only to show the inputs and outputs of the decision tasks. Accordingly this figure does not do full justice to these studies and the reader is urged to refer to the original study to capture the full flavor of the experimental designs. However for the purposes of this research these input/output relationships are the only features brought forward.

[4] In addition, certain background information on the firm is provided which is held constant across tasks. This should ameliorate the degree of abstraction which the cases themselves represent. Libby (1981) notes, however, that the impact of the fidelity of background material is an unresolved issue.

[5] Some people may argue that providing the auditor with more information increases

Table 2: The Audit Model Employed in Lens Model Studies

A brief description of the internal control system containing information on usually about 6 cues (controls)

A global opinion on the adequacy of the internal control sub-system

fore, experimental tasks which employ such abbreviated cue sets may be said to be unrealistic.

The second difficulty with this model lies with the use of aggregated judgments. It has already been discussed that internal control evaluation is primarily a process of relating specific controls and weaknesses to audit program planning. Therefore, it is argued that overall evaluations are not a principal component of the audit process shown in Figure 1. Global judgments may be occurring at the preliminary conceptual evaluation stage, for instance, for inputting into statistical sampling plans. However, it was pointed out in that section that the basis for making these aggregations from individual controls is uncertain. It may be unfair then to generalize as to auditor expertise on what may be simply a heuristic process.[6]

It is not being asserted that auditors do not make global assessments. Overall judgments are a useful and necessary heuristic for the auditor. An overall impression that the system of internal control is weak may induce the auditor to exercise an extra degree

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rather than reduces uncertainty. But studies have shown that even if decision makers do not necessarily make better judgments with more data, they at least feel more confident in their decisions (Swieringa et al.,1976; Tversky & Kahneman, 1974). The point being made is that more information should improve decision making, or at least ease the decision maker's burden.

6 Figure 5 also ignores the dynamic nature of audit decision making which Step 4 of Figure 1 depicts. Compliance testing represents a form of feedback loop. The audit is a process of uncertainty reduction. The auditor continually gathers and evaluates evidence to minimize uncertainty (subject to economic constraints), and the nature of evidence gathered in the early stages affects the type and quantity of evidence gathered later on. Thus, feedback is continually incorporated into the decision model. For instance, Fox (1975) notes that an internal control system undergoes continual evolution throughout the period. Thus the evaluation of this system must continue throughout the engagement. The initial review serves as a preliminary basis for program planning but modifications may be forthcoming as more evidence of the effectiveness of the system is obtained. Explicit provision is even made for situations where uncertainty cannot be reduced to a manageable level, i.e. a subject to or a disclaimer of opinion is rendered. Therefore any experimental design which depicts audit judgment as a static process limits generalizability and this is a limitation of Figure 2 as well as this paper.

of caution in the conduct of the audit. The opposite view of the system might make the auditor feel much more comfortable with accepting client representations. An auditor is supposed to approach an audit with an air of "healthy skepticism". These overall impressions are necessary to establish the degree of "healthiness". An audit is such a complex interrelated process that a need does exist for integrative reasoning to cope with the huge amount of information that must be processed. The auditor's report is the final product of this integrative reasoning - the ultimate global judgment. The point being made here however, is that while these overall internal control evaluations do have utility, they are not part of the formal decision model at the program planning stage.

The Proposed Model

Figure 1 presented the normative model of the entire attestation process. Steps 2 through 8 describe the internal control evaluation process and the 9th step, the program planning stage. This section proposes an integrative model involving these two phases.

As discussed earlier, global internal control judgments are not part of this normative model. Instead, the auditor relates individual control weaknesses to audit procedures that assess the impact of that deficiency on the reliability of the accounting numbers. One of the Big Eight CPA firms characterizes this as the "objectives" approach to auditing (Touche, Ross & Co.). Other firms have similar approaches. Certain objectives should be met in any functional area by the client's system of internal control. These objectives can then be exploded into a series of more detailed controls which lead to attainment of these objectives. Each control is evaluated for its potential to either prevent or allow defalcations, errors or irregularities. Each perceived control weakness should lead to the design of a specific audit procedure to test the potential impact on the financial statements. This objectives approach is the basis for the model proposed in this paper. The key attribute of this model is that it relates *specific* controls or lack thereof to *specific* audit procedures. It is a major assertion of this paper that this specificity is an essential characteristic of a theory linking internal control evaluation and audit program planning. The next section proposes a research design to test this model, which is shown in Figure 3.

The objectives referred to in Step 1 of Figure 3 are taken from the normative literature. Step 3, which is called compliance testing, cannot be captured in a static experimental design.

Conclusions

There are two essential distinctions between Figure 1 (A Normative Model of the Audit Process) and Figure 3 (An Integrated Model of Internal Control Evaluation and Program Planning). These are:

1. Figure 1 is a normative model provided by the professional standards literature to give overall guidance to auditors. As such, it represents a *philosophical* statement of intent. The model is stated in broad terms which are left to individual interpretation. For instance, Step 4 states "FORMULATE OPINION ON INTERNAL CONTROL". The standards do not state, however, precisely how this is to be accomplished. Figure 3 on the other hand, is intended to be an *operational* statement. It purports to be a descriptive model of the decision process actually used by auditors.

Table 3: An Integrated Model of Internal Control Evaluation and Program Planning

Step	
1	Decide on the basic objectives that have to be met in each area to ensure the system produces reliable accurate data
	↓
2	Specify the controls necessary to achieve these objectives
	↓
3	Test for the presence of these controls and their effectiveness
	↓
4	Design the nature, extent, and timing of audit procedures

2. Figure 1 depicts the entire audit whereas Figure 3 has a much narrower scope. It covers only the relationship between internal control and the design of audit testing. This would correspond to Steps 2 through 5 in Figure 1.

In conclusion, there are many advantages to having a representational model of audit judgment in internal control evaluation. For example, such a model may be of use to standard setting bodies, or as a guide to process tracing descriptive modelling. This paper has argued that a disaggregated objectives approach to control evaluation is a more representative depiction of audit judgment than is the global approach characteristic of most previous research.

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APPLICATION OF THE CASE METHOD WITH GUIDED DESIGN AND CoRT TECHNIQUES TO ACCOUNTING INSTRUCTION

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I. INTRODUCTION

This paper is an outgrowth of the 1984 Waterloo Symposium on Accounting Education, which was designed to improve the quality of accounting instruction at the university level and in so doing to introduce new instructional techniques to accounting professors. One of the authors of this paper attended the Waterloo Symposium, and has since attempted to apply the techniques presented there in the classroom.

The case method, which is the focus of this paper, is a highly desirable method to use to foster understanding of the function of accounting in organizational decision-making. As an experiential approach, the case method brings the real world into the classroom and allows for integration of topics across various disciplines. This method, dealing with actual companies, can serve to motivate students, enhance their zest to learn, and even attract better students to the accounting discipline, those who would otherwise shy away from procedural drudgery. The case method constitutes a learning-by-doing approach, enabling the students to learn from vicarious experience and even role-playing, i.e., assigning management roles to selected students who "act out" these parts in class.[1] A "discovery" approach, the case method accents students' active participation in the instructional process with a view to achieving insight and understanding. Furthermore, many decisions in the real world are group- rather than individual-oriented, and the case method lends itself to study group activities. It should be emphasized, however, at the outset that we are not recommending that the case method be used to supplant traditional teaching methods, but rather to complement the traditional methods. Accordingly, we do not favor elimination of the lecture approach.

The remainder of this paper is organized as follows. Part II furnishes an overview of the case method, including different ways of utilizing this method in the classroom. Part III provides an analysis of "Guided Design," one particular approach to applying the case method. Part IV contains our specific recommendation on applying the case method to accounting instruction. Part V consists of our concluding comments. Part VI contains a specific accounting case, which is not included here due to space constraints, and shows how Guided Design, and subsequently a combination of Guided Design and the CoRT (Cognitive Research Trust) Thinking Program, can be applied to the case.

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[1]Role-playing is recommended to the extent that emotions and values, which are present in the thinking process, do not distort the thinking process. Emotions and values should be brought into the thinking process at the end, rather than at the beginning, of the process as postulated in the CoRT Thinking Program. See Part III of this paper.

II. AN OVERVIEW OF THE CASE METHOD

Sterling (1975, p.55) has observed that:

> [A]ccounting teachers seduce [their] students by making them believe that accounting problems are well structured, well defined and have an easily recognizable solution. ...

In fact, most accounting problems in the real world are ill-structured, despite the typical impression that students derive from university accounting courses. As for its conceptual merits, the case method serves to emphasize the lack of structure in business and accounting situations, the qualitative (e.g., behavioral and political) and quantitative factors associated with organizational decision-making. Cases reflect actual, real world problem situations, which lack "neat" solutions. There are no "right" and "wrong" answers to cases. The information provided in the cases is generally less than complete. Emphasis is placed on the quality of the student's thinking and analysis of the situation in question. In addition, the case method promotes active participation of students in the instructional process, a lively exchange of viewpoints.

There are essentially three different types of cases (Kaplan, 1986): (1) armchair, which represents the figment of the imagination of the casewriter; (2) library, which is based on available publications such as annual reports; and (3) field study, which is descriptive of actual organizational and environmental conditions. The last type of case is the hardest for the casewriter to prepare, and can be a particularly challenging assignment.

Amernic (1985, p.68) strongly advocates the case method in accounting instruction "based on the notion that educational curricula should 'mimic'--in a controlled manner--the stuff of practice." He contends that conventional, structured problem material should play a "subsidiary role in modern accounting education." (p.68) Additionally, Amernic and Enns (1979) have argued in favor of the use of less structured material for the purpose of developing students' cognitive skills. The specific learning objectives of a particular accounting course should be used in deciding on the nature of the cases (e.g., comprehensive or topic-specific) that may be appropriate for the students in question. (Reynolds, 1978, p.129)

The case method, its advantages notwithstanding, has not been widely used in accounting instruction for several reasons. First, most accounting educators (full- and part-time, with or without doctoral degrees) were generally not exposed as students to the case method in accounting, but rather to the conventional lecture approach that has long characterized most collegiate and university instruction. Faculty members tend to teach their courses based on their own experiences, i.e., often the way they themselves were taught. Second, it is not clear to many faculty that the case method ought to be used, let alone accentuated, in accounting education. Many misguided accounting educators remain wedded to a highly structured, procedural approach[2] in order

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[2]At this point, it is desirable to differentiate between two dichotomies: "structured vs. unstructured" and "procedural vs. conceptual." As Amernic and Beechy observe (1981, p.105):

to prepare their students to pass the uniform professional examinations.[3] The case method relative to the lecture approach tends to be less effective and less efficient in covering subject matter per se. Third, the development of suitable case materials for different courses can be a laborious and time-consuming endeavor. It takes a considerable effort to prepare and test case material for regular classroom use, and this effort should not be underestimated. Fourth, all too many respectable universities do not consider the preparation of case materials to be "research" work, let alone "respectable" scholarship. Many institutions place considerable emphasis on research productivity at the expense of innovative teaching. Fifth, a key problem with the case approach is that many students have a deep-rooted aversion to participating in class discussions, lest they make mistakes. On the other hand, some students are loquacious, and tend to dominate class discussions regardless of the topics considered, to everyone else's annoyance. Sixth, the size of the class may affect the instructors' interest in using innovative teaching approaches such as the case method. Case instruction can be especially difficult with classes having more than 50 students.

Perhaps, and this is most important, it is much more difficult to use cases than lecture-discussions in accounting instruction.

> Not only is it harder, at times it is physically and emotionally exhausting and potentially ego-threatening. With a case that has a fairly unstructured set of directions and even a moderately complex scenario, the instructor has to expect the unexpected. Because of our own limitations, we cannot be in total control and have all the answers with a case. A lecture format, supplemented by highly directed (right/wrong) teaching materials, is really much safer for an instruc-

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> "Conceptual material can be highly structured and directed (e.g., 'explain the concept of materiality,'), while procedural material can be quite unstructured and non-directive (e.g., a 'bookkeeping' problem which requires the student to figure out adjusting entries in situations not previously encountered)."

Additionally, it can be asserted that structured vs. unstructured and conceptual vs. procedural are extreme points on two continuums. Most learning material falls in-between the structured and unstructured boundaries; likewise with the conceptual-procedural dichotomy. Furthermore, as George H. Sorter once said: "You can teach concepts procedurally and procedures conceptually."

[3]In the U.S., the Uniform CPA Examination is largely technically- and procedurally-oriented, although the Certificate in Management Accounting Examination has a decision-making orientation like the Canadian Chartered Accountancy Uniform Finals and Certified Management Accounting Examination of the Society of Management Accountants. Some uniform accounting examinations have attempted to go far beyond structured problem material. For example, the CICA Uniform Final Examination includes a "comprehensive question":

> "Its distinguishing feature is that it is a relatively unstructured, nondirective simulation of a practical problem situation which might be encountered in real life. It is primarily a test of practical problem-solving abilities as opposed to theoretical knowledge." (Uniform Final Examination Handbook, CICA, Toronto, 1980, p.153.)

> tor. Making extensive use of cases is not the way to manage risk especially when some students may resist to the point of rebellion. After all, they have a vote when it comes to filling out course evaluations. (Amernic, 1985, pp.69-70)[4]

Additionally, too many academic administrators rely heavily on student course evaluations without considering innovative teaching materials prepared by instructors.[5] There is also a limited set of current accounting cases. All the foregoing factors militate against prevalent usage of the case method in accounting instruction.

Before we present and analyze an accounting-oriented case, let us consider alternative ways of applying the case method of instruction. Regardless of the particular approach used, the instructor should be a mentor to assist students in understanding the cases and drawing inferences from those materials. Moreover, students ought to be active learners, rather than passive note-takers, and participate frequently in class discussions. With the traditional lecture approach, the instructor may very well dominate class sessions, often doing most of the talking, while the students listen and take notes. The role of the instructor in traditional teaching is all-important in terms of directly delivering the material in question whereas his/her role in case teaching is quite different--enhancing the students' self-learning process. (Dooley and Skinner, 1977, p.283)

One method is "to throw the students in the water," a "sink-or-swim" approach--that is, to impel the students to cope with each case on their own, either individually or in groups, and prepare their own case analyses in their own chosen formats. This is an unstructured, non-directive approach. The problem here is that all too many students cannot cope with the ambiguity, uncertainty, and frustration inherent in this approach, and therefore it is seldom used in practice.

A second method of using cases for instructional purposes is to have the students analyze each case in terms of a particular format such as the following: (1) Explain the key problem. (2) Discuss the subsidiary problems. (3) Analyze the factors underlying the problem. (4) Discuss the alternative solutions. (5) Select the most feasible alternative, and explain your choice. (6) Discuss how you would implement that alternative.

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[4]Argyris (1980, p.295), based on his observations of an intensive executive case program, points to various dysfunctions in applying the case method, including the following: (a) instructors may well present answers as "right" and others as "wrong;" (b) different points of view may not be considered as opposed to those the instructors share; (c) instructors may keep their additional knowledge about cases to themselves even though such knowledge could be enlightening to the students; (d) instructors maintain considerable control over the learning process to the point that students learn to "psyche out" their instructors and harmonize their comments with their instructors' views. The goals of the case method are laudable, but the problem is how to implement them.

[5]Most of the current accounting case material is U.S.-oriented. There are very few Canadian accounting casebooks available for instructional purposes.

A third method of case instruction is through "Guided Design," which is described in Part III.

III. GUIDED DESIGN

Description and Analysis

"Guided Design" is an educational approach formulated by Wales[6] with a view to developing students' problem-solving and decision-making skills as well as subject matter. This approach consists of 14 steps, each of which is divided into two parts: instruction and corresponding feedback.

Guided Design is based on group discussion. Lectures are discouraged, except when instructors feel that particular topics lend themselves best to this method of instruction. Like case instruction in general, instructors are mentors, facilitators, or coaches, rather than lecturers. The typical procedure is as follows: Students are given certain information with the respective instructions, such as to identify the problem, state the goal, gather information. Following the group discussion, and when there appears to be a consensus among members of the group, the corresponding feedback is provided. Although, theoretically, students should be allowed to disagree with the feedback provided, that would demand excessive flexibility on the part of the instructor, rendering the application of this approach even more complicated and uncertain than otherwise. Guided Design is so-called in view of the way the cases are prepared and analyzed. The information and instructions are provided in intermittent steps. Feedback is furnished along with additional information, instructions, and so on at each step. It is important to understand that Guided Design is not to be used to make decisions, but rather to learn how to make decisions and to develop problem-solving skills.

Comments on Guided Design

1. Identify the Problem. This is a critical step. While it may seem easy to identify the problem, that is not so. Students have difficulty identifying the problem. Very often they confuse the problem with its symptoms or possible solutions. Also, students tend to submit solutions to a problem that have not been defined.

2. State the Goal. If the problem is the lack of production capacity, the solution may well be to increase the production capacity. If the problem is low sales, the solution may well be to increase sales. The question then is how to increase the production capacity or how to increase sales. Since everything else depends upon the problem definition, the definition is critical.

3. Gather Information. This is the next logical step. Having identified the problem and therefore the goal, gathering information serves to indicate the availability and feasibility of different actions. Here the

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[6]C.E. Wales and R.A. Stager, Guided Design, privately published, 1977.

"6 Ws" (Who, What, When, Where, Why, and How) are a helpful tool for comprehensive coverage of all factors involved in the situation. Who is involved? What is involved? What happened? What changed? When does it happen? When is it going to happen? When did it happen? Why does it happen? Why did it not happen before? How often? How much?

4. Component Analysis. The main concern of this step is to identify those components or factors that can be changed. The key question is which major factors can be changed. The rationale for this analysis is that the output of the decision-making process, i.e., the decision, should include only those factors susceptible to change.

5. Generate Possible Solutions. The task is to generate possible solutions that can serve to achieve the goal defined in Step 2.

6. Constraints and Assumptions. Preferability of various solutions depends on existing constraints, which must be taken into consideration. Assumptions help to simplify the problem.

7. Choice. From the possible solutions generated in Step 5, the most suitable one must be selected, taking into account its constraints as defined in Step 6. The solution to be selected permits achievement of the stated goal, within the constraints specified above. This is a critical step in the decision-making process.

8. Analysis. Although the selected solution has been compared to other possible solutions, an analysis of its components should be considered. Here again, the "6 Ws" are a helpful tool.

9. Synthesis. In this step, the questions raised in Step 8 should be answered, so that a detailed solution can be devised.

10. Evaluation. An evaluation of the selected solution has to be undertaken in order to verify whether the plan in question satisfies the goal within the constraints described in Step 6. If the selected plan does not meet the specific requirements, it may conceivably be necessary to return to Step 5, pick up another possible solution, and proceed again through the same process.

11. Recommendations. After evaluating the selected plan in light of the requirements, pertinent recommendations should be made.

12. Report. A report should be proposed and, if approved, implemented.

13. Implementation. This pertains to the implementation of the recommendations reported in Steps 11 and 12.

14. Check the Results. This is for control purposes.

There seem to be a number of "adopters" in Canadian universities of the Guided Design approach as applied to accounting instruction. Nonetheless, there are certain factors that should be carefully considered before a decision is made regarding its implementation or rejection.

Research productivity, not teaching proficiency, is often explicitly encouraged in our major universities. Since teaching takes a "back seat" to scholarship in our academic system, faculty tend to channel their energies towards more rewarding areas, relegating the development of teaching skills to a low priority. The result appears to be a lack of commitment to improving in teaching skills.

Guided Design is time-consuming and costly. Implementation of Guided Design requires a tremendous effort in order to prepare cases adequately. Not only is more faculty time necessary to prepare their courses, time that otherwise would be spent doing research, but, also given the number of instructions and feedback inherent in Guided Design, it is likely to require a number of extra photocopies for each case per student relative to the other case approaches discussed in Part II of this paper.

The use of Guided Design may make the case method and our courses more interesting and exciting, but it could have the opposite effect. At the beginning of the semester, when the technique is new to the students, the approach may conceivably be provocative and stimulating. However, after 4 or 5 applications of this approach in the same course, it can become monotonous to use. Several steps may seem repetitious and unnecessary. As a result, interest among the students may steadily wane.

Guided Design requires large rooms and small sections, just what most universities lack. Guided Design requires that students learn the technical aspects of the course on their own, which seems to imply that students are willing to do a great deal of self-study work in order to learn. From our own experiences, it appears that few students are adequately motivated to do that. Indeed, elimination of the lecture approach is unrealistic.

IV. OUR RECOMMENDATION

In view of the foregoing factors, we recommend that the case method be introduced in the accounting curriculum by combining an adapted version of the Guided Design approach and the CoRT Thinking Program designed by DeBono.[7] CoRT stands for Cognitive Research Trust. The CoRT Thinking Program consists of six units, each of which is composed of ten techniques. Although each unit has a specific goal to be achieved through its application, any technique can be applied without previous knowledge of the others. Thus, CoRT I--"Breadth"--is concerned with broadening students' perception, that is, with expanding their perception in analyzing a problem. In CoRT II--"Organization"--students are encouraged to think in an organized manner: to recognize, analyze, compare, etc. the different components of a specific situation. The objective of CoRT III--"Interaction"--is for students to learn to observe the thinking process involved in debating issues, that is, to explore all sides involved in an argument. Through CoRT IV--"Creativity"--students learn specific techniques in order to generate "new" ideas. "Lateral thinking" is the main approach developed in this unit. It is so called as opposed to logical (Vertical) thinking. The two types of thinking are, however, complementary rather than antithetical. Lateral thinking is applied in order to generate ideas, whereas

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[7]E. DeBono, CoRT Thinking Program, The Cognitive Research Trust, Pergamon Press, 1981.

order to generate "new" ideas. "Lateral thinking" is the main approach developed in this unit. It is so called as opposed to logical (Vertical) thinking. The two types of thinking are, however, complementary rather than antithetical. Lateral thinking is applied in order to generate ideas, whereas vertical thinking is applied in order to develop them. Lateral thinking provides vertical thinking with additional ideas, which can be suitable or unsuitable. Through the application of specific techniques such as Stepping Stone, Escape, Random Stimulation, lateral thinking encourages the generation of "new" ideas. CoRT V--"Information and Feeling"--is essentially concerned with the control of values and emotions involved in the thinking process. The thinking process tends to be more effective when values and emotions are brought in at the end rather than at the beginning of the thinking process. In effect, ordinary emotions such as joy, fear, anger, jealousy, and ego-emotions such as pride, the need to be right all the time, the need to feel important, tend to distort the thinking process and as a result its output. CoRT V is designed to show how to incorporate such emotions into the thinking process without distorting it. Finally, CoRT VI--"Action"--summarizes the whole thinking process, being mainly concerned with the necessary steps towards implementing the outcome of the thinking process.

We recommend the combination of Guided Design and the CoRT Thinking Program in order to develop students' decision-making and problem-solving skills. This hybrid approach can be used as a means to an end: to smooth the transition from the use of structured to less structured material, i.e., to introduce the case method to accounting students. Once the students have been sufficiently exposed to case analysis, then a less-structured, non-directive, and more efficient approach to casework, such as the two other approaches delineated in Part II of the paper, can be applied. In effect, Guided Design provides the structure for learning the decision-making process, while CoRT provides the exploratory tools, allowing for the development of thinking skills. Such a combination is intended to provide students with the necessary adaptability and flexibility to cope with unknown situations in our changing environment. This approach appears to us to be especially desirable for students who have a low threshold for ambiguity, and it should serve to alleviate the anxiety associated with case analysis.[8]

As previously asserted, we do not propose to eliminate lectures, but rather to complement them through case analyses. Under this combined approach, information would be provided once rather than in intermittent stages à la Guided Design. We would retain the Guided Design process (through Step 7, in order to avoid repetitive processes). In each step of Guided Design, a CoRT technique is applied, which constitutes an exploratory feature.

V. CONCLUDING COMMENTS

We recommend the case method--and the combination of Guided Design and CoRT, in particular, in introducing the case method--in order to complement the traditional teaching methods. The case method can serve to simulate the

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[8]Holland (1973), as cited by Amernic and Beechy (1981), asserts that accounting students are generally "conventional" types, meaning that they are averse to ambiguity. They prefer the "ordered," "explicit," and "systematic."

business environment, develop students' thinking skills, and encourage them to apply accounting concepts and techniques to particular situations. Since many decisions in the real world are made by groups, we recommend the use of case study groups. On the importance of group decision-making, Reich (1983, p.58) observes:

> Increasingly, professional education in America stresses the manipulation of symbols to the exclusion of other sorts of skills--how to collaborate with others, to work in teams, to speak foreign languages, to solve concrete problems--that are more relevant to the newly competitive world economy. And more and more, the career ambitions of America's best students have turned to professions that allow them to continue attending to symbols, from quiet offices equipped with a telephone, a Telex, and a good secretary. The world of real people, engaged in the untidy and difficult struggle with real ... problems, becomes ever more alien to [our] best and brightest.

If we do not attempt to make our courses more current and relevant, reflecting real world situations and the dynamic aspects of decision-making using accounting data, then our student majors--the few whom we will have--are going to be ill-equipped for future practice. We hold the view that the application of the case method to accounting instruction is desirable in order to enhance the relevance of our courses and kindle student interest in accounting subject matter. The traditional lecture approach to accounting education, which fosters rote memorization without understanding of the rationale underlying concepts and techniques, is an inherently passive approach to learning. The case method, on the other hand, is an active approach. Cases can serve to create a vibrant classroom environment, a sense of excitement about accounting and business, and, in turn, to promote a spirit of inquiry and analysis, thereby making the learning process a challenging experience. The cases could even deal with one company, and be used in an integrative fashion in cognate business courses. We firmly believe that the case method, in view of its conceptual desirability, ought to be applied across the board to all business courses, leaving no subject area untouched. Part VI of this paper, which is not included there due to space constraints, presents a detailed, original case and our analysis of it using a combination of Guided Design and CoRT.

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