

**COMPTE RENDU
PROCEEDINGS**

**CONGRÈS ANNUEL DE 1984
1984 ANNUAL CONFERENCE**



Mai 1984 May 1984

**l'Université Guelph
University of Guelph
Guelph, Ontario**

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

COMPTE RENDU

PROCEEDINGS

CONGRES ANNUEL DE 1984

1984 ANNUAL CONFERENCE

l'Université de Guelph

University of Guelph

le 29 - 31 mai 1984

May 29 - 31, 1984



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

October 2, 1984.

**The Members
The Canadian Academic Accounting Association**

Our 1984 Annual Conference was held in Guelph, Ontario, at the University of Guelph, as part of the Learned Societies Conference. We enjoyed a record attendance of 176 members. This volume of Proceedings contains the Program, abstracts of all research papers, and the papers themselves. Certain of the research papers have not been included in this volume, at the request of the authors. All authors were given this option. You are encouraged to write directly to the authors involved if you wish a copy of any excluded papers -- their names and affiliations are included in their abstracts.

The Program consisted of invited papers and papers accepted from the general call. Twenty-two papers were submitted in response to the general call, of which 13 were accepted, following review by two referees not from the author's institution. I wish to thank all of these referees for their generous assistance. I also wish to thank the persons who presented invited papers. These papers covered topics that, in the opinion of the program chairman, would be interesting and useful to members, including interim reports from recipients of CAAA Research funding.

Professors David Carter, University of Waterloo, and Bill Braithwaite, University of Guelph gave me much assistance in organizing the Conference. In addition, my thanks go to Barbara Jaeger of CAAA Secretariat.

This volume, in a separate section, contains the sessions sponsored by the CAAA Education Committee.

The assistance of Peat, Marwick, Mitchell & Co. and Charette, Fortier, Hawey/Touche Ross in publishing these proceedings is gratefully acknowledged.

Sincerely,

/ap
Encl.

W.R. Scott,
1984 CAAA Conference,
Program Chairman.



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

Le 2 octobre 1984.

Aux membres de l'Association Canadienne
des Professeurs de Comptabilité.

Notre congrès annuel de 1984 a eu lieu à Guelph en Ontario, à l'Université de Guelph, dans le cadre du congrès des Sociétés Savantes. Un nombre record de 176 membres ont participé au congrès de notre association. Ce compte rendu du congrès comprend le programme, les résumés des mémoires de recherche et les mémoires eux-mêmes. A la demande des auteurs, certains mémoires n'apparaissent pas dans cette publication. Tous les auteurs avaient ce choix. Si vous désirez un exemplaire des mémoires non publiés, vous pouvez écrire directement aux auteurs concernés - leur nom et l'endroit où vous pouvez les contacter sont indiqués dans les résumés.

Le programme du congrès comprenait des mémoires sollicités de particuliers et des mémoires choisis parmi ceux qui ont été reçus suite à une demande générale. Un total de 22 mémoires ont été soumis suite à une demande générale de mémoires et 13 ont été acceptés après un examen par deux arbitres qui n'étaient pas de l'institution de l'auteur. Ces arbitres je les remercie tous pour leur généreuse collaboration. Je tiens aussi à remercier les personnes qui ont présenté des mémoires sollicités. Ces mémoires portaient sur des sujets qui, de l'avis du président du congrès, pouvaient être intéressants et utiles aux membres. Ces mémoires comprenaient des rapports d'étape de bénéficiaires de fonds de recherche de l'ACPC.

Les professeurs David Carter de l'Université de Waterloo et Bill Braithwaite de l'Université de Guelph m'ont beaucoup aidé dans l'organisation du congrès. De plus, je remercie Barbara Jaeger, secrétaire de l'ACPC.

Cette publication contient dans une section distincte les présentations du comité d'enseignement de l'ACPC.

Nous sommes reconnaissants aux cabinets Peat, Marwick, Mitchell & Co. et Charette, Fortier, Hawey/Touche Ross pour l'aide apportée dans la publication du compte rendu du congrès.

Sincèrement,

W.R. Scott

Président du congrès 1984 de l'ACPC

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1984 CAAA Conference
The University of Guelph Campus
Tuesday Evening, 29 May, 1984 to Thursday Afternoon, 31 May, 1984

Tuesday, 29 May, 1984

8:00 - 10:00 p.m. Opening Reception, Cafeteria/Patio, Lennox-Addington Building. Sponsored by the Ontario Institute of Chartered Accountants.

Wednesday, 30 May, 1984

8:15 - 8:30 a.m. Plenary session, Macdonald Hall, Room 149, Welcoming remarks by CAAA President Gilles Chevalier.

8:30 - 10:00 a.m. Plenary session.
 Chairperson: Dr. Gilles Chevalier,
 Charette, Fortier, Hawey

Professor Phelim Boyle, University of Waterloo, "Valuation of Stock Portfolios for Life Insurance Companies: Some Actuarial Perspectives," and

Professor Daniel Thornton, University of Toronto, "Potential Applications of Option Pricing Theory to Accounting and Auditing,"

10:00 - 10:15 a.m. Coffee-break

10:15 - 11:45 a.m. Two concurrent research sessions:

- Session 1, Mackinnon Bldg., Room 121.
 Chairperson: Professor Harvey Mann,
 Concordia University.

Professor Richard Mattessich, U.B.C.
 "Bridging the Gap Between Contemporary Accounting Research and the Profession," and

Professor G.R. Chesley, Dalhousie University,
 "Inference in Auditing: The Implications of Coherence."

Wednesday, 30 May, 1984 continued

- Session 2, Mackinnon Bldg., Room 227.
Chairperson: Professor Howard Armitage,
University of Waterloo.

Professor Wally Smieliauskas, University of Toronto, "A Review of Several Issues Associated with the Practical Implementation of SAS 39 and Its Canadian Counterpart in the EAT Study," and

Professor Claude Lanfranconi and Rick Robertson, University of Western Ontario, "The Behaviour and Disclosure of Changes in Deferred Taxes in a Recessionary Environment."

12:00 noon - 1:45 p.m. Luncheon, University Centre, Peter Clark Hall. Sponsored by the Certified General Accountants Association of Canada. The C.G.A. Canada Distinguished Speaker will be Professor Nicholas Dopuch, Washington University who will speak on, "An Editor's Perspective on Accounting Research."

2:00 - 3:30 p.m.

Two concurrent research sessions:

- Session 1, Mackinnon Bldg., Room 121.
Chairperson: Professor Chris Robinson,
York University.

Professor Tony Atkinson, Dalhousie University, will give a progress report on his SMA/CAAA research project, "Intra-Firm Cost and Resource Allocations: Theory and Practice," and

Professor Amin Amershi, U.B.C., will report on his CICA/CAAA research project, "Economic Analysis of Audit Contracts."

- Session 2, Mackinnon Bldg., Room 227.
Chairperson: Professor Terry Anderson,
University of Ottawa.

Professor Ross Archibald, University of Western Ontario, "Corporate Accounting for Pension Costs and Liabilities: Some Key Issues for Resolution," and

Wednesday, 30 May, 1984 cont'd

Professor Daniel McMahon, Université du Québec à Trois Rivières, "A Survey of Preferences About Pension Accounting in Canada."

3:30 - 3:45 p.m. Coffee-break

3:45 - 5:15 p.m. Two concurrent research sessions:

- Session 1, Mackinnon Bldg., Room 121.
Chairperson: Professor Michel Legault,
Université Laval

"Research: Practical Possibilities and Academic Angles." Mr. Howard Lyons, Deloitte, Haskins & Sells will speak on accounting and auditing areas that could benefit from academic research. Professor Michael Gibbins, U.B.C., will address the same topic from an academic perspective.

- Session 2, Mackinnon Bldg., Room 227.
Chairperson: Ahmed Naciri,
Université du Québec
à Montréal.

Professor Terry Anderson, University of Ottawa, "Stock Market Reaction and Test Procedure Sensitivity: The Case of a Canadian Accounting Pronouncement," and

Professor Bipin Ajinkya, University of Florida and Professor Michael Gift, Indiana University, "Voluntary Disclosure of Unfavorable Private Information: An Empirical Examination."

5:30 - 7:00 p.m. Reception, Cafeteria/Patio, Lennox-Addington Building. Sponsored by Prentice-Hall Canada Inc.

Thursday, 31 May, 1984

8:45 - 10:15 a.m. CAAA Annual Business Meeting, Macdonald Hall, Room 149. Financial and other reports to members and elections, presentation of the L.S. Rosen outstanding educator award and the award for best paper presented at the Conference. Professor Andrew Bailey, Jr., University of Minnesota and a Vice-President of the American Accounting Association will outline current developments at the AAA.

10:15 - 10:30 a.m. Coffee-break

10:30 - 12:00 noon Two concurrent sessions:

- Session 1, Mackinnon Bldg., Room 121.
Chairperson: Professor Morley Lemon,
University of Waterloo.

Sponsored by the Education Committee of the CAAA. Professors Howard Armitage and Efrim Boritz, University of Waterloo, will present a paper, "Integrating Computers into the Accounting Curriculum."

- Session 2, Mackinnon Bldg., Room 225.
Chairperson: Mr. Stephen Spector,
CGA Canada.

Professor Randy Kudar, University of Western Ontario, "The Major Issues and Models of Measuring Productivity at the Level of the Firm," and

Edward Burnett and Vivienne Livick, McGill University, "Motivational Profile of Students for Successful Completion of the Graduate Diploma in Public Accountancy."

12:15 - 1:30 p.m. Buffet luncheon, Arboretum. Sponsored by The Society of Management Accountants of Canada. NOTE: The Arboretum is a considerable distance from the other Conference sessions. Walking shoes advised. For those who do not wish to walk, a bus will be available.

Thursday, 31 May, 1984 continued

1:45 - 3:15 p.m. Two concurrent sessions:

- Session 1, Mackinnon Bldg., Room 121.
Chairperson: Professor Ross Denham,
University of Alberta.

Sponsored by the Education Committee of CAAA.
Mr. Robert Lalonde, Assistant Auditor General
for Canada and Professor James Cutt,
University of Victoria will speak on
accounting education for the non-profit
sector.

- Session 2, Mackinnon Bldg., Room 225.
Chairperson: Professor Paul Paré,
Université Laval.

Professor Andrew Bailey, Jr., University of
Minnesota, "Expert Systems: Auditing
Internal Control," and

Professor Rajendra Gupta, Memorial
University, "A Survey of Math Programs in
Audit Staff Planning."

3:15 - 3:30 p.m. Coffee-break

3:30 - 5:00 p.m. Two concurrent sessions:

- Session 1, Mackinnon Bldg., Room 121.
Chairperson: Ms. Vivienne Livick,
McGill University.

Professor Haim Falk, University of Calgary
and McMaster University, will present an
information session about the new CAAA
journal, Contemporary Accounting Research,
and

Professor Chor Lau, University of Windsor and
Byron Reaume, "New! Is It Necessary? An
Evaluation of the Forward Averaging
Provisions of the Federal Income Tax Law."

CONFÉRENCE 1984 DE L'A.C.P.C.

Campus de l'Université de Guelph

du mardi soir 29 mai 1984 au jeudi après-midi 31 mai 1984

Le mardi 29 mai 1984

20h - 22h Réception d'ouverture à la Terrasse de la cafétéria de l'édifice Lennox-Addington. Elle sera financée par l'Ontario Institute of Chartered Accountants.

Le mercredi 30 mai 1984

8h15 - 8h30 Séance plénière au Macdonald Hall, salle 149. Mots de bienvenue du président de l'A.C.P.C., Gilles Chevalier.

8h30 - 10h Séance plénière présidée par le Dr. Gilles Chevalier de Charette, Fortier, Hawey.

Le professeur Phelim Boyle de l'Université de Waterloo présentera son mémoire "Valuation of Stock Portfolios for Life Insurance Companies: Some Actuarial Perspectives," et

Le professeur Daniel Thornton de l'Université de Toronto nous parlera de son mémoire intitulé "Potential Applications of Option Pricing Theory to Accounting and Auditing."

10h - 10h15 Pause-café.

10h15 - 11h45 Deux séances parallèles sur la recherche:

- Séance 1, à l'édifice Mackinnon, salle 121. Elle sera présidée par le professeur Harvey Mann de l'Université Concordia.

Le professeur Richard Mattessich de l'Université de la Colombie-Britannique nous parlera de son livre dans une présentation intitulée "Bridging the Gap between Contemporary Accounting Research and the Profession," et

Le professeur G.R. Chesley de l'Université Dalhousie présentera son mémoire intitulé "Inference in Auditing: The Implications of Coherence."

- Séance 2, à l'édifice Mackinnon, salle 227. Elle sera présidée par le professeur Howard Armitage de l'Université de Waterloo.

Le professeur Wally Smieliauskas de l'Université de Toronto présentera son mémoire intitulé "A Review of Several Issues Associated with the Practical Implementation of SAS39 and Its Canadian Counterpart in the EAT Study," et

Les professeurs Claude Lanfranconi et Rick Robertson de l'Université de Western Ontario nous parleront de leur mémoire intitulé "The Behaviour and Disclosure of Changes in Deferred Taxes in a Recessionary Environment."

12h - 13h45

Déjeuner au centre universitaire, Peter Clark Hall, financé par l'Association des comptables généraux licenciés du Canada. L'éminent conférencier invité par l'A.C.G.L.C. sera le professeur Nicholas Dopuch de l'Université Washington qui nous parlera de "An Editor's Perspective on Accounting Research."

14h - 15h30

Deux séances parallèles sur la recherche:

- Séance 1, à l'édifice Mackinnon, la salle 121.
Elle sera présidée par le professeur Chris Robinson de l'Université York.

Le professeur Tony Atkinson de l'Université Dalhousie nous donnera un compte-rendu de son projet de recherche de l'A.C.P.C. intitulé "Intra-Firm Cost and Resource Allocations: Theory and Practice," et

Le professeur Amin Amershi de l'Université de la Colombie-Britannique nous parlera de son projet de recherche de l'I.C.C.A. et de l'A.C.P.C. intitulé "Economic Analysis of Audit Contracts."

- Séance 2, à l'édifice Mackinnon, la salle 227.
Cette séance sera présidée par le professeur Terry Anderson de l'Université d'Ottawa.

Le professeur Ross Archibald de l'Université de Western Ontario présentera son mémoire intitulé "Corporate Accounting for Pension Costs and Liabilities: Some Key Issues for Resolution," et

Le professeur Daniel McMahon nous parlera de son "Survey of Preferences About Pension Accounting in Canada."

15h30 - 15h45

Pause-café.

15h45 - 17h15

Deux séances parallèles sur la recherche:

- Séance 1, à l'édifice Mackinnon, salle 121.
Elle sera présidée par le professeur Michel Legault de l'Université Laval.

M. Howard Lyons de Deloitte, Haskins & Sells nous parlera des domaines de la comptabilité et de la vérification qui pourraient bénéficier de recherches. Le professeur Michael Gibbins de l'Université de la Colombie-Britannique joindra M. Lyons dans cette présentation intitulée "Research: Practical Possibilities and Academic Angles" et parlera du même sujet mais du point de vue de l'enseignant.

- Séance 2, à l'édifice Mackinnon, salle 227.
Elle sera présidée par M. Ahmed Naciri de l'Université du Québec à Montréal.

Le professeur Terry Anderson de l'Université d'Ottawa présentera son mémoire intitulé "Stock Market Reaction and Test Procedure Sensitivity: The Case of a Canadian Accounting Pronouncement," et

Le professeur Bipin Ajinkya de l'Université de la Floride et le professeur Michael Gift de l'Université Indiana nous présenteront leur mémoire "Voluntary Disclosure of Unfavorable Private Information: An Empirical Examination."

17h30 - 19h

Réception à la Terrasse de la cafétéria de l'édifice Lennox-Addington. Elle sera financée par Prentice-Hall Canada Inc.

Le jeudi 31 mai 1984

8h45 - 10h15

L'Assemblée annuelle de l'A.C.P.C. au Macdonald Hall, salle 149. L'ordre du jour inclura la présentation des rapports financiers et d'autres rapports aux membres, les élections, la présentation du prix L.S. Rosen à l'enseignant éminent et la remise du prix pour le meilleur mémoire présenté à la Conférence. Le professeur Andrew Bailey, Jr. de l'Université du Minnesota et vice-président de l'American Accounting Association nous fera part des activités de l'A.A.A.

10h15 - 10h30

Pause-café.

10h30 - 12h

Deux séances parallèles:

- Séance 1, à l'édifice Mackinnon, salle 121.
Elle sera présidée par le professeur Morley Lemon de l'Université de Waterloo.

Les professeurs Howard Armitage et Efrim Boritz de l'Université de Waterloo présenteront leur mémoire "Integrating Computers into the Accounting Curriculum." Cette présentation sera financée par le Comité d'enseignement de l'A.C.P.C.

- Séance 2, à l'édifice Mackinnon, salle 225.
Elle sera présidée par M. Stephen Spector de l'A.C.G.L.C. à Vancouver.

Le professeur Randy Kudar de l'Université de Western Ontario nous parlera de "The Major Issues and Models of Measuring Productivity at the Level of the Firm," et

M. Edward Burnett et Mme. Vivienne Livick de l'Université McGill présenteront leur mémoire intitulé "Motivational Profile of Students for Successful Completion of the Graduate Diploma in Public Accountancy."

12h15 - 13h30

Buffet à l'Arboretum financé par la Société des comptables en management du Canada.

A NOTER: L'Arboretum est assez loin de l'édifice Mackinnon. Il y aura un autobus pour ceux qui ne désirent pas faire le trajet à pied; les autres devront porter des chaussures convenables.

13h45 - 15h15

Deux séances parallèles:

- Séance 1, à l'édifice Mackinnon, salle 121.
Elle sera présidée par le professeur Ross Denham de l'Université de l'Alberta.

M. Robert Lalonde, vérificateur général adjoint du Canada, et le professeur James Cutt de l'Université de Victoria nous parleront de l'enseignement de la comptabilité dans les secteurs d'activité sans but lucratif. Cette séance sera financée par le Comité d'enseignement de l'A.C.P.C.

- Séance 2, à l'édifice Mackinnon, salle 225.
Elle sera présidée par le professeur Paul Paré de l'Université Laval.

Le professeur Andrew Bailey, Jr. de l'Université du Minnesota présentera son mémoire intitulé "Expert Systems: Auditing Internal Control," et

Le professeur Rajendra Gupta de l'Université Memorial de la Terre-Neuve présentera son mémoire "A Survey of Math Programs in Audit Staff Planning."

15h15 - 15h30

Pause - cafe.

15h30 - 17h

- Séance, à l'édifice Mackinnon, salle 121.
Elle sera présidée par Mme Vivienne Livick de l'Université McGill.

Le professeur Haim Falk de l'Université de Calgary et l'Université McMaster nous donnera des renseignements sur le nouveau journal de l'A.C.P.C., Recherche comptable contemporaine, et

Le professeur Chor Lau de l'Université de Windsor et M. Byron Reaume présenteront leur mémoire "New! Is It Necessary? An Evaluation of the Forward Averaging Provisions of the Federal Income Tax Law."



ABSTRACTS

CAAA ANNUAL CONFERENCE

University of Guelph

29-31 May, 1984

VALUATION OF STOCK PORTFOLIOS FOR LIFE INSURANCE COMPANIES:
SOME ACTUARIAL PERSPECTIVES

Professor Phelim Boyle
Accounting Group
University of Waterloo

The financial statements of life insurance companies have historically been based on statutory account principles. Since Federal insurance legislation has as its main aim the solvency of the individual companies, the reported statements were essentially balance-sheet oriented. Within the last decade there have been significant changes in the insurance legislation to bring insurance company statements more into line with GAAP. There is an ongoing discussion on the appropriate methods for the valuation of assets and liabilities and the reporting of earnings.

In particular, the valuation of the equity investments of life companies is under discussion at the present time. The paper examines some of the background to this discussion, analyzes some of the issues involved, and suggests certain procedures. It is emphasized that the paper is written from an actuarial and financial perspective. However it is hoped that the analysis and framework will also be of interest to accountants.

The first part of the paper discusses some of the desirable criteria for an accounting method - from the perspective of one interested user group. A methodology is proposed for the evaluation of these criteria. A few actual life company stock portfolios are examined to provide representative statistics. The various accounting methods are analyzed using investment performance distributions based on these empirical statistics. In the final section of the paper, a procedure for obtaining a synthesis of views is described and the results of some practical experiments are reported.

POTENTIAL APPLICATIONS OF OPTION PRICING
THEORY TO ACCOUNTING AND AUDITING

Daniel B. Thornton
University of Toronto

Financial economic theory has tended to influence accounting theory, research and practice with a lag of a decade or so. A notable exception is option pricing theory, which has been with us since the early 70's yet has had apparently no impact. This presentation will explore some potential applications. In particular:

a) A loan guarantee by a parent of a subsidiary's debt will be viewed as a short position in a put option, with exercise price equal to the face value of the debt. The implications of this treatment for consolidation theory will then be discussed.

b) The so-called "bargain purchase option" in a capital lease (described in s.3065 of the CICA Handbook) will be viewed as a European call option, with striking price equal to the bargain purchase price. The impact on financial statements of this proposed treatment will be analysed using data on five-year photocopy machine leases. As long as the bargain purchase price is low compared with today's value of similar used machines, the CICA recommendation gives carrying values almost identical to the proposed values; but, as the bargain purchase price increases, the disparity begins to increase. Ideally, this analysis will give accountants a way of deciding whether to assume that the bargain purchase option will be exercised when computing the carrying value of a lease obligation.

BRIDGING THE GAP BETWEEN CONTEMPORARY ACCOUNTING RESEARCH
AND THE PROFESSION

Richard Mattessich
Faculty of Commerce and Business Administration
University of British Columbia

This paper offers an overview of the philosophy and content of the recent book:

Modern Accounting Research: History, Survey and Guide, edited by R. Mattessich, with a Foreword by Y. Ijiri and twenty-one contributions by prominent accounting scholars (Vancouver, B.C.: Canadian Certified General Accountants' Research Foundation -- Monograph Series, 1984).

This book is not a mere anthology, but also tries to convey the personal viewpoint of its editor through introductory sections to the various parts of the book (Part I: The Scientific Approach to Accounting; Part II: Evolution or Revolution of Modern Accounting Theory?; Part III: Positive Versus Normative Accounting Theory and Standard Setting; Part IV: Agency Theory and Information Economics; Part V: Empirical Accounting Research; Part VI: Managerial and Institutional Accounting and Auditing).

The commentaries treat accounting as an applied science in need of a purpose-oriented methodology. For this reason, the recent trend towards a purely positive approach in accounting is viewed with some scepticism. Great hope is placed in the further development of agency-information analysis, which offers a sophisticated version of the stewardship principle, thus moderating the extreme view that accounting primarily serves the broad spectrum of potential investors and financial analysts. But the major concern is to create a means of informing students and practitioners about the essence, attempts, and aspirations of modern accounting research.

INFERENCE IN AUDITING: THE IMPLICATIONS OF COHERENCE

G.R. Chesley
Dalhousie University

The probabilities used in the auditing literature, based on the concept of chance, are only one conception of probabilities. Epistemic probabilities are used to represent inductive inference and historically have been developed to represent inferences of the type used by auditors in forming their opinions on the fairness of financial statements.

The basic role of each of these two views of inference is explored in terms of some of the inference used by auditors. This analysis provides an opportunity to examine the assumptions implicit in such constructions of probabilities. It also provides an opportunity to undertake further reviews of the empirical relations that exist in audit inferences so that their representation by probabilities can be examined.

This paper presents one construction of the alternative epistemic view of probabilities. These so called Baconian probabilities have an axiom system that has been assessed in terms of legal inferences and one that seems to provide interesting possibilities for auditors. The inferences suggested by their construction provide a view of inductive inference that is decidedly different than the view represented in the auditing literature.

A REVIEW OF SEVERAL ISSUES ASSOCIATED WITH THE PRACTICAL IMPLEMENTATION
OF SAS No. 39 AND ITS CANADIAN COUNTERPART IN THE EAT STUDY

Professor Wally Smieliauskas
Faculty of Management Studies
University of Toronto

This paper reviews some key issues concerning the formulation of risk models of audit practice. In particular it focuses on differences between the Canadian and American models and it analyses the advantages and disadvantages of both approaches. The paper concludes that the question of preferability can only be answered by making assumptions about the behavioral consequence of using the two approaches.

THE BEHAVIOR AND DISCLOSURE OF DEFERRED INCOME TAXES
IN A RECESSIONARY ENVIRONMENT

Claude P. Lanfranconi
and
Darroch A. Robertson
University of Western Ontario

It has been postulated in the literature that a severe recession might create conditions which would impact on the behavior of deferred tax accounts. This study reports descriptive data which examines the behavior of deferred income taxes during the unusually severe 1982 recession in Canada. We made the following observations:

1. There was an increased incidence of drawdowns during the 1982 recession. The number of drawdowns increased substantially and the average amount approximately doubled over the prior year. Fifty-three percent of our sample had drawdowns with an average amount in excess of \$18 million.
2. Although current disclosure in the financial statements does not permit clear interpretation of the underlying course there is considerable evidence that a substantial part was due to recognizing the income tax benefits of losses rather than due to the involuntary reversal of timing differences.

INTRA-FIRM COST AND RESOURCE ALLOCATIONS: THEORY AND PRACTICE

Anthony A. Atkinson
School of Business Administration
Dalhousie University

This study is an investigation of the theory of cost allocation and its practice in a selected sample of Canadian firms. The study is funded by the Society of Management Accountants of Canada through the Canadian Academic Accounting Association. The project was begun in May 1982 and is expected to be completed in June 1985.

The initial chapter of the study presents a survey of the treatment of joint cost allocation in the following disciplines: accounting, economics, law, social psychology, game theory, and the regulation literature.

The investigative part of the study began with a mail survey of cost allocation practice in the 430 largest Canadian firms. Then a series of six case studies of actual firms was undertaken to uncover interesting (to me) and relevant (to the firm) cost allocation problems. This process uncovered the following five cost allocation problems which are the subject of investigation in this study:

1. the use of joint cost allocation in the acquisition and allocation of jointly used resources
2. the potential effects of bargaining on the cost allocation and transfer pricing processes
3. the use of cost allocation in the process of standard setting for performance measurement and evaluation
4. the use of cost allocation to motivate short-run capital investment decisions
5. the effect of cost allocation and multi-attribute reward systems on organizational behaviour.

AN INFORMATION ECONOMIC EXPLORATION OF AUDIT CONTRACTS

Professor Amin Amershi
Faculty of Commerce and Business Administration
University of British Columbia

This paper presents some insights into the type of incentive contracts that investors would strike with auditors of firms. First we show that in any firm, where production decisions are delegated to managers, and investors cannot observe the productive acts, investors demand accounting information. Then we show that if this information is supplied by a third party such as an auditor, a complex game arises between investor, manager and auditor. We show that if this game has a unique Nash equilibrium, then part of the auditor's compensation depends on due care standards established by regulatory bodies. In the event that the game has multiple Nash equilibria, there would often arise a demand for auditor judgment rather than a complete analysis of what the manager does.

CORPORATE ACCOUNT FOR PENSION COSTS AND LIABILITIES:
SOME KEY ISSUES FOR RESOLUTION

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Corporate accounting for pension costs and liabilities has surfaced as a highly controversial financial reporting topic. Satisfactory resolution of the multitude of accounting standard setting problems will require numerous decisions on many key issues, some of which are currently unfamiliar to large groups of accountants and other interested parties.

The main goal of the presentation and the attendant document is to foster informed discussion, as a route to developing better methods of reporting pension costs and liabilities. In the paper, the author identifies what he regards as a group of the key and in some cases the most controversial issues under discussion.

At the outset three fundamental issues are identified as vital to understanding the economic realities of pensions. They are:

1. The role of the actuary and the role of the accountant;
2. The deferred wage concept;
3. The going concern assumption.

Subsequently four crucial areas of controversy are specified as:

1. The proper target for accounting allocations;
2. The nature of actuarial obligations and accounting liabilities;
3. The legitimacy of salary projection;
4. The underlying characteristics of accrued benefit versus level contribution actuarial valuation methods.

The author analyzes the fundamental issues and key areas of controversy presenting his personal conclusions in an effort to aid the process of enhancing accounting standards for the financial reporting of pension costs and liabilities.

A SURVEY OF PREFERENCES ABOUT PENSION ACCOUNTING IN CANADA

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There are numerous opinions about the appropriate method to measure the pension liability and periodic expense. Many authors have provided useful analysis of the basic questions essential to a solution of the pension accounting problem. Even then, empirical data on preferences for alternate solutions is virtually non-existent. This study has addressed the issue by obtaining the preferences of academics, chartered accountants and corporate financial officers. The results reveal (1) a high level of uniformity in the preferences of each group about the nature of pension plan arrangements, pension liability and measurements; (2) a potential consensus among all groups about the periodic pension expense, accounting for plan changes and actuarial gains and losses.

RESEARCH: PRACTICAL POSSIBILITIES AND ACADEMIC ANGLES

Michael Gibbins
University of British Columbia
and
P. Howard Lyons
Deloitte Haskins & Sells

This session will explore several accounting and auditing issues that could benefit from academic research. The objective is to provoke research ideas and discussion from the floor by providing comments from a practitioner's and an academic's perspective on each issue. By taking turns throwing down and picking up the gauntlet, the presenters will examine the potential academic value, practical interest, feasibility and contribution to the body of research in Canada of issues the presenters believe deserve attention. Empirical and theoretical research issues in accounting, auditing, staff training, professional standards and professional judgment will be included. Wide-ranging discussion will be encouraged.

STOCK MARKET REACTION AND TEST PROCEDURE SENSITIVITY:
THE CASE OF A CANADIAN ACCOUNTING PRONOUNCEMENT

Teresa Anderson
University of Ottawa

This paper examines the behaviour of stock prices on the Toronto stock exchange in response to the release of the Exposure Draft on Foreign Currency Translation by the Canadian Institute of Chartered Accountants in August 1977 and to its subsequent suspension in 1979. The study uses four separate procedures to test the null hypothesis of no reaction. It indicates that the results are sensitive to the test procedure used and that, subsequently, no conclusions can be drawn regarding stock market reaction.

VOLUNTARY DISCLOSURE OF UNFAVORABLE PRIVATE INFORMATION:
AN EMPIRICAL EXAMINATION

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University of Florida
and
Michael J. Gift
Indiana University

The purpose of this study is to determine if the current market structure provides sufficient incentives for voluntary disclosure of both favorable and unfavorable private information. Signalling models have predicted full disclosure, however, in Penman's (1980) empirical study he concluded that "with regard to the full disclosure issue, the results suggest that voluntary disclosure does not result in full disclosure of earnings forecasts." We think that this conclusion was unwarranted, both from a theoretical standpoint and also due to (what we believe were) possible measurement problems in Penman's study. To seek resolution, we partially replicated Penman's study, using a different sample of firms (although drawn from approximately the same time period) and modifying the research design and the measurement of a crucial independent variable.

Using 123 earnings forecast observations (for calendar year firms) from 1970 to 1973, we computed two independent variables:

$$M = (\text{management forecast} - \text{prior analyst forecast}) / (\text{prior analyst forecast})$$

$$E = (\text{actual earnings} - \text{management forecast}) / (\text{actual earnings})$$

We used the latest financial analyst forecast to capture the updated market expectation at the time that the management forecast was released. The variable of primary interest was M , while E controlled for the effects of other information that became available during the test period. The dependent variable, \bar{V} , was computed as the average standardized residual over a 13 month test period beginning in March of the year the management forecast was released through April of the following year, when the earnings announcement was published.

The distribution for the primary forecast variable M is quite symmetrical, with a significant incidence of both positive and negative values. The distribution of \bar{V} had a good proportion of significant negative market reactions. It remained to be shown that the negative (positive) values for \bar{V} were conditional upon negative (positive) values of the forecast variable M .

A regression analysis was performed to test the relationship of the independent variables, M and E , to the dependent variable \bar{V} . Both regression coefficients were positive and significant. Thus, our results clearly showed that "unfavorable" private information is voluntarily disclosed. Further, the results indicate that the market views it accordingly, that is, revises prices downward in such instances. These results support the full disclosure hypothesis, indicating that the forecasting firms appear to adequately represent firms releasing both unfavorable and favorable financial information.

WHY LOOK AT PRODUCTIVITY MEASUREMENT MODELS

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It is only in the last decade that productivity issues have taken on significance to academics and managers. However, productivity is not a well understood concept. There are three major issues facing managers who want to address productivity within their firms. The first issue is the low level of agreement regarding what is an output, what is an input, how should they be measured, and how should the results be interpreted? The second issue involves the number of different productivity measurement criteria available to assist managers in selecting the most appropriate model. Finally, the third issue focuses on the relationship between productivity measures and profitability measures.

By understanding the way in which the different productivity models define and measure productivity within the firm, and through experimentation, examination, and investigation of productivity measurement models in firms, it is possible to develop some understanding of the way in which these issues may be addressed.

MOTIVATIONAL PROFILE OF STUDENTS FOR SUCCESSFUL COMPLETION
OF THE GRADUATE DIPLOMA IN PUBLIC ACCOUNTANCY

Edward Burnett
and
Vivienne Livick
McGill University

Many students at McGill University found the program difficult to complete. Studies were initiated to determine the reasons for their difficulty. It was found that personal motivation was an important criterion for completion of the program. We found that self-screening by students and screening at program entry level rendered traditional measurement tools ineffectual in predicting probability of successfully completing the program. Measurement of general characteristics of CA students was undertaken and a pattern of needs (motivators) was determined. A preliminary testing instrument was developed based on identified self-motivational factors as predictors of success. Initial testing of these motivational factors suggested that they are reliable predictors.

EXPERT SYSTEMS: AUDITING INTERNAL CONTROL

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Gordon L. Duke
Paul E. Johnson
William B. Thompson
Rayman D. Meservy
University of Minnesota

The objective of this study is to build a computational model (expert system) based on the processes employed by auditors in identifying and evaluating internal accounting controls for subsequent compliance testing. Knowledge for the computational model will be acquired from: (1) available books and monographs; (2) interviews with practicing auditors; and (3) observations of expert auditors performing the task using "thinking-aloud protocols". The resulting model will be cross-validated with the performance of additional auditors.

A SURVEY OF MATH PROGRAMS IN AUDIT STAFF PLANNING

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Audit staff planning problem is the aggregate production planning exercise in an audit firm. Several math programming techniques, such as linear programming, goal programming, and multi-criteria programming have been applied to this problem. We critically survey the literature and suggest directions for future research.

NEW! IS IT NECESSARY?
AN EVALUATION OF THE FORWARD AVERAGING SYSTEM OF THE FEDERAL INCOME TAX LAW

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University of Windsor
and
Byron J. Reaume
Deloitte Haskins & Sells

The old general averaging provision and income-averaging annuity contract (IAAC) were recently replaced by the forward averaging provision. The Department of Finance gave examples which indicated that the IAAC was not significantly better than forward averaging. The comparison ignored the general averaging provision which was also renewed.

This paper completes the examples by focusing the comparison on the general averaging provision, and assessing the need for changing the law in respect to averaging. Additionally, examples are presented to show situations, in particular those related to deceased taxpayers, in which forward averaging may be considered.

It was found that general averaging was superior not only because it resulted in less tax, but more importantly because of the non-tax considerations. The non-tax considerations are:

1. automatic application without the need to make an election;
2. certainty of tax liability because it is done presently once for all,
3. non-discriminatory because the computer was programmed to automatically apply to all qualified individual taxpayers without the necessity of professional advice.

It was concluded that forward averaging has dubious utility to the taxpayer because its application requires a consideration of uncertain future variables. If increased tax revenue is what is desired, the forward averaging provision should be removed from the statute in accordance with the current public sentiment to simplify the tax law.



RÉSUMÉS

CONFÉRENCE 1984 DE L'A.C.P.C.

L'UNIVERSITÉ DE GUELPH

du 39 mai 1984 au 31 mai 1984

LA VALORISATION DES PLACEMENTS DE PORTEFEUILLES ET LES COMPAGNIES
D'ASSURANCE-VIE: QUELQUES PERSPECTIVES ACTUARIELLES

Phelim Boyle
de l'Université de Waterloo

Les états financiers des compagnies d'assurances ont été basés, historiquement, sur des principes comptables découlant de statuts. Ces états étaient présentés principalement sous forme de bilan, afin de témoigner de la solvabilité que recherchent les lois fédérales des assurances. Au cours des dix dernières années cette législation a été changée d'une façon significative en vue d'une présentation plus conforme aux P.C.G.R. des états financiers des compagnies d'assurances. On discute toujours des méthodes convenables de valorisation des actifs et des passifs et de comptabilisation du revenu.

A l'heure actuelle on discute surtout de la valorisation des titres de participation des compagnies d'assurance-vie. Cette étude examine le contexte du problème, analyse quelques questions soulevées par ce problème et suggère quelques approches. Ceci est fait d'un point de vue actuariel et financier mais l'analyse et l'approche pourraient aussi intéresser les comptables.

Dans la première partie de l'étude on discute des critères d'une méthode comptable choisis par un groupe d'utilisateurs qui s'intéresse à cette valorisation des titres de participation. On examine aussi quelques portefeuilles types afin d'en tirer des statistiques représentatives. L'analyse des différentes méthodes de comptabilisation s'est faite d'après l'évaluation des rendements révélés par ces statistiques. Dans la dernière partie de l'étude, on décrit une procédure qui obtiendra une synthèse des approches du problème de la valorisation des placements de portefeuille et on discute de quelques aspects pratiques de ces approches.

APPLICATIONS POSSIBLES À LA COMPTABILITÉ ET À LA VÉRIFICATION DE LA THÉORIE
DU DROIT À L'OPTION D'ÉTABLISSEMENT DES PRIX

Daniel B. Thornton
de l'Université de Toronto

La théorie économique influence d'habitude la théorie comptable avec un retard d'à peu près dix ans. Une exception à noter est la théorie du droit à l'option d'établissement des prix qui existe depuis les années 70 mais qui n'a pas encore influencé la théorie comptable. Cette présentation examinera quelques applications possibles de cette théorie économique dans le domaine de la comptabilité, dont:

1. Une garantie de prêt faite par une société mère sur la dette d'une filiale sera considérée comme une position à découvert dans une option de vente et le prix de levée d'option égalera la valeur nominale de la dette. On discutera des implications de cette méthode sur la théorie de consolidation;
2. On considérera la soi-disant "option d'achat à prix de faveur" (décrite dans la section 3065 du Manuel de l'I.C.C.A.) comme une option d'achat européenne, et le prix stipulé égalera le prix de faveur de l'option mentionnée ci-dessus. On analysera l'effet de cette méthode sur les états financiers en se servant des informations sur des contrats de location avec une durée de cinq ans des machines à photocopier. Si le prix de faveur reste inférieur à la valeur actuelle des machines d'occasion, les valeurs comptables de la méthode suggérée par l'I.C.C.A. ne seront guère différentes des valeurs proposées. Pourtant, le décalage entre les valeurs comptables et les valeurs proposées augmente par rapport à l'augmentation du prix de faveur. On espère que cette analyse aidera les comptables à décider si l'option d'achat à prix de faveur sera pertinente dans le calcul de la valeur comptable de tout contrat de location.

COMMENT SUPPRIMER L'ÉCART ENTRE LA RECHERCHE COMPTABLE CONTEMPORAINE
ET LA PROFESSION COMPTABLE

Richard Mattessich
de l'Université de la Colombie-Britannique

Cet article présente un survol de la philosophie et du contenu du livre:

Modern Accounting Research: History, Survey and Guide rédigé par R. Mattessich, avec une préface de Y. Ijiri et vingt et un articles de spécialistes en comptabilité (Vancouver: Centre de recherche des comptables généraux licenciés canadiens -- Monograph Series, 1984).

Ce livre n'est pas qu'une collection d'articles, il est aussi l'expression du point de vue de l'auteur. Ce point de vue se voit dans les introductions aux diverses parties du livre (Section I: L'Approche scientifique à la comptabilité; Section II: La Théorie comptable moderne: s'agit-il de l'évolution ou de la révolution?; Section III: La Théorie comptable et l'établissement des principes: approche positif ou normatif?; Section IV: La Théorie des mandataires et l'économie de l'information; Section V: Recherche comptable empirique; Section VI: Comptabilité et vérification gestionnaires et institutionnelles).

Les commentaires présentent la comptabilité comme une science appliquée en train de chercher une méthodologie qui s'oriente vers des objectifs spécifiques. La tendance actuelle dans le domaine de la comptabilité à une approche purement positive n'est pas donc tout à fait acceptable. On attend beaucoup du plus ample développement de l'analyse des informations mandataires qui tient compte de la conception fiduciaire de la comptabilité et qui suggère donc que ce n'est pas que les investisseurs et les analystes financiers qui peuvent bénéficier des sciences comptables. Cependant, on espère surtout révéler aux étudiants et aux praticiens la nature, les tentatives et les aspirations de la recherche comptable contemporaine.

LA VÉRIFICATION ET L'INFÉRENCE: LA COHÉRENCE

G.R. Chesley
de l'Université Dalhousie

Les probabilités, basées sur la notion de hasard, que l'on trouve dans la documentation en vérification ne tiennent pas compte de tous les aspects des probabilités. Le raisonnement par récurrence se base sur les probabilités sémantiques, qui représentent aussi l'inférence dont se servent les vérificateurs afin d'évaluer la validité des états financiers.

On examinera les rapports entre ces deux conceptions des probabilités et l'inférence utilisée par les vérificateurs aussi bien que les hypothèses fondamentales inhérentes à ces conceptions. On examinera aussi les rapports empiriques des inférences de vérification dans le but d'évaluer la représentation de ces rapports par des probabilités.

Dans ce mémoire, on présentera une des conceptions sémantiques des probabilités. Il s'agit des probabilités baconiennes qui ont un système d'axiomes déjà évalué par rapport aux inférences légales et auquel pourraient s'intéresser les vérificateurs. Il y a une différence frappante entre la conception du raisonnement par récurrence suggérée par ces probabilités baconiennes et celle déjà représentée dans la documentation en vérification.

UNE EXAMINATION DE QUELQUES QUESTIONS LIÉES À LA MISE EN OEUVRE DU
SAS no 39 ET SON HOMOLOGUE CANADIEN DE L'EAT STUDY

Wally Smieliauskas
de l'Université de Toronto

Cette étude examine quelques aspects importants de la formulation des modèles de risque des procédés de vérification. Il s'agit surtout des différences entre les modèles canadiens et les modèles américains et de l'analyse des avantages et des désavantages des deux approches. On arrive à la conclusion que toute préférence pour l'une ou l'autre des approches doit forcément contenir des suppositions au sujet des conséquences behavioristes de l'usage de telle ou telle approche.

LA NATURE ET LA DIVULGATION DES IMPÔTS REPORTÉS
DANS UNE PÉRIODE DE RÉCESSION

Claude P. Lanfranconi
et
Darroch A. Robertson
de l'Université de Western Ontario

Certains auteurs proposent qu'une période difficile de récession pourrait donner naissance à des conditions qui auraient une grande influence sur la nature des impôts reportés. Cette étude présente des informations descriptives qui révèlent la nature des impôts reportés pendant la récession canadienne de 1982 qui était exceptionnellement dure. On a trouvé que:

1. Pendant la récession de 1982 il y a eu une augmentation importante de prélèvements sur les impôts reportés. Le montant moyen de ces prélèvements était à peu près le double de celui de l'année précédente. Il y a eu des prélèvements avec des montants moyens dépassant la somme de \$18 millions dans cinquante-trois pourcent des cas étudiés.
2. Malgré l'ambiguïté de la présentation des impôts reportés dans les états financiers et l'impossibilité résultante d'interpréter clairement la situation sous-jacente, on pourrait conclure que l'augmentation du nombre de prélèvements est attribuable à la constatation des avantages fiscaux des pertes plutôt qu'à l'inversion involontaire des écarts temporaires.

RÉPARTITIONS DES COÛTS ET DES RESSOURCES À L'INTÉRIEUR DES FIRMES:
THÉORIE ET PRATIQUE

Anthony A. Atkinson
de l'Université Dalhousie

Cette étude examine la théorie de la répartition d'un coût et la pratique de cette répartition dans un échantillon de firmes canadiens. L'étude est financée par la Société des comptables en management du Canada avec l'Association canadienne des professeurs de comptabilité. On a commencé le projet en mai 1982 et on espère voir son achèvement en juin 1985.

La première partie de l'étude présente un survol de la manière dont la répartition des coûts communs est traitée dans les disciplines suivantes: la comptabilité, l'économie, le droit, la psychologie sociale, la théorie des jeux et la documentation de régulation.

L'enquête a été mise en marche par un sondage postal de la répartition des coûts pratiquée dans 430 des firmes canadiennes les plus importants. Ensuite on a étudié en détail six firmes en particulier afin de révéler des problèmes intéressants (à l'auteur) et pertinents à la firme) de la répartition des coûts. On a découvert les cinq problèmes suivants qui sont donc analysés dans cette étude.

1. le rapport entre la répartition des coûts communs et l'acquisition et la répartition des ressources partagées;
2. les effets possibles de la négociation sur la répartition des coûts et la détermination des prix de cession interne;
3. le rôle de la répartition des coûts dans l'établissement des normes d'évaluation de la productivité;
4. l'influence de la répartition des coûts sur les décisions portant sur les placements à court terme; et
5. l'effet de la répartition des coûts et des systèmes de récompense sur le comportement organisationnel.

UNE EXPLORATION DES CONTRATS DE VÉRIFICATION BASÉE SUR L'ÉCONOMIE
DE L'INFORMATION

le professeur Amin Amershi
de l'Université de la Colombie-Britannique

Ce mémoire examine le genre de contrat de motivation qui s'établirait entre les investisseurs et les vérificateurs d'entreprises. Nous voyons, tout d'abord, que les investisseurs exigent des informations comptables dans n'importe quel établissement où ils ne peuvent pas surveiller eux-mêmes les activités de production et où la responsabilité des décisions de production reste au niveau gestionnaire. Nous montrons ensuite que l'intervention d'un tiers, par exemple d'un vérificateur, qui fournit ces informations à l'investisseur donne naissance à un jeu complexe entre cet investisseur, le vérificateur et le gestionnaire de l'établissement. Nous montrons aussi que s'il y a un seul équilibre Nash, la rémunération du vérificateur dépend partiellement des normes de diligence établis par des organismes de régulation. Dans le cas où il y a plusieurs équilibres Nash, il faudrait un jugement de la part du vérificateur plutôt qu'une analyse complète du travail du gestionnaire.

COMPTABILISATION GÉNÉRALE DES DETTES ET DES CHARGES DE RETRAITE
QUELQUES QUESTIONS CLEFS À RÉSOUDRE

T. Ross Archibald
de l'Université de Western Ontario

De nos jours, on discute beaucoup des problèmes de comptes-rendus financiers par rapport à la comptabilisation générale des dettes et des charges de retraite. Afin de résoudre d'une manière satisfaisante tous les problèmes de la normalisation comptable, il faudra s'entendre sur beaucoup de questions clefs, dont quelques-unes restent toujours inconnues à beaucoup de comptables et à d'autres spécialistes dans le domaine financier.

Le but de cette présentation et de l'article qui l'accompagne est de stimuler des discussions informées qui mèneront peut-être au développement de méthodes améliorées de rendre compte des dettes et des charges de retraite. L'auteur de l'article y présente les questions clefs qui sont, selon lui, celles qui incitent la plus grande partie des discussions actuelles.

On verra, tout d'abord, trois questions fondamentales qui sont indispensables à la compréhension de la nature économique des charges de retraite:

1. le rôle de l'actuaire et celui du comptable;
2. la notion des salaires reportés;
3. la convention de la continuité de l'exploitation.

Ensuite, on examinera quatre questions importantes et souvent discutées:

1. l'objectif réel de la répartition en comptabilité;
2. la nature des obligations actuarielles et des responsabilités comptables;
3. la validité de la prévision des salaires;
4. la comparaison de la méthode rétrospective et de la méthode prospective d'évaluation des prestations de retraite.

L'auteur analyse ces questions fondamentales et présente ses propres conclusions dans le but d'améliorer les normes comptables de la communication financière des dettes et des charges de retraite.

QUE PENSE-T-ON DE LA COMPTABILISATION DES RÉGIMES DE RETRAITE AU CANADA

Daniel McMahon
Université du Québec à Trois-Rivières

Plusieurs auteurs ont recensé et analysé les diverses façons d'améliorer les normes comptables en matière de comptabilisation des régimes de retraite. De ces efforts jaillit un nombre restreint de traitements comptables potentiellement acceptables que nous avons soumis à des dirigeants d'entreprise, des experts-comptables (CA) et des universitaires canadiens. Les résultats de cette étude révèlent (1) un degré élevé d'uniformité entre les préférences exprimées par les trois groupes concernant la nature d'un régime de retraite, la dette devant figurer au bilan ainsi que la mesure de ce passif; et (2) qu'il existe un compromis acceptable par lesdits groupes au sujet de la détermination de la charge annuelle de retraite et de la comptabilisation des modifications apportées à un régime ainsi que du traitement des gains et pertes résultant d'une révision actuarielle.

RECHERCHE: LES POSSIBILITÉS PRATIQUES ET LES TRAITS TECHNIQUES

Michael Gibbins
de l'Université de la Colombie-Britannique
et
P. Howard Lyons
de Deloitte Haskins & Sells

Pendant la séance, on explorera plusieurs questions dans les domaines de la comptabilité et de la vérification qui pourraient profiter des recherches théoriques. On espère inciter l'assistance à développer des sujets de recherche en discutant ces questions, et du point de vue d'un praticien et du point de vue d'un universitaire. Dans le contexte de cette juxtaposition de points de vue, on examinera la valeur intellectuelle, l'intérêt pratique, et les contributions à la recherche comptable au Canada de ces questions, aussi bien que la possibilité de mettre en marche des recherches dans ces domaines. On espère discuter de nombreux sujets de recherche empirique et théorique, dont la comptabilité, la vérification, la formation du personnel, les normes professionnelles et les jugements professionnels.

RÉACTION DE LA BOURSE ET SENSIBILITÉ AUX PROCÉDURES ANALYTIQUES:
L'EFFET D'UNE DÉCLARATION COMPTABLE CANADIENNE

Teresa Anderson
de l'Université d'Ottawa

Cette étude examine les rapports entre la parution en août 1977 de l'exposé-sondage de l'Institut Canadien des Comptables Agréés au sujet de la conversion des devises étrangères et sa suspension postérieure en 1979, et le cours des actions à la Bourse de Toronto. L'étude se sert de quatre procédures différentes afin de montrer que la parution et la suspension de cet exposé-sondage n'ont produit aucun changement dans le cours des actions, n'ont stimulé aucune réaction. L'ensemble de l'étude montre, pourtant, que les résultats changent selon le choix de procédure et que l'on ne pourra donc rien conclure au sujet de la réaction de la course devant cet exposé-sondage.

LA PRÉSENTATION VOLONTAIRE DES INFORMATIONS PRIVÉES DE NATURE NÉGATIVE:
UN ÉTUDE EMPIRIQUE

Bipin B. Ajinkya
de l'Université de la Floride
et

Michael J. Gift
de l'Université Indiana

Dans cette étude on voudra déterminer si la structure actuelle du marché invite la présentation volontaire d'informations privées - et celles d'une nature positive, et celles d'une nature négative - ou si le marché actuel décourage cette présentation. Les modèles indicatifs ont prévu une présentation complète, pourtant Penman, dans son étude empirique de 1980, donne la conclusion que "par rapport à la question d'un exposé complet, clair et véridique, les résultats indiquent que la présentation volontaire ne donne pas un exposé clair des prévisions de résultats." Les auteurs pensent que cette conclusion est injustifiée du point de vue théorique et aussi à cause de la possibilité de problèmes d'évaluation dans l'étude de Penman. Afin de résoudre cette question, on a refait en partie l'étude de Penman, en se servant d'un nouvel échantillon de firmes (bien qu'ils soient tirés de la même période temporelle) et en modifiant la conception de recherche et la détermination d'une variable indépendante importante.

On a calculé deux variables indépendantes en se servant de 123 prévisions de résultats (de firmes qui suivent l'année civile). Ces variables sont:

$$M = \frac{(\text{prévision gestionnaire} - \text{prévision antérieure de l'analyste})}{(\text{prévision antérieure de l'analyste})}$$

$$E = \frac{(\text{résultats réels} - \text{prévision gestionnaire})}{(\text{résultats réels})}$$

Avec la dernière prévision des analystes financiers, on a déterminé la prévision du marché de la période temporelle de la prévision gestionnaire. On s'intéressait surtout à la variable M; la variable E permettait l'inclusion d'autres informations trouvées pendant la durée du sondage. La variable dépendante, \bar{V} , avait la valeur du résidu moyen de la période temporelle entre le mois de mars de l'année où on a fait sortir la prévision gestionnaire et le mois d'avril de l'année suivante où on a publié la prévision de résultats.

La répartition des valeurs de la variable M est assez symétrique, comprenant une fréquence importante de valeurs positives et de valeurs négatives. Les valeurs de la variable \bar{V} montraient plutôt les réactions négatives du marché. Il fallait encore démontrer que les valeurs négatives (positives) de la variable \bar{V} dépendaient des valeurs négatives (positives) de la variable M.

Avec une analyse de régression, on a évalué les rapports entre les variables indépendantes M et E et la variable dépendante \bar{V} . Les coefficients de régression étaient positifs et importants et montraient donc que les informations privées de nature négative sont, en effet, déclarées volontairement. Les résultats du sondage témoignent donc l'hypothèse de la présentation complète et indiquent que les firmes de prévision restent fidèles aux informations négatives et positives déclarées par les firmes commerciaux et financiers.

POURQUOI EXAMINER DES MODÈLES D'ÉVALUATION DE LA PRODUCTIVITÉ

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Les universitaires et les gestionnaires se sont intéressés aux questions de productivité au cours de la dernière décennie. La notion de productivité, pourtant, n'est pas bien comprise. Il y a trois questions principales auxquelles devraient répondre les gestionnaires qui voudraient s'occuper de la productivité de leurs compagnies. Premièrement, il faut établir une entente sur ce qui concerne la nature exacte des extrants et des intrants de la production, la méthode d'évaluation de ces éléments et l'interprétation des résultats de cette évaluation. Deuxièmement, il faut se rendre compte de la quantité de critères d'évaluation de la productivité qui pourraient aider les directeurs de sociétés à choisir les modèles d'évaluation qui conviendraient le mieux dans toutes les circonstances. La troisième question se concentre sur les rapports entre les méthodes d'évaluation de la productivité et les méthodes d'évaluation de la rentabilité.

L'explication du développement de définitions et d'évaluations à la productivité offertes par différents modèles de productivité employés dans une société, ainsi que l'expérimentation de l'étude des modèles d'évaluation de la productivité dont se servent ces sociétés aideront à trouver la direction à prendre fin de répondre à ces trois questions.

PROFIL MOTIVATIONNEL DES ÉTUDIANTS QUI RÉUSSISSENT AU PROGRAMME D'ÉTUDES
SUPÉRIEURES EN COMPTABILITÉ PUBLIQUE

Vivienne Livick
et Ed Burnett
Université McGill

De nombreux étudiants de l'université McGill ont éprouvé des difficultés à terminer avec succès leur programme. Nous avons donc entrepris des études en vue de déterminer les raisons de ces difficultés. Nous avons trouvé que la motivation personnelle constituait un critère important pour la réussite au programme. Nous avons aussi trouvé que l'auto-analyse de la part des étudiants et l'analyse au moment de l'inscription au programme étaient des outils de mesure inefficaces pour prédire la probabilité du succès. Nous avons entrepris la mesure des caractéristiques générales des étudiants en expertise comptable et déterminé une configuration des besoins (facteurs de motivation). Nous avons créé un instrument préliminaire de test basé sur les facteurs auto-motivationnels à titre de prédicteurs de succès. Le test initial de ces facteurs motivationnels laisse entendre qu'il s'agit de moyens de prévision fiables.

SYSTÈMES EXPERTS: LA VÉRIFICATION DU CONTRÔLE INTERNE

Andrew D. Bailey, Jr.

Gordon L. Duke

Paul E. Johnson

William B. Thompson

et Rayman D. Meservy

de l'Université du Minnesota

Le but de cette étude est de développer un modèle mathématique (un système expert) en vue de sondages de conformité. Ce modèle sera basé sur les processus dont se servent les vérificateurs afin d'identifier et d'évaluer les contrôles comptables internes. On tirera ces éléments de base de ce modèle de trois sources: 1) des livres et monographies disponibles; 2) des interviews avec des vérificateurs praticiens; et 3) de l'observation des vérificateurs experts en train de faire ces identifications et évaluations avec une approche "penser-à-haute-voix". Le modèle ainsi développé sera contre-validé par les résultats d'autres vérificateurs.

UN SURVOL DU RÔLE DES PROGRAMMES MATHÉMATIQUES DANS
LA PLANIFICATION DU PERSONNEL DE VÉRIFICATION

Rajendra K. Gupta
de l'Université mémoriale de la Terre-Neuve

La planification du personnel de vérification est l'ensemble de la planification de production dans un cabinet de vérification. Afin de résoudre ce problème, on se sert de plusieurs techniques de la programmation mathématique, notamment, la programmation linéaire, la programmation des objectifs et la programmation multi-critères. On examine d'un oeil critique la documentation qui existe et suggère des directions de recherche à prendre.

C'EST NOUVEAU! EST-CE NÉCESSAIRE?
UNE ÉVALUATION DU SYSTÈME D'ÉTALEMENT DU REVENU DE LA LOI FÉDÉRALE DE
L'IMPÔT SUR LE REVENU

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On vient de remplacer les anciennes dispositions relatives à l'établissement de la moyenne générale et contrat de rente à versements invariables (C.R.V.I.) par la disposition relative à l'étalement du revenu. Le Ministère des Finances a offert des exemples indiquant que le C.R.V.I. n'était guère meilleur que l'étalement du revenu. Pourtant, dans cette comparaison, le Ministère des Finances n'a pas tenu compte de la disposition relative à l'établissement de la moyenne générale, qui a aussi été enlevée de la loi.

Cet article s'ajoute à la comparaison faite par le Ministère des finances en donnant des exemples qui mettent en relief la disposition relative à l'établissement de la moyenne générale et en évaluant la nécessité de changer la conception de la moyenne exprimée actuellement dans la Loi de l'impôt sur le revenu. On offre aussi des exemples qui examinent des situations où l'étalement du revenu pourraient être considéré, en particulier dans le cas des contribuables décédés.

Les résultats indiquent que l'établissement de la moyenne générale était supérieur parce que son application exigeait moins d'impôts, et surtout grâce aux considérations non-liées de l'impôt, notamment:

1. l'application faite automatiquement et sans la nécessité d'en faire le choix;
2. la certitude de l'assujettissement à l'impôt parce qu'elle est déterminée une fois pour toutes;
3. l'aspect non-discriminatoire du système qui était appliqué automatiquement par l'ordinateur à tous les contribuables qui en avaient les conditions requises, sans qu'ils aient eu à demander des conseils professionnels.

On est arrivé à la conclusion que l'utilité de l'étalement du revenu pour le contribuable est mise en question par la considération inhérente à cette méthode des variables futures. Si le but du gouvernement est l'augmentation du revenu de l'impôt, il faut satisfaire le désir actuel de simplifier la Loi de l'impôt sur le revenu et enlever du statut la disposition relative à l'étalement du revenu.

APPLICATIONS OF OPTION PRICING THEORY TO ACCOUNTING

DANIEL B. THORNTON, UNIVERSITY OF TORONTO
WITH JAMES BALSILLIE, CLARKSON GORDON

Financial economic theory has tended to influence accounting theory, research and practice only after lags of ten years or more. Option pricing theory, in its modern garb, has been with us for about a decade: yet, I have not noticed any substantive applications of the theory to financial accounting problems. This presentation discusses some of my research in progress in which I attempt to use the Black-Scholes model to analyse a bargain purchase option in a lease.

Previous applications of option pricing theory:

The fundamentals of option pricing theory are summarized in a footnote for readers unfamiliar with the concepts¹. More detail can be found in the two articles by Smith (1976, 1979). Elsewhere (Thornton, 1983) I have attempted to apply option pricing theory to the analysis of corporate loan guarantees and to the theory of consolidations. I will not repeat those applications here to-day. Instead, I will present some research in progress that treats a bargain purchase option on a leased asset as a "European Call".

Until recently the calculations required to compute option values have been too tedious for most people to contemplate doing them. With the advent of the micro-computer, however, the computations are fully within reach of all of us. In the appendix I have attached a short BASIC program that I wrote for my undergraduate students in Finance. It is a "user-friendly", interactive program that computes the values of puts and calls according to the Black-Scholes formulae in footnote 1, then allows you to do sensitivity analysis by changing one parameter at a time. I hope that the publication of the program in the proceedings will make it easier for more accounting researchers and practitioners to experiment with option pricing theory in situations that are of interest for financial accounting.

Bargain purchase options as European Calls:

Section 3065 of the CICA Handbook says we should capitalize a lease on the lessee's balance sheet if there is a bargain purchase option attached to it. How do we know whether it is a bargain or not? To date, I believe that only intuition has been brought to bear in most practical situations.

A European Call is a call that can be exercised only on the date of expiry of the option. In contrast, an American Call can be exercised any time before its expiry date. A bargain purchase option on a leased asset appears to fit the definition of a European Call perfectly. My proposal to-day is that the option can be looked at as a bargain if the value of the call, computed according to the formulae in footnote 1 (which form the basis of the BASIC program in the appendix) is material in relation to the value of the asset itself.

To see whether the theory could be applied, we elicited data from a major Toronto lessor of photocopy machines. Only one example is given here, since the objective is only to illustrate how the theory may be

applied. A new photocopy machine can be bought outright for \$5,000. Instead, a lessee decides to lease it for five years with an option to purchase the used machine for \$400 at year five. The lessor tells us that a typical five-year-old machine can be bought for \$800. We ask the lessor for subjective probabilities that a machine will be worth less than \$200, less than \$400, ..., less than \$2,400 after five years. The lessor is able to answer such questions with some assurance, since he has had experience with thousands of similar machines. From the cumulative probability distribution, we estimate that that variance rate for the price of five-year old machines is 16% per year. We take the square root of this to get the standard deviation rate of 40% per year.

The only missing piece of data for the Black-Scholes model is the riskless rate of interest. On March 26, 1984, the date on which we elicited the probabilities, the rate on Treasury bills was 10.52% per year which, continuously compounded, gave us precisely 10% per year ($\log_e 1.1052 = .100$).

A summary of the inputs to the model is as follows:

1. A, the present value of the optioned asset, is \$800, since the asset of interest is a used, five-year old machine.
2. X, the striking price of the option, is \$400.
3. T, the time to expiry of the option, is 5 years
4. σ , the standard deviation rate per year of the percentage change in price of the asset, is .4
5. R_f , the riskless rate of interest, is .1

Using these values, the computer program in the appendix tells us that the call option is worth \$572.94 and the put option, if it existed, would be worth \$15.56. Interestingly enough, the call option to buy the asset for \$400 is worth more than the \$400 striking price itself. This reflects the underlying riskiness of the used asset's price. Quite clearly, the call option has a material value in relation to the cost of the asset, new: it is almost 12% of that cost. I would propose, then, that the option should be regarded as a bargain.

If this lease were not capitalized, and if the purchase option were not present-valued on the lessee's balance sheet, there would be a conceptual error that could be corrected with the following journal entry:

dr. Value of option to buy leased equipment	572.94
cr. Deferred benefit of option to buy leased equipment	572.94

If for some reason such leases were generally not capitalized, this could be material information to disclose to readers of financial statements.

On the other hand, if this lease were capitalized, and if the purchase option were deemed to be a bargain and discounted along with the lease payments in arriving at present values for the lessee's assets and obligations, I believe that conceptually the lessee would have an

"accounting put" that is ignored under contemporary accounting practice. I call this an accounting put because the lessee does not really have the right to sell the used asset to the lessor for \$400. But the lessee has booked this \$400 payment as if it will be made for sure. Consequently, it makes good conceptual sense to recognize that the lessee does not have to exercise this option that has been assumed exercised for sure by accountants. This omission could be corrected by the following journal entry:

dr. Value of option <u>not</u> to buy leased asset		
("an accounting put")	15.56	
cr. Deferred benefit thereof		15.56

Ignoring the accounting put gives an error of only 15.56, which is apparently immaterial in relation to the cost of the asset. Discounting the bargain purchase option as part of the lease capitalization process gives an excellent approximation to the results arrived at by applying option pricing theory.

There are, however, situations in which neither discounting nor not discounting the purchase option gives a very good approximation, and in which only option pricing theory can come to the rescue. Figure 1 shows what happens as we begin to increase the striking price of the option:

1. The call price drops, though at a diminishing rate: This makes sense, since the option to buy the asset will not be worth as much if the price one has to pay is higher.
2. The put price rises at an increasing rate. This is also logical, since if one has an option to sell something, that option is worth more if the price (s)he can get is higher.

In particular, if the striking price were in the \$1,250 range, the call and put values would be about the same (approximately \$275). In this case, if we discounted the purchase option and capitalized the lease we would ignore an accounting put of \$275, and if we did not discount the purchase and did not capitalize the lease we would ignore a real call of \$275. My preliminary research shows that these pesky "in-between" cases are quite common.

In the example at hand, it might be argued that the \$275 "error" is not material under either procedure. But there are lots of other examples in which it is. As the variance rate of the change in price of the underlying used asset increases, both the call price curve and the put price curve shift upward: this happens because any option is worth more if the risk of the optioned asset is greater. After all, the very nature of an option is that you do not have to exercise it - you will only exercise it if it is in your best interest to do so. The option to refrain from exercising the option cuts off a fat lower tail of a probability distribution on the price of the used asset, and the option to exercise it opens up a shot at a fat upper tail.

Changing other parameters will tend to alter the relative positions of the put and call curves:

FIG. 1: BASE CASE $r_f = .1$, $T = 5$, $\sigma = .4$, $S = 800$
 D.B. Thornton - April, 1984.

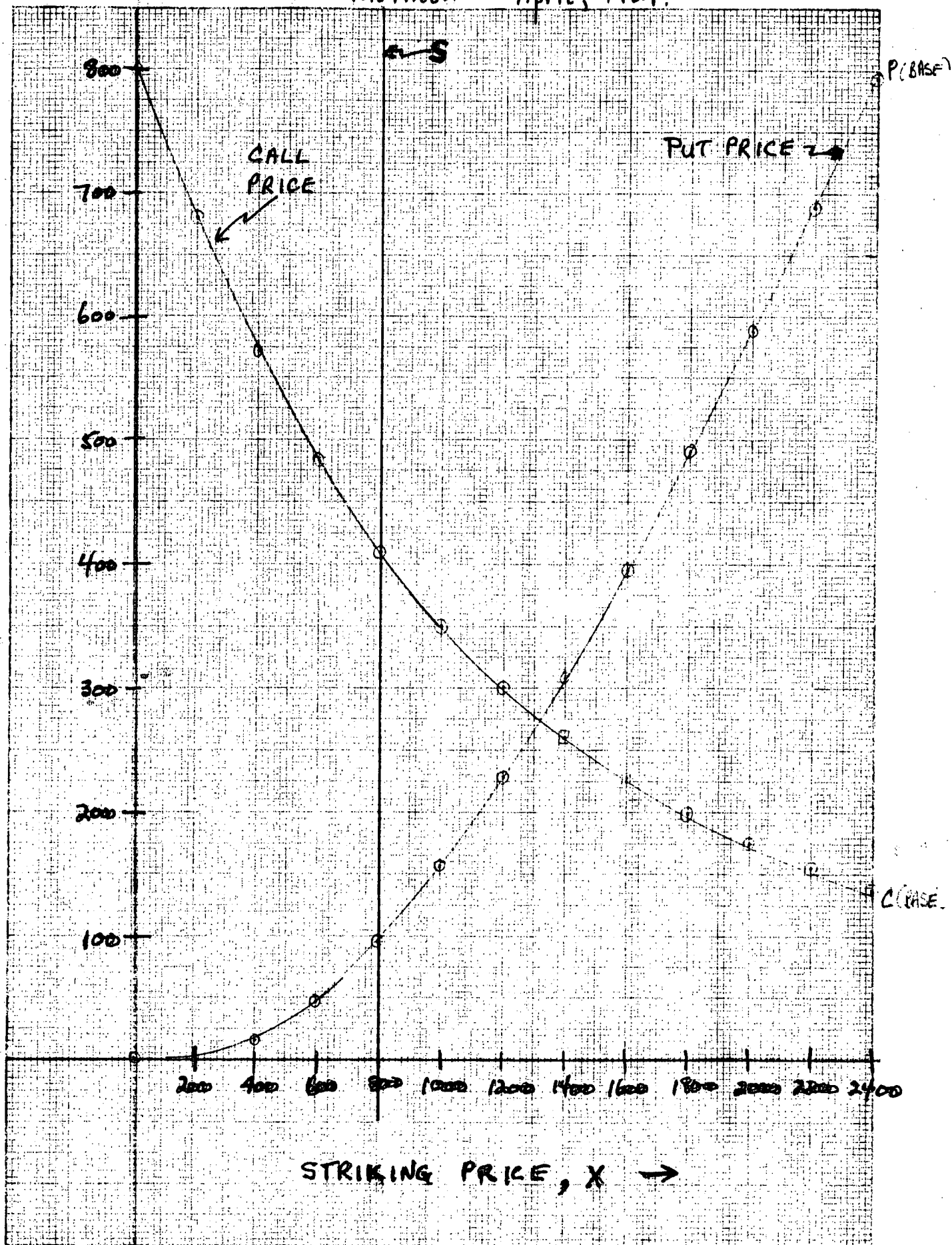


EXHIBIT 1: BASE CASE.

S= 800 RF= .1 T= 5 SIGMA= .4

OPTION PRICES FOR DIFFERENT STRIKING PRICES, GIVEN THE ABOVE DATA:

STRIKING PRICE	CALL	PUT
0	800	0
200	680.3098	1.615967
400	572.9466	15.55896
600	483.3513	47.26966
800	410.0687	95.29321
1000	350.2662	156.7968
1200	301.209	229.0458
1400	260.7111	309.854
1600	227.0321	397.4812
1800	198.8072	490.5623
2000	174.9689	588.0301
2200	154.718	689.0855
2400	137.4127	793.0863

1. As T , the time to exercise, increases the call curve shifts up and the put curve down. This reflects a trade-off between lower present values and the possibility of higher future asset values as time to exercise increases.
2. As R_f , the riskless rate of interest, goes up, the call curve shifts up and the put curve down. This is a consequence of the fact that less of a "downpayment" is made in setting aside the riskless present value of the striking price of the option. (See footnote 1 for a technical explanation).
3. As S , the price of to-day's used machine goes up, the call curve shifts up and the put curve down. This is intuitively obvious.
4. As X , the striking price, increases we move down a put curve and up a call curve in the diagram.

Of course, in any particular case all of these factors come into play. It is not possible at this time for me to say precisely when a purchase option will lead to material errors in accounting for leases, but I can list a few things that will tend to do so:

1. Risky optioned asset.
2. High interest rates in the economy, lease not capitalized; or low interest rates, and lease capitalized.
3. Valuable used equipment (the "Mercedes case"), and lease not capitalized; or cheap used equipment and lease capitalized.
4. Low striking price and lease not capitalized; or high striking price and lease capitalized.
5. Long time to exercise and lease not capitalized, or short time to exercise and lease capitalized.

I should stress, however, that all of the five parameters work together in producing potentially material accounting errors. The list above looks only at tendencies for one variable at a time to give error-prone situations. Empirical research is needed to identify when errors actually occur in accounting practice.

Conclusions and limitations of the analysis:

One of the nice things about option pricing theory for accountants' applications is that it makes no assumptions about the utility functions or the degree of risk aversion of people. The fundamental equations in footnote 1 are derived by pure arbitrage arguments. None the less, agency theorists will no doubt wish to point out that there is an information asymmetry between the lessee and the lessor, which leads to moral hazard and adverse selection. The option that the lessee has can affect the way (s)he utilizes the asset, which in turn can alter its value at the date of expiry of the option.

There is a mirror image problem on the books of the lessor that looks extremely interesting. The relevant risk of an option (put or call) is its total risk, not its systematic risk: if a lessor has a large lease portfolio of machines in the hands of lessees, all of which have purchase options attached, the risk of getting stuck with valueless equipment can be very high. There appears to be no practical way of diversifying it away. This also deserves careful thought and follow up research.

Finally, the Black-Scholes model may not be strictly applicable because the market for used equipment is less well-developed than markets for securities on which puts and calls are generally written. This too cries for empirical analysis. But, even if it is found that the model is wanting, I suspect that it will still be useful as a first approximation.

None of these considerations will alter the importance of the basic idea expressed in this talk: Sooner or later, Accounting must face problems of contingencies and uncertainties directly. Option pricing theory, along with other financial economic theories, may be of some help.

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_____. (1979) "Applications of Option Pricing Analysis". In James L. Bicksler (ed.) Handbook of Financial Economics. Amsterdam: North Holland Publishing Company.

Thornton, D. B. (1983) Financial Reporting of Contingencies and Uncertainties: Theory and Practice. Vancouver, B. C.: Certified General Accountants Research Foundation Monograph No. 5.

1. A BRIEF TUTORIAL ON OPTION PRICING THEORY

OPTIONS:

CALL = OPTION TO BUY A RISKY ASSET T YEARS FROM NOW AT "STRIKING PRICE" X, NO MATTER WHAT THE MARKET PRICE OF THE ASSET IS AT THAT TIME.

PUT = SAME, BUT TO SELL.

POSITIONS - LONG: YOU OWN THE ASSET, SO YOU CAN DO IT TO SOMEONE
 - SHORT: SOMEONE ELSE HOLDS THE OPTION, SO HE/SHE CAN EXERCISE THE OPTION ON YOU
 - FOR EVERY LONG, SOMEONE ELSE MUST BE SHORT

SOME FUNDAMENTAL EQUATIONS IN OPTION PRICING THEORY:

1. AT EXPIRY OF THE OPTION (T): $X + LC = LA + LP$

where X = striking price of the option

LC = long position in a call option on the risky asset

LA = long position in the risky asset

LP = long position in a put option on the risky asset.

In the position represented by either the left or right side of the equation, you would have the lesser of the striking price or the value of the stock. Thus the two positions are equivalent.

2. NOW (T=0): $Xe^{-RT} + C = A + P$

HERE, C AND P ARE TODAY'S CALL AND PUT PRICES; A IS THE PRICE OF THE OPTIONED RISKY ASSET.

Essentially, equation 2 is just to-day's version of equation 1, which holds T periods from to-day.

3. BLACK-SCHOLES FORMULAE FOR C AND P:

(A) COMPUTE TWO NUMBERS D1 AND D2:

$$D1 = [\text{LOG}_e(A/X) + RT]/\sigma\sqrt{T} + .5\sigma\sqrt{T}$$

$$D2 = D1 - \sigma\sqrt{T}$$

(B) LOOK UP AREAS UNDER NORMAL CURVE (PROGRAM IN APPENDIX DOES THIS FOR US):

$$N(D1) = \text{AREA FROM ZERO TO } D1$$

$N(D2)$ = AREA FROM ZERO TO $D2$

(C) THEN THE PUT AND CALL PRICES ARE AS FOLLOWS:

$$C = A.N(D1) - Xe^{-RT}.N(D2)$$

P --- USE EQUATION IN 2 ABOVE

THESE EQUATIONS ARE BASED ON ASSUMPTIONS THAT MAY NOT BE
APPROPRIATE FOR SOME ACCOUNTING APPLICATIONS (SEE SMITH 1976).

APPENDIX

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```

10 REM uses variance rate per period, which must be mult. by root t
11 CLS
12 FOR I=1 TO 20
14 PRINT TAB(10) "*****"
16 NEXT I
20 PRINT "BLACK-SCHOLES OPTION PRICING PROGRAM"
21 PRINT "    PROFESSOR DANIEL B. THORNTON"
22 PRINT "    APRIL 1984"
23 FOR I=1 TO 10
24 PRINT TAB(10) "*****"
26 NEXT I
27 PRINT
30 INPUT "Today's price of the risky asset s: ",S
40 INPUT "exercise price (striking price) at expiry date x: ",X
50 INPUT "Riskless rate (must be per annum, continuously compounded), rf: ",RF
60 INPUT "Time to exercise (must be in years) t: ",T
70 INPUT "Square root of variance rate per year, sigma: ",SIGMA
80 D(1)=(LOG (S/X)+RF*T)/(SIGMA*SQR(T))+.5*SIGMA*SQR(T)
90 D(2)=D(1)-SIGMA*SQR(T)
95 CLS
96 PRINT "
100 PRINT "S=  $"S
101 PRINT "X=  $"X
102 PRINT "RF=  "RF" PER YEAR"
103 PRINT "T=  "T" YEARS"
104 PRINT "SIGMA=  "SIGMA" PER YEAR"
105 PRINT "
110 PRINT
120 PRINT"D1=  " D(1),"D2=  "D(2)
140 GOSUB 1000
160 PRINT
170 PRINT "N(D1)=  " ND(1),"N(D2)=  "ND(2)
180 C=S*ND(1)-(X)*(EXP(-(RF)*T))*ND(2)
190 P=X*EXP(- RF *T )+C-S
195 PRINT
196 PRINT "
197 PRINT
200 PRINT "Call price:  $"C
210 PRINT "Put price:   $"P
215 PRINT "
217 PRINT
218 PRINT
220 INPUT "Do you want to change a variable? ",W$
230 IF W$="yes", GOTO 234
232 GOTO 250
234 GOSUB 2000
240 GOTO 80
250 PRINT " "
280 PRINT "end of program"
290 END
1000 FOR J=1 TO 2
1010 Y=ABS(D(J))
1020 R=EXP(-(Y^2)/2)/2.5066282746#
1030 Y=1/(1+.33267*ABS(Y))
1040 PR=1-R*(.4361836*Y-.1201676*Y^2+.937298*Y^3)
1042 IF D(J)<0, GOTO 1045
1044 GOTO 1070

```

```
1045 PR=1-PR
1070 ND(J)=PR
1080 PR=0
1110 NEXT J
1120 RETURN
2000 INPUT "what variable do you want to change? ",C$
2010 IF C$="s",GOTO 2500
2020 IF C$="x",GOTO 2510
2030 IF C$="rf",GOTO 2520
2040 IF C$="t",GOTO 2530
2050 IF C$="sigma",GOTO 2540
2060 INPUT "new s: ",S
2500 INPUT "s",S
2505 GOTO 2550
2510 INPUT "new x: ",X
2515 GOTO 2550
2520 INPUT "new rf: ",RF
2525 GOTO 2550
2530 INPUT "new t: ",T
2535 GOTO 2550
2540 INPUT "new sigma: ",SIGMA
2550 RETURN
```

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BRIDGING THE GAP BETWEEN CONTEMPORARY ACCOUNTING RESEARCH AND THE
PROFESSION

Richard Mattessich

ABSTRACT:

This paper offers an overview of the philosophy and content of the recent book:

Modern Accounting Research: History, Survey and Guide,
edited by R. Mattessich, with a Foreword by Y. Ijiri and twenty-
one contributions by prominent accounting scholars (Vancouver,
B.C.: Canadian Certified General Accountants' Research Foundation
-- Monograph Series, 1984).

This book is not a mere anthology, but also tries to convey the personal viewpoint of its editor through introductory sections to the various parts of the book (Part I: The Scientific Approach to Accounting; Part II: Evolution or Revolution of Modern Accounting Theory?; Part III: Positive Versus Normative Accounting Theory and Standard Setting; Part IV: Agency Theory and Information Economics; Part V: Empirical Accounting Research; Part VI: Managerial and Institutional Accounting and Auditing).

The commentaries treat accounting as an applied science in need of a purpose-oriented methodology. For this reason, the recent trend towards a purely positive approach in accounting is viewed with some scepticism. Great hope is placed in the further development of agency-information analysis, which offers a sophisticated version of the stewardship principle, thus moderating the extreme view that accounting primarily serves the broad spectrum of potential investors and financial analysts. But the major concern is to create a means of informing students and practitioners about the essence, attempts, and aspirations of modern accounting research.

BRIDGING THE GAP BETWEEN CONTEMPORARY ACCOUNTING RESEARCH AND THE PROFESSION

Richard Mattessich*

Many people find it difficult to believe that some accountants can be scholars and even scientists. This in spite of the fact that academic accounting has been around for well over one hundred and fifty years. Indeed, the National Accounting Academy (nowadays renamed as the Accademia Italiana di Economia Aziendale) was founded in Italy as early as 1813. On the other hand, it must be admitted that the truly scientific aspects of accounting developed slowly, and literally burst upon the scene during the last twenty-five years or so. This has been a dramatic experience for all those who have actively participated in it, but it must have been a traumatic experience for the older generation, and particularly for accounting practitioners. I distinctly remember an encounter at the first International Convention of Accounting Education of 1962 in Urbana when, after a presentation of mine, I was approached by an elderly gentleman who was

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unfortunately already marked by one of those fateful diseases that do not allow their victims to live for more than a few months. His remark made me quite sad, but it seemed of some consolation to him. He said: "I am so glad I don't have to bother any more with all that mathematical stuff you were talking about." At the time, such a remark was much more difficult for me to understand than it is now. But nowadays I have moments when I feel like Goethe's Sorcerer's Apprentice who helped to conjure up a flood he could not control himself. At such moments, those cynical but memorable remarks of that desperate man no longer prove so incomprehensible.

Yet even if some of the modern analytical and statistical methods are so complex that I find them difficult to grasp, I rejoice in the fact that academic accounting has greatly matured in my lifetime; and that it is about to become a cultural-scientific activity ranking equally with economics in at least some of its endeavours. Obviously, we still have a long way to go, but I suppose most of you share with me this optimistic view and feel the excitement that is in the air. But do our undergraduates and MBA students and, above all, the practitioners think the same way? Very few of them do, and there are two major reasons for that:

- (1) As mentioned before, the tools of modern accounting research are becoming increasingly complex and require a highly-sophisticated education, which only a doctoral study can transmit.
- (2) We have done too little in conveying to non-researchers the purpose, meaningfulness, and results of contemporary accounting research.

Whether this gap can ever be bridged is difficult to say, but we certainly are obliged to try our very best to convey to students and practitioners what contemporary accounting research is all about.

We hope that our collection of survey articles, in combination with the short commentaries to the various Parts and the current General Introduction, will serve as a first step toward clarifying the endeavours of present-day academic literature for practitioners and students of accounting as well as for more traditionally oriented academics. However, without an honest desire and some serious effort on the part of practitioners to overcome their diffidence toward academic literature, the chasm between practice and research will continue to grow and, in time, must affect the social and intellectual climate as well as the long-run economic conditions of countries afflicted by this kind of alienation. Nevertheless, the burden of a changing attitude lies equally on the shoulders of the academic community. Even if some of its research tools surpass the skill of practitioners, its literary presentations ought to be comprehensible to a wider spectrum of accountants -- at least to those who seriously endeavour to digest academic literature. Furthermore, academics must pay greater attention to the goals and needs of accounting practice. For these reasons, we hope that our anthology will be of interest not only to the profession and to students, but also to academic accountants. And it is for the same reasons that we felt compelled in our commentaries to question the quest for an exclusively positive theory of accounting.

I: METHODOLOGICAL CONSIDERATIONS

Recently, it has become fashionable among accounting researchers to deride normative theory in the same way as the Victorians derided sex: namely, without being able to dispense with it. Can an applied discipline like accounting refuse to deal with goals, norms, and prescriptive conclusions? Does not the broad spectrum of information goals manifested by different accounting user groups necessitate a search for the means by which each of these ends can be achieved? Does accounting not have the major dual task of demonstrating, on one side, which accounting standards satisfy which national economic and social goals, and, on the other side, which specific accounting systems serve which information purposes? If these questions are to be affirmed, then surely accounting theory must be conditionally prescriptive. This does not mean a rejection of positive models and subtheories. Partial theories and hypotheses may prove highly useful for accounting, even if purely descriptive; but a theory serving the ultimate purpose of our discipline cannot renounce prescriptions based on preconceived goals. Twenty-five years ago, when game theory came into its own, similar thoughts were expressed by Luce and Raiffa in the following passage, which we may accept verbatim provided one substitutes "accounting theory" for the expression "game theory:"

We belabor this point because we feel that it is crucial that the social scientists recognize that game theory is not descriptive, but rather (conditionally) normative. It states neither how people do behave nor how they should behave in an absolute sense, but how they should behave if they wish to achieve certain ends. [Luce and Raiffa 1957, p. 63]

And even such a positivistically oriented scholar as Herbert Simon warns of the onesided research training in present-day professional schools and appeals for a science of design, i.e., for teleologically oriented research:

Engineering schools have become schools of physics and mathematics; medical schools have become schools of biological science; business schools have become schools of finite mathematics. . . .

The problem is widely recognized in engineering and medicine today and to a lesser extent in business. . . . The older kind of professional school did not know how to educate for professional design at an intellectual level appropriate to a university; the newer kind of school has nearly abdicated responsibility for training in the core professional skill. Thus we are faced with a problem of devising a professional school that can attain two objectives simultaneously: education in both artificial and natural science at a high intellectual level. This too is a problem of design -- organizational design. [Simon 1981, pp. 130-131]

Many people, including practitioners, question the usefulness of a scientific approach to accounting. They may ask whether our discipline has not always been an "art" rather than a "science". Apart from the fact that the terms "art" and "science" (or their equivalents) are nowadays differently understood in most European languages than in traditional English, we must bear in mind that accounting is in a similar position as engineering and medicine. In the past, both of these have been considered arts but are presently accepted as applied sciences. In the end, it is the methodology that determines whether a discipline manifests itself as an art, a science, or a mere skill. And it is this criterion that is responsible for the transition which such arts as medicine and engineering have undergone to become applied sciences. A glance into the cultural history of the last hundred fifty years leaves little doubt that scientific methods have progressively

penetrated these two areas as well as other disciplines, converting them from arts to applied sciences. During the twentieth century, these same scientific methods have gradually been adopted by our discipline, and the inclusion of academic accounting among the applied sciences seems to be well justified. General theories of applied sciences are relatively novel; they have, in spite of their generality, a specific focus and also find increasing support in the accelerating trend towards computerization. In medicine, it is the general theory of diagnosis and therapy as well as of the determination and prevention of vectors of disease; in architecture and engineering, there is the endeavour towards a general theory of design; and in accounting, the pivot can hardly be anything else but the flow and aggregation of wealth and their representation through input-output models.

If accounting is a science, or ever becomes one, it will by its very nature be an applied (or instrumental) science but not a pure one. The major difference between pure and applied science lies in the fact that a pure science is disinterested, that is, purely cognitively oriented, and does not directly serve practical ends. Whereas an applied science directly pursues such practical purposes as fighting diseases, or building machinery and edifices, or measuring aggregates and increments of wealth attributed to some micro- or macro-economic entity to facilitate decisions and choices.¹ Thus every applied science, besides pursuing a cognitive end and doing some fundamental research, becomes an instrument for attaining "efficiently" a fairly well defined area of goals beyond the satisfaction of mere scientific curiosity. In the pure

sciences, teleologic thinking is still prohibited, while in the applied sciences it is a necessity. Familiarity with the dichotomy between pure and applied science, and comprehension of the latter's essential nature are paramount for a genuine insight into the major problems confronting present-day accounting.

In our anthology we have tried to offer a representative, though by no means exhaustive, picture of modern accounting research. The major vehicle to reach this goal is "the survey article," and most of the papers included are reprints of this kind or of a related type. But there are five hitherto unpublished papers included in this book: my own paper on "The Scientific Approach to Accounting;" an article by M. J. Bryant and D. B. Thornton on "Public Choice of Corporate Accounting Standards," one by S. Sunder and S. Haribhakti on "Economic Interests and Accounting Standards (both in Part III); the superb article by Gerald Feltham (in Part IV), "Financial Accounting Research: Contributions of Information Economics and Agency Theory;" and that by Peter Clarkson and myself (in Part V), "A Review of Market Research in Financial Accounting," pointing to some of the empirical accounting literature not indicated in the other papers of Part V.

Since I referred to the particular methodology as the criterion for designating a discipline as a science, pure or applied, the last phase of Part I constitutes a general discussion of methodology. But what is this methodology, of what does it consist, and what is its relation to the ultimate theory? Although there is a trend toward methodological pluralism (see Caldwell [1982]² for its promotion in economics), it seems that every

empirical science requires the following six methodological components, but the weight which each step bears may vary greatly from discipline to discipline:

1. Observation, experimentation, and their design.
2. Qualitative and quantitative description.
3. Generalization (usually through inductive inferences or other conjectures).
4. Analysis (through mathematical and other deductive inferences).
5. Interpretation and model-building (further specification and linking of theoretical terms to observational terms by means of rules of correspondence).
6. Testing and revising (usually through some confirming or corroborating evidence, attempts of refutation, and demonstration of coherence with neighbouring theories or hypotheses).

II: EVOLUTION OR REVOLUTION OF MODERN ACCOUNTING RESEARCH?

This second part sets the stage by hinting at the evolutionary background and the recent predicaments of accounting research. The search for a systematic basis and a deductive framework constitutes one of the core activities of modern accounting research. As my 1978 article (see Appendix for source reference) shows, this search began, or at least was revived, in the late fifties with four articles (two by Chambers and two by Mattessich)³ and continued during the sixties in several books by these and other authors (e.g., Moonitz, Ijiri). Indeed, accounting historians and theoreticians usually deal with Chambers and myself under a common label, without articulating the great divergence between our views.⁴ Here, the attempt to formulate the postulates or basic assumptions of accounting, and the different views and

aspects emerging from this effort, are discussed. Our discipline, unlike a natural science, cannot extract its premises from an experimentum crucis and from the observation of fundamental empirical regularities. Thus the following alternatives offer themselves: (1) to borrow some (or a great number of) more or less basic statements from other social disciplines and to accept them in an absolute-normative way as fundamental to accounting -- as Chambers did; or (2) to accept empirical regularities of a low and often coincidental order as premises for partial accounting theories of limited scope -- as it is nowadays done in "positive accounting theory." But there is a third possibility; namely, to invert the question and to ask what basic methodological assumptions underlie present-day accounting practice, and to what extent can these assumptions be subjected to different interpretations (i.e., specific models) matching different information purposes. This approach -- which we have adopted -- recognizes the important information function which traditional accounting fulfills and thus is also normative, but conditional-normative and not dogmatic.

The second important core activity is closely connected with the first and concerns the question: Which valuation (and related) hypotheses ought to be accepted in accounting practice? Here too, our views diverge from those of Chambers, the explanation again lying in the difference between absolute versus conditional prescription. Chambers admits as "correct" only current values based predominantly (or even exclusively) on exit values, while I have been pleading for the acceptance of various valuation bases⁵ (e.g., historical cost basis supplemented by a flexible scheme of

current entry and exit values similar to the recently accepted current value accounting legislations in the U.S.A. and Canada and, to some extent, in the U.K., Australia, and New Zealand), each serving any one among different information purposes, such as income determination under nominal and real financial capital maintenance as well as under physical capital maintenance. As previously hinted at, this kind of current value legislation, and the fact that public accounting bodies have resumed their search for a systematic conceptual framework, provide excellent evidence that accounting theory has not failed to serve actual practice.

Wells' 1976 article is an attempt to apply to accounting the distinction between ordinary and revolutionary science, as developed by the well-known philosopher and historiographer Thomas S. Kuhn. For Wells, the old paradigm (disciplinary matrix), consolidated during the thirties and forties, is the historical cost doctrine with all its paraphernalia of cost and revenue matching, realization at sales, going concern notion, and, of course, depreciation adjusted acquisition cost valuation. He notes the striking similarities between Kuhn's chronological schema -- of an existing paradigm, emerging anomalies and professional crises, the development of emerging alternatives, competing new schools of thought fighting with each other to displace the old paradigm by forming a new one which, in time, ought to be generally accepted -- and the happenings in accounting during recent decades. All this becomes evidence supporting Wells' argument that the (normative) a priori research emerging during the "golden age" of the sixties were by no means vain attempts, but important historical manifestations of a scientific-cultural

process in search of a new paradigm of accounting. Has this paradigm emerged by now? And, if so, what is it called and what does it imply? Wells does not say; seven years ago, when his article was written, he believed it was too soon to give an answer. Is this still true today?

We think that the single most decisive set of events in the direction of the acceptance of a new paradigm of accounting is the legislation introducing -- supplementary to the historical cost approach -- a fairly flexible scheme of current value accounting in the United States (1979)⁶ and Canada (1982), and a similar but less flexible scheme in the United Kingdom (1980) as well as Australia and New Zealand.⁷ If this turns out to be the major manifestation of a new paradigm, then the latter is characterized by the following features:

1. Simultaneous acceptance of different valuation, realization, and classification hypotheses for different information uses.

2. Continuing use of the historical cost method for legalistic and similar purposes and as a basis for taxation.

3. Utilization of the nominal current cost model for income measurement under physical capital maintenance (e.g., in firms the specific prices of which tend to advance beyond the inflationary rate) and related purposes. The remarks in parentheses of this and the next item constitute an extension of the principle of conservatism to current value accounting.

4. Utilization of the real current cost or value model for income measurement under real financial capital maintenance (e.g., in firms the specific prices of which tend to advance below or in

conformity with the inflationary rate) and related purposes.

5. The possible extension of the above-mentioned flexibility by utilizing also the present value method (discounted net future cash flows) especially for internal investment calculations and management accounting decisions (while items 2 to 4 are provided for in Section 4510 of the Canadian CICA Handbook, no provisions are, or were expected to be, made for this last item).⁸

The two topics, "accounting on the crossroads" and "the need for the present value method," are continued in the next and first article by Nils H. Hakansson (1979), in which the relationship of our discipline to economics and finance is illuminated. In discussing the relevance of the capital pricing model, the option pricing model, decision theory, as well as the theory of private and public information to accounting and crucial public policy issues, this paper prepares the reader for further and more detailed discussions of these and related topics in Parts III, IV, and V.

The last article, also by Hakansson (1978), is a response to and critique of the last of the American Accounting Association reports on "the state of the art," which this association is committed to publish every decade or so. As much as one may be dissatisfied with this report, it is interesting to note that it, like the previously discussed article by M. C. Wells, refers to Thomas S. Kuhn's thesis and distinguishes between different competing accounting paradigms. Although this Statement on Accounting Theory and Theory Acceptance [SATTA 1977] suffers from the two major curses of our discipline (an insufficient grounding in methodological background and the perennial confusion of

"accounting" with "financial accounting"), it is praiseworthy in many respects.

We cannot agree with SATTA's pessimistic view that "a general theory does not exist at this time" (p. 1). Before one makes such a pronouncement, one ought to survey the many assumptions underlying every present-day accounting practice, together with the general consequences that follow from these assumptions. Indeed, if such general assumptions and consequences did not exist, accounting could hardly be taught at universities.

This does not deny the considerable amount of disagreement among practicing as well as academic accountants; but the theory of any scientific discipline is made up of the common ground and not of the controversies among its members. Furthermore, we believe that the controversial parts of various conflicting theories concern a limited number of hypotheses and that the misunderstanding arises out of the accountants' failure to specify the action goals and information purposes that a "specific theory" is supposed to serve. As we have shown elsewhere, one can get around most of the conflicting areas by formulating some of the basic assumptions as "empirically empty shells," holding a place for specific hypotheses. This deployment of surrogate assumptions is much more than a cheap trick; it is a device to harness the area of agreement within a general theory and, at the same time, to separate it from the area of disagreement. In this way, a detailed purpose-oriented interpretation becomes possible, which in turn opens the door to an instrumental theory (in contrast to a cognitive theory) of accounting. When we look at accounting as it actually is, we run much less risk of missing the common ground

than when guessing what accounting ought to be. To our mind, we are not at all lacking a generally accepted theoretical basis of accounting (in spite of the fact that SATTA makes neither any effort to expose this common basis or its formulations in the literature, nor to attempt a formulation of its own, as might have been its original task). But what accounting is lacking is a systematic development of various interpretations (of this general, theoretical basis) for different information purposes. Although the difference between an un- or semi-interpreted theory and its interpretation is a very important one, accountants seem to continue to disregard it.

III: POSITIVE versus NORMATIVE ACCOUNTING THEORY AND STANDARD SETTING

Part III deals with an issue most decisive for the future of our discipline. Is a general positive theory of accounting indispensable, necessary, desirable, or even possible? The two articles by Watts and Zimmerman seem to plead strongly for such a positive theory. Their (1978 and 1979) battle-cry for a positive theory of accounting (as manifested by both the articles here reprinted) has reverberated throughout the American accounting community for the last half decade. Indeed, the response to this call to arms was not much short of the phenomenal. Articles praising the positivistic programme of these joint authors not only appeared in academic journals, but even in professional magazines;⁹ scholars whose own approach is undeniably normative (though they may not want to admit it) felt compelled to proclaim

that theirs is "a positive theory;" the Collected Abstracts of the 1982 Annual Meeting of the American Accounting Association lists no less than four papers under the two sections of "Positive Research in Accounting," and a fifth paper bearing the title, "Towards a Positive Theory of Information Evaluation," by A. Schepanski and W.C. Uecker. But what is most surprising is that all this enthusiasm occurs in accounting at a time when historians, epistemologists, natural scientists, and social scientists alike regard positivism as a naïve, obsolete, and outmoded philosophy.¹⁰ There can be little doubt that the call for a "positive theory" in our discipline filled a deep psychological need in many young academics trained in rigorous methods and influenced by the conservative Chicago school of economics. But one wonders whether all this fervour is not based on several misconceptions: first, many authors fail to comprehend "accounting in general" as an applied, hence conditionally prescriptive, discipline; second, they seem to underrate the limitations to which any positive theory concerned with human preferences is subjected; third, they do not fully grasp modern methodology and the reasons for the obsolescence of positivism; fourth, some of them even fail to realize that only a theory, but no research activity, can be free of value judgements; and, finally, they apply the term "theory" indiscriminately also to hypotheses, models, and standards.

Of particular importance is the distinction between a theory of accounting measures, on one side, and a behavioural theory of accounting standard setting, on the other. Unfortunately, some professional accountants and even many academics do not realize

that only the latter theory is meant by "the positive theory of accounting." Most accountants assign a much more general or fundamental meaning to this expression. A theory studying bargaining and lobbying behaviour may well be carried out in a descriptive, i.e., positive, way. But, even here, its ultimate object of investigation is the purpose-directed action of people and groups searching and employing different means to attain various ends. And as long as these means-end relationships are not being analyzed, there will be no general accounting theory answering the most important questions posed by users and producers of accounting information. The manager, the investor, and the practicing accountant all want to know which set of accounting tools serve this purpose and which serve that. Of course, one might also want to know which accounting standards favour this group and which another. But, this becomes a major issue only in times when a fundamental overhaul in the accounting standards is contemplated. And since the FASB in the United States and the CICA in Canada are presently engaged in such an undertaking, it is understandable that this problem is currently magnified beyond its usual proportions.

Watts and Zimmerman's second article, "The Demand for and Supply of Accounting Theories: The Market for Excuses (1979)," can be interpreted in different ways; but already the title suggests that traditional, nominal accounting theories (under subsequent reference to the theories of Paton, Edwards and Bell, Sprouse and Moonitz, Gordon and Chambers) are supplied by scholars on the demand of and financed by vested interests, who in turn exploit these theories as justifications for attaining their personal

goals. Apart from the old truth that vested interests will use any means that fit their purposes, the authors' implication that, in general, accounting theoreticians are systematically bribed or tricked by research funds into providing convenient excuses for lobbying purposes must be rejected as counter-factual.

Christenson's 1983 article is an outspoken critique of Watts and Zimmerman's positive accounting approach and of the "Rochester School of Accounting" in general. He shows that the questions, which Michael C. Jensen¹¹ and other members of the "Rochester School" regard as normative questions, all refer to what we previously called "a theory of accounting measures," while those regarded as positive questions refer to the behaviour of accountants (or other users of accounting data), which Christenson regards as belonging not to questions about accounting entities, but to a positive meta-theory of accounting. Yet Christenson regards most accounting theorists as methodologists and thus as also belonging to the meta-theoretical camp, though to the normative one. In contrast to Watts and Zimmerman, whose plea for a positive theory of accounting seems to be rooted in a positivistic philosophy relying on confirmation, Christenson assumes a neo-rationalistic methodology and pleads for falsification and corroboration. He thus regards Watts and Zimmerman's hypothesis as insufficiently corroborated.

Bryant and Thornton's 1983 article goes beyond Watts and Zimmerman's work and aims at a meta-theory of accounting in which expectations equilibria (an idea derived from socio-biology and macro-economics but here referring to the fulfillment of some expectations concerning changes in accounting standards) as well

as the notion of institutional information (based on more or less arbitrary institutional conventions)¹² play a prominent role. These authors, like Watts and Zimmerman, are strongly influenced by agency theory and exploit some of its basic ideas.

Finally, Sunder and Haribhakti's short 1983 article analyzes the relation of the traditionally implied "truthfulness" of accounting statements to the facts of harsh reality, where standards are born under the pressure of vested interests. The authors regard this kind of "truthfulness" as being in the eyes of the beholder; they plead rather for an explicit recognition of the various conflicts and for a compromise that will be beneficial to society as a whole in the long run.

IV: AGENCY THEORY AND INFORMATION ECONOMICS

We regard this fourth Part as the very core of our book and, perhaps, the key to a future theory of accounting. Unfortunately, it is also the most difficult one to digest and requires some concentration on the part of the reader. Analytical methods have assumed an increasing importance in accounting since the publication of the first books in this area twenty years ago.¹³ This approach has become highly sophisticated and has attained its apex in a combination of information economics and agency theory, and in its application to accounting.

Information economics is a natural extension of statistical decision theory in which an individual makes a choice according to the rank ordering of expected values (i.e. the sums of state-contingent utilities weighted by the probability of each state).

Information economics enriches this simple decision theoretic model in many ways, the most important of which is the formulation of each expected value as conditioned on the receipt of some information. This not only preserves the basic decision-theoretic features, but also provides an analytical framework for assigning definite expected values to alternative information systems from which the one with the highest expected value can be chosen. But the emphasis is on conceptualization rather than on actual calculations which are feasible only for relatively simple situations.

Agency theory, on the other hand, focuses on situations in which one party (principal) delegates authority, through a contractual relationship, to another party (agent) to accomplish some task. The principal, however, may not always be able to obtain the most desirable outcome via the agent's action. This failure to achieve the so-called "first best" solution is due to two factors, at least: first, the agent's objective (or utility function) is different from that of the principal, and second, the agent's action itself, or the ensuing outcome, is not observable. For example, if the agent is risk-averse and the principal is risk-neutral and, in addition, the agent's action is not observable (directly or indirectly through the outcome), then the agent's optimization behaviour (of maximizing his expected utility) may not result in maximizing the principal's objective function (e.g., expected profits). In such a situation, information on the outcome, or on the action of the agent, becomes an important tool for the principal's decision making. Often, a third party is required to collect necessary information as a

monitor or auditor. Such information can be used as a basis for maintaining the contractual relationship between the principal and the agent.

Accounting information may thus fulfill an indispensable function, not only in monitoring the agent's activity, but also in providing a contractual basis for sharing the risks and the fruits of a common endeavour. The basic agency theory¹⁴ has been greatly enriched through a fusion with information theory and might more appropriately be called agency-information theory.

The first paper (1983) is by Feltham, one of the leading accounting researchers in the area of information economics. The essay is a comprehensive survey of various developments in information economics and its significance for financial accounting research. Its primary focus is on the implications of information economics "for understanding the impact of and demand for alternative external financial reporting systems."

In general, information economics confirms that investors prefer (at least in a weak sense and under ceteris paribus conditions) a more informative public reporting system. Thus the incremental cost of acquiring more information should be weighed against the incremental benefits. Information can be considered as a production factor like labour or capital. However, the problem is not quite straightforward, because information often creates externalities and often is a public good, thus resulting in a "free-rider" problem. In such a situation, we may encounter a market failure. Even if information is private, the individual possessing the information may reveal it by his action (or the outcome of his actions, e.g., by prices) or may have an incentive

to reveal it voluntarily. Sometimes, private and public information may be regarded as substitutes for each other or as complements.

In the next (1982) essay, Butterworth, Gibbins, and King provide a programmatic overview of various issues relevant to the further development of accounting theory. Their basic position is that accounting ought to respond to the market demand for information. We interpret this as conforming to our own claim that means of information must be provided which satisfy specific ends or needs manifesting themselves in our economy. The paper is divided into six sections: (I) introduction; (II) historical perspectives of the standard setting process; (III) agency framework as a basis for developing accounting theory; (IV) methodological issues in accounting research; (V) review of recent accounting research; and (VI) summary and future directions.

The authors believe that the basic difficulty in the past has been the lack of an economic theory suitable for accounting, taking into consideration the important role of information. Above all, they discuss the use of accounting information within the framework of agency theory.

Thus the most interesting and perhaps surprising aspect of this second essay is that accounting theory has come full circle back to the stewardship function as the major goal of accounting practice. For decades, leading theoreticians tried to convince us that, unless financial accounting serves the shareholders in their investment decisions, it has little *raison d'être*. Yet, more recently, the efficient market hypotheses and the pertinent empirical evidence have revealed that financial statements are of

relatively little use for investment decisions and that investors, indeed, rely on those statements to a limited extent only. The agency theory reinstates the stewardship function and illuminates it from an entirely novel and more sophisticated perspective.

The next (1982) article, by Stanley Baiman, is the link to the last Part and could have been incorporated there, as it is a careful effort to put the ever growing literature on agency theory into a managerial accounting perspective. If managerial accounting has advocated the use of certain procedures (such as overhead allocation, standard costing, etc.) without offering well-developed justifications, the agency approach may overcome this deficiency and, furthermore, provides useful insights into the design of managerial accounting systems. More specifically, the purpose of this article is fourfold: (1) to survey and synthesize the agency literature (the overlap with the preceding article by Feltham is minimal, because this preceding contribution was specifically written for our book and hence with Baiman's article in mind); (2) to develop some of the positive implications of agency research for managerial accounting problems; (3) to provide a basis for evaluating the agency model for normative implications in managerial accounting; and (4) to identify some unanswered managerial accounting questions that can be analyzed within the agency framework. The agency model, in contrast, is capable of incorporating satisfactorily both belief revisions and performance evaluations. These two information functions appear to play crucial roles in optimization. Although self-interest is the prime motivation for each agent, this does not preclude the possibility of Pareto improvement (making one party better off, but none

worse) through mutual cooperation; the nature and the degree of "cooperation" are determined by the contractual relationships which exist among the involved parties. Cooperative solutions may not be obtainable when appropriate information is unavailable in the following two situations: the case of moral hazard (due to the conflict of interests and lack of contract enforceability) and/or the case of adverse selection (due to asymmetry in information between agent and principal). The discussion of the agency model starts with a simple example, followed by a description and a mathematical formulation of the so-called "basic agency model." This model deals with situations involving a single agent, exogenous labour markets, and a single period.

V: EMPIRICAL ACCOUNTING RESEARCH

Empirical accounting research employing rigorous survey methods, questionnaires, behavioural experiments with hypothesis testing, etc., is of relatively recent vintage. It began in the fifties in the area of budgeting with the behavioural surveys of Chris Argyris,¹⁵ continued with the award winning experimental research of Andrew Stedry,¹⁶ and has since found widespread acceptance, even more so in financial accounting and related areas. Indeed, since the late sixties, especially during the seventies and early eighties, a large number of empirical accounting studies have emerged. It is not an easy task for the uninitiated to find his way through this maze of different but often interrelated topics and broader subject areas. Even experts occasionally require some guidance, and the survey article becomes

an indispensable beacon for general orientation.

In the first article, Dyckman, Gibbins, and Swieringa begin with an overview of research in Financial Statement Disclosure and Use. They conclude that "there does not appear to be a burning desire for drastic revisions or changes . . . most of the criticism . . . is not that there is necessarily something wrong with what is presently reported, but that relevant data are left out. However, there is relatively little agreement about what these relevant data are." Meanwhile, of course, inflation became more rampant and legislations on current value disclosures, filling a particularly urgent need, have been issued in the United States (FAS No. 33) and Canada (Section 4510 of the CICA Handbook). The authors also confirm the limited usefulness of financial statements for making investment decisions. They then examine research on Accounting Principles and Models, including proposals on price-level and current-value accounting. The latter was only slightly favoured over the former -- a result that may have influenced the Financial Accounting Standards Board (FASB) and perhaps even the Canadian Institute of Chartered Accountants (CICA) to ultimately opt for a combination of both.¹⁷

The second paper, by Kaplan, is predominantly concerned with the relevance of accounting data for investors.¹⁸ It begins with the relation between empirical accounting research and the market model (a topic which the first part of our last paper recapitulates and tries to bring up-to-date). The author gives free rein to his astonishment over the fact that the securities market seems to be fairly efficient in spite of the widespread ignorance among "financially knowledgeable" people.

The third article, by Gibbins and Brennan (now Hughes), is of most recent date and fulfills a dual function in our anthology. It not only brings up-to-date some of the material discussed in the first two articles of Part V, but concentrates more on behavioural accounting research in the judgemental and decision-making literature.¹⁹ The emphasis here is not only on the evaluation of financial information by investors and creditors, but also on issues relevant for the FASB and its constituency. The major conclusions of this paper are:

(i) Behavioural studies had little success in confirming the predictions of normative models of judgement and decisions, but were somewhat more successful in confirming results of simple statistical models. Nevertheless, normative as well as statistical models seem to be useful first approximations of purposeful decision making and prediction.

(ii) Although there was little support for alternatives to historical cost-accounting models, current-cost data are viewed more positively now than in the past among persons of influence.

(iii) Users' needs are specific, and no general summary of information priorities has or will emerge. Research interest is thus shifting towards the study of thought processes involved in investment decisions.²⁰

(iv) Accounting is not neutral, and more attention should be paid to its role as a behavioural control process (a statement which is not only in line with our plea for a normative approach, but also with managerial accounting and the more recent trend towards agency theory).

(v) Behavioural accounting has no integrated theory, and progress might have to wait for a "hybrid approach" that provides more solid theoretical foundations.

The functions of the last paper, by Clarkson and myself, are: first, to emphasize empirical accounting research based on security markets; and second, to bring the reader up-to-date in this literature as well as in the area of experimental and survey research in financial accounting.²¹

The application of various versions of the efficient market notion and of the capital asset pricing model (developed in finance theory) to accounting raised the hope that, in this way, the content of public accounting information could be properly quantified.²² But there is hardly any theoretical explanation about the extent and means by which accounting information is reflected in security prices. In consequence, the expectations put on this kind of research have been greatly moderated.²³

It is regrettable that, so far, relatively little empirical research is concerned with objectives, information goals, and, above all, the means-end relations connecting specific accounting hypotheses to different information needs.

VI: MANAGERIAL AND INSTITUTIONAL ACCOUNTING, AND AUDITING

Our own first article begins with a concise historical synopsis and then offers a survey of present-day management accounting, its problems and future prospects. Attention is paid to the following topics:

Systems Philosophy as the Most Basic Influence (indicating

the impact of such philosophically and systems oriented management scientists as Churchman and Ackoff²⁴ upon management accounting).

Electronic Data Processing and Management Information Systems as the Strongest Influence (pointing at the technical as well as human-behavioural aspects of this, from a practical point of view, all-important area).

The Shifting Influence of Operations Research (an area that may not have quite fulfilled the expectations many of us harboured two decades ago but which, nevertheless, had notable impact upon management accounting by introducing it to quantitative methods -- for details of the latter, see the second article of the current Part, by Kaplan).

The Significance of Information Economics (including Agency Theory) for Management Accounting (recapitulating, from a somewhat different angle, a topic discussed in considerable detail by Baiman in Part IV).

Speculations about the Future (pivoting on management accounting's trend towards specialization and fragmentation). This section distinguishes between the object-area (efficiency control, performance evaluation, optimizing and satisfying goals) and the meta-area of management accounting (dealing with the environmental and behavioural interrelations) and argues against a substitution of the former by the latter, but for both complementing each other. Furthermore, emphasizing the object-area means that a unifying, organizing framework must grow out of the very core of accounting and cannot be grafted on at the periphery. This section also examines the possibility of counterbalancing the ongoing fragmentation of management accounting; the remedy might be a

truly integrated and general, but flexible, accounting theory.

The second article, by Kaplan, surveys the "Application of Quantitative Models in Managerial Accounting." This author does not deny that the early hopes in quantitative methods were fulfilled; although he points out that those methods are still not sufficiently integrated in most cost accounting texts, he predicts a change in attitude.²⁵

The third article, by Vatter, refers to institutional or nonbusiness accounting (for governmental agencies, hospitals, religious organizations, universities, foundations, etc.). For lack of much research in this area, this "State of the Art" report concentrates mainly on reviewing Robert Anthony's Research Report, Financial Accounting in Nonbusiness Organizations -- An Exploratory Study of Conceptual Issues (Stamford, Conn.: Financial Accounting Standards Board, 1978). This report searches for principles underlying institutional accounting (e.g., to distinguish operating from capital flows, to establish "recognition" instead of realization criteria, to find substitutes for, or modifications to, depreciation, and to deal with other ideosyncrasies) and for alternative models, i.e., Operating Statements and Financial Flow Statements.

The last article, by Joyce and Libby, deals with the young and fast-growing area of behavioural research in auditing. This excellent and lucidly written paper begins with an outline of three major paradigms and methodologies employed in this area, which are discussed in greater detail in the last part of the paper.

From a practical point of view, behavioural research in

auditing seems to be one of the most successful applications of empirical accounting research. The reasons for the favourable response on the part of public accountants lie in the increasing competition among auditing firms, in a growing number of litigations against them, and in the fact that minor and inexpensive procedural modification in auditing can lead to considerable cost reduction and an improvement in general effectiveness.

APPENDIX

MODERN ACCOUNTING RESEARCH: HISTORY, SURVEY, AND GUIDETABLE OF CONTENTS

PREFACE

FOREWORD by Yuji Ijiri

ACKNOWLEDGEMENTS

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ENDNOTES

¹The "measurement of income and wealth" shifts from positive economics to normative accounting as soon as this measurement becomes an approximation based on surrogates and on a cost-benefit criterion and is used to satisfy various information requirements.

²Bruce J. Caldwell, Beyond Positivism: Economic Methodology in the Twentieth Century (London: George Allen & Unwin, 1982).

³One article of each of these authors ("Detail for a Blueprint" by R. Chambers [1957] and "Towards a General and Axiomatic Foundation of Accountancy -- With an Introduction to the Matrix Formulation of Accounting Systems" by R. Mattessich [1957]) was recently reprinted in S. Zeff's historical collection, The Accounting Postulates and Principles Controversy of the 1960's (New York: Garland Publishing, Inc., 1982) as having influenced the AICPA Accounting Research Study No. 1, The Basic Postulates of Accounting, by M. Moonitz [1961], which is also reprinted in Zeff's [1982] book.

⁴E.g., Michael Chatfield, History of Accounting Thought, rev. ed. (New York: R. E. Krieger Publishing Co., 1977), pp. 300-301; G. J. Previts and B. D. Merino, A History of Accounting in America (New York: Ronald Press, 1979), pp. 292-294; S. Hendriksen, Accounting Theory, 4th ed. (Homewood, Illinois: R. D. Irwin, Inc., 1982), pp. 53-55.

⁵Cf. R. Mattessich, Accounting and Analytical Methods (Homewood, Illinois: R. D. Irwin, Inc., 1964; reprinted, Houston: Scholars Book Co., 1977), pp. 42-43, 158-183; 215-237; *idem*, "The Canadian CCA Exposure Draft -- A Flawed Approach," CA Magazine (Nov. 1980), pp. 48-57; *idem*, "Major Concepts and Problems of Inflation Accounting -- Part I and Part II," CGA Magazine (May 1981), pp. 10-15 and (June/July 1981), pp. 20-27; *idem*, "Still Shooting with Bow and Arrow -- To the CICA Re-Exposure Draft on 'Reporting the Effects of Changing Prices,'" Cost and Management (Nov. 1982), pp. 16-19; *idem*, "On the Evolution of Inflation Accounting -- With a Comparison of Seven Major Models" Economia Aziendale 1/3 (December 1982), pp. 349-381. In Canada, all these efforts seem to have been accompanied by success, as a very reasonable and flexible solution was ultimately adopted in Sect. 4510 (Nov. 1982) of the Handbook of the Canadian Institute of Chartered Accountants.

⁶But current value legislation is only a single aspect of the "enormous increase in the financial reporting required of corporations," and one might well regard the consequences of all this new legislation a paradigm shift, as it is implicit in W. H. Beaver's book, Financial Reporting: An Accounting Revolution

(Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1981).

⁷Cf. Statement of Financial Accounting Standards No. 33 -- Financial Reporting and Changing Prices (Stamford, Conn.: Financial Accounting Standards Board, 1979); "Section 4510 -- Reporting the Effects of Changing Prices" of the CICA Handbook (Toronto: Canadian Institute of Chartered Accountants, 1982); Statement of Standard Accounting Practice No. 16: Current Cost Accounting (London: Institute of Chartered Accountants of England and Wales, 1980); and Guidance Notes on SSAP 16: CCA (London: ICAEW -- ASC, 1980).

⁸In our repeated plea for the simultaneous use of several valuation methods, we have also emphasized the need for the present value hypothesis (see our controversy with Chambers in Cost and Management (March/April 1970, March/April 1971, and July/August 1971) as well as for a consideration of alternative accounting hypotheses beyond the mere valuation issue. Some alternative realization and classification hypotheses have indeed been taken into consideration in Section 4510 of the CICA Handbook).

⁹E.g., Sandra Felton, "Positive Thinking in Accounting Research," CA Magazine 115 (March 1982), pp. 60-64.

¹⁰Cf. R. Mattessich, Instrumental Reasoning and Systems Methodology (Dordrecht, Holland/Boston, Mass.: D. Reidel Co., 1978), pp. 260-299.

¹¹"Reflections on the State of Accounting Research and the Regulation of Accounting," Price Waterhouse Lectures in Accounting (Stanford University, 1976).

¹²Some twenty years ago, we expressed this idea in the following way: "Accounting and its effectiveness can be understood much better from a psychological than from a logical point of view. . . . the effectiveness of traditional accounting lies not in the preciseness of information to management for maximizing profit or any other entrepreneurial goal, but in its authoritative character. The institution of control checks upon people and enables the depiction of the firm's financial structure in a simple and crude but overall model which constitutes a mighty bulwark against chaos." R. Mattessich, "Operations Research and Accounting: Competitors or Partners?" The Quarterly Review of Economics and Business (August 1962), pp. 7-14. Further remarks on institutional facts as values may be found in R. Mattessich, Instrumental Reasoning and Systems Methodology (Dordrecht, Holland/Boston, Mass.: D. Reidel Co., 1978/1980), pp. 48-52.

- ¹³See R. Mattessich, Accounting and Analytical Methods -- Measurement and Projection of Income and Wealth in the Micro- and Macro-Economy (Homewood, Ill.: R. D. Irwin, 1964; reprinted in the "Accounting Classics Series," Houston: Scholars Book Co., 1977); and its companion volume: idem, Simulation of the Firm through a Budget Computer Program (Homewood, Ill.: R. D. Irwin, 1964; reprinted in facsimile in Ann Arbor, Mich.: University Microfilms International, 1979); see also T. H. Williams and C. H. Griffin, The Mathematical Dimension of Accounting (Cincinnati: South-Western Publishing Co., 1964); and Yuji Ijiri, Management Goals and Accounting for Control (Chicago: Rand McNally, 1965).
- ¹⁴As originally formulated in A. A. Alchian and H. Demsetz' "Production, Information Costs, and Economic Organization," American Economic Review 62 (December 1972), pp. 777-795; and in M. C. Jensen and W. H. Meckling's "Theory of the Firm: Managerial Behavior Agency Costs and Ownership Structure," Journal of Financial Economics 3 (October 1976), pp. 306-360.
- ¹⁵The Impact of Budgets on People (Ithaca, N. Y.: The Controllership Foundation, 1952).
- ¹⁶Budget Control and Cost Behavior (Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1959/1960).
- ¹⁷This is to be most welcome, because only through such a combination is it possible to separate fictitious from real holding gains.
- ¹⁸One of the first modern books paying attention to this problem was George J. Staibus' A Theory of Accounting to Investors (Berkeley: University of California Press, 1961).
- ¹⁹Other excellent and more comprehensive surveys in this area are offered by Robert Libby, Accounting and Human Information Processing: Theory and Applications (Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1981); and Robert Libby and B. L. Lewis, "Human Information Processing in Accounting: The State of the Art," Accounting Organizations and Society 2 (1977), pp. 245-268; and idem, "Human Information Processing in Accounting 1982," Accounting Organizations and Society (forthcoming 1983).
- ²⁰We, of course, would ask: "Why is there hardly any attempt to relate those specific needs to specific accounting models?"
- ²¹See also the paper by B. Lev and J. A. Ohlson, "Market-Based Empirical Research in Accounting: Review, Interpretation and

Extension," and other papers, all presented at the 1982 Annual Accounting Research Conference (Chicago: University of Chicago, Graduate School of Business, April 1982).

²²"By (1) isolating the release of accounting information as much as possible from other factors which might impact on security prices, (2) separating the security price change at that point of time into a part explained by the market model as well as an unexplained part, and finally (3) hypothesizing that the unexplained part was due to the accounting information release, these researchers were able to place a number on the information content of the release, an achievement which had seemed impossible until then." Hein Schreuder, "Accounting Research and Practice," pp. 10-11, a paper presented at the Conference on "New Challenges to Management Research" of the European Institute for Advanced Studies in Management, Brussels, 23-24 May 1984.

²³Cf. William H. Beaver, Financial Reporting: An Accounting Revolution (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1981).

²⁴For further details on the contributions of Ackoff, Churchman, and Simon to systems theory, see R. Mattessich, "The Systems Approach: Its Variety of Aspects." Journal of the American Society for Information Science 33 (November 1982), pp. 385-394, especially 387-393.

²⁵Meanwhile, several text books have appeared which confirm Kaplan's prediction: e.g., A. Belkaoui, Cost Accounting (Chicago: Dryden Press, 1983); A. W. Corcoran, Costs: Accounting, Analysis and Control (New York: J. Wiley & Sons, Inc., 1978); M. J. Mephram, Accounting Models (Afferton-Stockton: Polytech Publishers Ltd., 1980), the only one that takes budget simulation into consideration; and one by R. S. Kaplan himself, Advanced Management Accounting (Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1982).

INFERENCE IN AUDITING: THE IMPLICATIONS OF COHERENCE*

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INFERENCE IN AUDITING: THE IMPLICATIONS OF COHERENCE

Auditors and their inferences and decisions have constituted an important and growing area of study (for a recent review see Ashton, 1983). Both prescriptions and descriptions have been presented to attempt to improve the efficiency and effectiveness of auditors, to test their inferences and decisions, to provide a basis for training new auditors in the ways of professional judgement and even to attempt to debias the inferences of auditors. Models based on economic decision analysis under uncertainty, Bayes theorem, agency theory, linear programming, and reliability theory exist in the literature as prescriptive approaches to audit questions. Such traditional statistical inference models as stratified mean per unit, ratio and difference estimates, binomial attributed programs and dollar unit sampling models are presented as methods for improving the efficiency and effectiveness of auditors. Descriptive approaches based on the lens model (a linear statistical model) and concocted heuristics cases have been applied to study how inferences are made by practitioners and to suggest where auditors might depart from the rules prescribed by the models or the axioms of probability and utility. Recent research has begun to examine the cognitive psychology ideas of templates (Waller and Felix, 1983) and to use various approaches from psychology and information systems (e.g., cybernetics) to examine ways of characterizing aspects of the audit (e.g.: computer systems evaluation by computer audit specialists and bad debt allowance estimation) (see Messier and Hansen, 1983). As yet, however, no one

Pascalian probability calculus. We must adopt the careful analysis of the measurement theory literature which suggests we should examine the relationship and consistency between the empirical relations of audit inference and the numerical relations specified by the models we present. Otherwise, we run the risk of using numerical relations that over specify the empirical ones and thus suggest the use of say an absolute scale to measure ordinal relationships, a problem resolved in welfare economics years ago.

The term coherence, as it is used in mathematical decision theory, implies that a person must follow the rules of Pascalian probability to be coherent.

A set of degrees of belief in a set of propositions (or statements, or events) is called coherent if and only if those degrees satisfy the axioms of probability calculus (Kyburg, 1970, pp. 69-70).

The reason one should be coherent is to avoid having a "book" made against you. As stated by Kyburg (1970, pp. 69-70).

... a necessary and sufficient condition of not being in a position to have a book made against one is that one's degree of belief be coherent.

A Dutch Book represents a betting situation where a person cannot win, whatever happens. For example, if one person assigned $\frac{1}{2}$ to the probability of a head and $\frac{2}{5}$ to the probability of a tail in the flip of a fair coin where another person paid the incoherent bettor for a win and the bettor paid the coherent person for a loss, then payoffs could be structured to allow the incoherent person to be "pumped" dry of money. For a \$20 payoff on both states, the incoherent player has an expected value of \$18 whereas a coherent player has an expected value of \$20. Therefore, a series of side payments could be made for a series of such games that would drain the incoherent player.

Another more rigorous example has been constructed as follows. Assume a person feels event E is less probable than event F which is less probable than G which is less than E. If the same prize (P) were awarded for each event, then $P(E) < P(F) < P(G) < P(E)$. But the person would be intransitive and thus irrational (a term applied to the violation of utility axioms) in his or her choices. The opponent could "pump" the player dry of money in this game (Moore and Thomas, 1976, p. 164, or Lindley, 1971, p. 20).

The axioms of Pascalian calculus have numerous variations in the literature. However, DeGroot (1970, pp. 9 & 10) presents a two part definition of a probability space that is as general as any and is sufficient for purposes of this discussion.

1. A family \underline{a} of sets, each of which is a subset of S is called a field if the family meets the following three requirements:

1. $S \in \underline{a}$ (\in designates contained in)
2. If $A \in \underline{a}$, then $A^C \in \underline{a}$ (A^C is the complement of set A)
3. If A_1, A_2, \dots is an infinite sequence of sets from \underline{a} , then $\bigcup_{i=1}^{\infty} A_i \in \underline{a}$ (U is the union of sets).

2. For a given sample space S and \mathcal{C} (termed sigma) field \underline{a} , a probability distribution P on (S, \underline{a}) is a non negative function, the value of which is defined for each event in field \underline{a} and which has the following two properties:

1. $P(S) = 1$
2. If A_1, A_2, \dots is a sequence of disjoint events, then $P(\bigcup_{i=1}^{\infty} A_i) = \sum_{i=1}^{\infty} P(A_i)$ (where \sum is a general summation operation). The triple (S, \underline{a}, P) is called a probability space.

In simplified terms, these axioms imply an absolute scale, a situation where the probabilities over all states sum to one, and a situation where the probability assigned to an event, proposition or state implies a complementary probability is necessarily assigned to the

complementary event, proposition or state, i.e., $P(x) = 1 - P(x^c)$. While other more subtle assumptions are also present, these are the ones that are commonly stated in the literature under the idea of coherence. These assumptions are implicit in relative frequency probabilities underlying statistical sampling, α and β errors or risks, subjective probabilities, economic decision models, Bayes Theorem, linear regression and lens models, heuristics and even logical probabilities (Dacey and Ward, 1980) which have recently appeared in the audit literature.

Auditing can be divided into two aspects which will serve to help present the ideas and arguments to follow. One aspect is called inference, the second is decision. Inference involves determining how one's beliefs are affected by the evidence available. Decision is the selection of the "best" of several possible actions (Smith, 1961, p. 1). The importance of this separation is because it is possible to consider inference without considering decision even though the two are continually intermingled in the auditing and probability literature. In this paper, I will try to maintain the distinction between these two aspects of the audit process.

The second conception that is important to keep in mind is the idea of a game. A game has certain characteristics as suggested in the quotation selected by Shackle (1961, p. 98) from a paper by Hamblin.

'The true basis of the disaster wrought upon economic theory by the games of chance universe of ideas is the notion of the existence and attainability of a list, complete and known to be complete, of all the possible outcomes of an action. In games of chance this possibility, of listing

completely all contingencies, is assured by the very nature of these games, their inherent and essential dependence upon a set of explicit rules. It is the completeness of this list, which makes it logically possible to distribution relative frequencies over contingencies.'

In addition, the idea of a game is fundamental to decisions and chance based probability but not so to inference. The Pascalian probability calculus needs the idea of chance or a game which some of the conceptions that will be examined as illustrations of the problems with coherence do not.

Two general problem areas seem to cause the major problems for the probability models that exist in the literature. One deals with the question of qualitative aspects of errors located by statistical samples (S.A.S. 39, 1981). The C.I.C.A. study entitled Extent of Audit Testing (1980) suggests the need for professional judgement in audit inference. It states,

At the present time, the auditor is the sole judge of the sufficiency of his audit testing and is therefore free to perform as little or as much as he considers necessary (p.3). In practice, "soft" evidence through observation and enquiry cannot usually be obtained using statistical methods since such evidence cannot usually be related to individual population items (p.25).

For example, statistical sampling would specify the same level of confidence for 200 positive receivable confirmations with no errors indicated as it would for 200 negative confirmations with no indicated errors. Certainly, inference using the total evidence available would not equate these two sampling results.

The second problem area involves the ability to develop aggregate risk or confidence levels from traditional models. Heimann and Chesley (1977) demonstrate the normal probability theory model for

such aggregation in a linear environment. Holstrum and Kirtland (1983) present a similar conceptualization of the Poisson theory problem. Chesley and MacLean (1984) present the complexity of the convolution of a Poisson and a normal probability model which runs afoul of the calculus and the ad hocery of the Stringer bound (Bailey, 1981, p. 196). Without solutions to the qualitative inference and the aggregation questions, little progress is likely on the modeling of audit inference in traditional Pascalian calculus frameworks.

RELAXATIONS OF COHERENCE

One area where Pascalian axioms could be relaxed is the use of magnitude scales. Toba (1975) and Kissinger (1977) consider inference as a matter of degree not absolutes. Thus ordinal probabilities rather than magnitude ones are suggested. Perhaps $P(S_1 \cup S_2) > P(S_1) + P(S_2)$ where S_1 and S_2 are disjoint because they have some synergistic effect for the auditor. Traditional calculus would require equality. Kmietowicz and Pearman (1981) present a connection between ordinal probabilities and the traditional probability calculus but not without imposing a number of assumptions such as the acceptance of a maximum and minimum solution for expected values or the ability to specify the magnitude of the differences between probabilities.

Pascalian calculus requires $P(S | R) = 1 - P(S^c | R)$. Thus evidence, R , must bear on both the proposition and its complement. Researchers studying inference suggest a model that would permit a person to withhold his or her belief from a proposition without according that

belief to the complement of the proposition (Shafer, 1976, p. 23, Popper, 1959, pp. 33 & 265). Cohen (1977, p. 239) suggests that inference should be expressed as $P(S | R) > 0$ and $P(R^c) = 0$, then $P(S^c | R) = 0$ where $P(R^c) = 0$ implies that the evidence R is not in complete or deliberately false. For example, if audit evidence R were gathered to substantiate the "fairness" of accounts receivable (S) and the support was found to be present, $P(S | R) > 0$, then the support of R for "not fairness" is deemed as nonexistent, $P(S^c | R) = 0$.

Conjunction is a common inference approach for auditors. Pascalian calculus requires $P(B \cap C | A) = P(B | A) \times P(C | A \cap B)$, the so-called product rule. Because multiplication is independent of order ($A \times B = B \times A$), the auditor must be prepared to accept that the order for making an inference should not affect the conjoined conclusion. One alternative conception of probability calculus suggests $P(B \cap C | A) = \min \{ P(B | A), P(C | A) \}$. In addition, order of inference is taken into account because a separate inference of a connected sequence is required rather than being a result of multiplication. Direction of testing appears to be important in some audit models (Kinney, 1975, p. 16) as well as auditor tests. For example, inventory cut off is normally established before a count occurs. Certainly, the conjoined conclusion is unlikely to be independent of the order of the individual conclusions.

In auditing, it is unlikely that the combined inference from tests of understatement of assets and overstatements equals the sum of the two, i.e., $P(S_1 \cup S_2 | R) \neq P(S_1 | R) + P(S_2 | R)$ for S_1 disjoint from S_2 . Pascalian calculus requires such an equality under

disjunction. Maybe the inference should be undertaken as a nested sequence $\{S_1\} \in \{S_1, S_2\} \in \{S_1, S_2, S_3\} \in \dots$ or maybe $P(S_1 \cup S_2 | R) \geq P(S_1 | R)$ where $P(S_2 | R) \geq P(S_1 | R)$. Regardless, coherence restricts the disjunctive inference to the specific sum of the separate results which may not adequately represent the auditor's inference.

The inference from evidence R to proposition S presently must be made by auditors without being concerned with the qualitative factors involved if the pure mathematical result is taken. 200 negative confirmation provide the same evidence as 200 positive confirmations as far as the statistics are concerned. Maybe auditors need a conception of probability which deals with the number of assumptions that are necessary to answer the relevant questions the evidence does not answer. The fewer the assumptions, the stronger the inference. Statistical sampling could then be used to indicate whether evidence should be accepted rather than as a measure of the inductive support provided by the evidence. Certainly, evidence from some of the heuristics studies (see Joyce and Biddle, 1981) could be more adequately dealt with if the full evidence provided by the experimenter to the subjects was considered. For example, maybe subjects felt the experimenter was tricking them or maybe the response scales were not reasonable for subjects, or maybe subjects used the full evidence connoted by the cases. Certainly it is not obvious subjects used only the evidence selected as relevant by the experimenter.

CONCLUSIONS AND EXTENSIONS

A recent debate in the psychology literature provides a succinct statement of the dangers of failing to carefully consider the assumptions we tend to take for granted.

What then follows from the thesis is that ordinary human reasoning - by which I mean the reasoning of adults who have not been systematically educated in any branch of logic or probability theory - cannot be held to be faultily programmed: it sets its own standards (Cohen, 1981, p. 317).

What is implied here, is the need to consider the nature of inference being made by auditors and then develop an axiom system consistent with these inferences, rather than basing suggested inferences on the untried assumptions of an imposed and hypothetical axiom system. As Einhorn and Hogarth (1981) state, no universally accepted theory exists as to what axioms are desirable.

Numerous axiom systems exist. Some accept coherence as a necessary requirement (see Fine, 1973). Some reject coherence as a necessary assumption (see Shafer, 1976; Cohen, 1977). Certainly we must not restrict our study to one system while excluding systems which depart from the Pascalian calculus of probability. Only by careful study of the empirical world of auditors and the various axiom systems that are available can the empirical relations and the numerical relations be consistent. A beginning can be made in this analysis by using the inferences that are implied by various axioms because they provide a reasonably uncluttered look at how auditors might make inferences. Once conjunctions, disjunctions, complementations and chainings are examined, a base will then exist to examine more complex settings.

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A REVIEW OF SEVERAL ISSUES ASSOCIATED WITH
THE PRACTICAL IMPLEMENTATION OF SAS NO. 39
AND ITS CANADIAN COUNTERPART IN THE
EAT STUDY

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ABSTRACT

This paper reviews some key issues concerning the formulation of risk models of audit practice. In particular it focuses on differences between the Canadian and American models and it analyzes potential problems of both approaches. The paper concludes that the question of preferability can only be answered by making assumptions about the behavioural consequences of using the two approaches.

I. INTRODUCTION

A variety of environmental factors has caused auditors to be more concerned about the control of audit risks. A formula has even appeared in an appendix to U.S. Auditing Standards (i.e., SAS No. 39), which suggests how various risks are related. This formula is a slight modification of an earlier formula that has existed in SAP 54 since 1972. This formula has come under increasing criticism from academics and practitioners. It is in danger of being dropped from the SAS No. 39 Appendix.

The purpose of this paper is to critically examine the criticisms that have been leveled at the SAS No. 39 formula. Although I generally sympathize with the intentions of many of these critics, I am concerned about the political consequences if this criticism gets out of hand or appears to be too one sided. For this reason, in this paper, I will play somewhat of a devil's advocate role concerning certain widely held views of auditing research. I do this despite the fact I tend to agree with these same views and have done work espousing some of these views. However, every model has its disadvantages as well as advantages and in this paper I would like to provide a perspective that, hopefully, will balance the views from other papers.

The rest of this paper is organized as follows: Section II introduces the SAS No. 39 and EAT risk model formulas. Section III discusses the reasons for the differences on the two risk models and identifies the key behavioural assumptions underlying these differences. Section IV reviews and discusses other

criticisms that have been raised for SAS No. 39. Section V provides a summary of the discussion and conclusions.

II. THE RISK MODELS

The basic formula in SAS No. 39 is the following:

$$UR = IR \times TD \times IC \times AR \quad (1)$$

where

IR = Inherent Risk = risk that monetary errors equal to tolerable error (material error) would have occurred in the absence of internal accounting controls related to the account balance or class of transactions under audit. In note 2 of the Appendix to SAS No. 39, Inherent Risk is set to one, the highest value possible, so that the formula above reduces to:

$$UR = TD \times IC \times AR \quad (2)$$

where

UR = Ultimate Risk that the audit procedures fail to detect material errors in the account balance or class of transactions under audit. Note that UR in eq. 1 is an unconditional probability whereas that in eq. 2 is conditional on a material error occurring.

IC = Auditor's Assessment of risk given that errors equal to tolerable error occur, the system of internal accounting control fails to detect them. Note that if the auditor specifies a material compliance deviation rate then the probability that this rate or higher exists is a valid value of IC. In this way the audit procedure of compliance testing can be tied into the risk model.

AR = Auditor's Assessment of risk that analytical review procedures and other relevant substantive tests would fail to detect material errors.

TD = Allowable Risk of incorrect acceptance for the substantive test of details given that material errors exist.

The SAS No. 39 assumption that Inherent risk = 1, tends to assure that planned UR \geq actual UR. This follows from formula (1) and the fact that actual Inherent Risk is probably something less than one.

Note that the overall level of assurance provided by the audit for the account balance or class of transactions is $1 - \text{UR}$. Hence planned assurance level = $1 - \text{planned UR} \leq 1 - \text{actual UR}$ = actual level of assurance. Some writers have pointed out that this is a basic objective of the audit and the SAS No. 39 assumption help to attain this (for example, Arens and Loebbecke, (1980; p. 142) state: "The achieved level of assurance must be greater than the desired level or the auditor should not issue an unqualified opinion.")

More recently, however, SAS No. 47 reflects a change in attitude concerning this philosophy of setting IR = 1. In paragraph 22 of SAS No. 47, the AICPA effectively encourages auditors to consider IR as a separate factor in the risk equation. The effect of this may be to reduce the extent of audit work, particularly in highly competitive situations. However, a potential problem with such a strategy may be that auditors will be overoptimistic in assessing IR so that achieved UR \leq planned UR. This would mean that the auditor may not be in a position to issue a clean opinion. Thus, although SAS No. 47

may better reflect the current highly competitive state of audit practice, it may be doing so at the cost of reducing audit reliability.

Several variants of the SAS No. 39 risk model have been proposed in the literature. Perhaps the most significant alternative is the one adopted in The Extent of Audit Testing (henceforth EAT study) published by the CICA in 1980. This model defines a joint risk as being equivalent to UR of SAS No. 39 but where IR is allowed to vary based on the auditors judgement, i.e. joint risk is the same as e.g. (1). However, the EAT risk model goes one step further and defines an overall risk (OR) to be:

$$OR = \frac{\text{joint risk}}{\text{joint risk} + (1 - \text{inherent risk})} = \frac{\text{joint risk}}{\text{joint risk} + (1 - IR)}$$

$$\text{However, UR (e.g. 2)} = \frac{\text{joint risk}}{\text{inherent risk}} = \frac{\text{joint risk}}{IR}$$

Note that the denominator of the OR formula is the probability that the auditor concludes there is no material error (i.e. a clean opinion on the account is given). Joint risk is the probability that the auditor incorrectly concludes there is no material error when there is and 1-inherent risk is the probability that there is no material error. Thus OR is the conditional probability, conditional on their being a clean opinion on the account, that the auditor incorrectly concludes there is no material error.¹ By contrast joint risk is the unconditional probability while UR (e.g. 2) is another conditional probability, conditional this time on there being a material error, IR.

On the face of it, one might wonder why such a refinement is more useful than the SAS No. 39 concept of UR or the SAS No. 47 and EAT study concept of joint risk. It can be shown that since joint risk (JR) is unconditional while OR is conditional, that

$$\text{joint risk} = \text{JR} \leq \text{OR}$$

There is, however, a major difference in philosophy concerning UR, JR, and OR which may not be evident from these basic definitions.

III: BEHAVIORAL DIFFERENCES IN USING THE MODELS

The SAS No. 39 formula (2) is a linkage formula in that it links the results of various audit tests to the overall assurance provided by the set of tests relating to an account balance or transaction stream. The formula is intended to be a guide only because it is recognized that considerable judgment is required in setting the values of the variables. Perhaps the most useful, immediate, practical result of SAS No. 39 is the implication it has for TD:

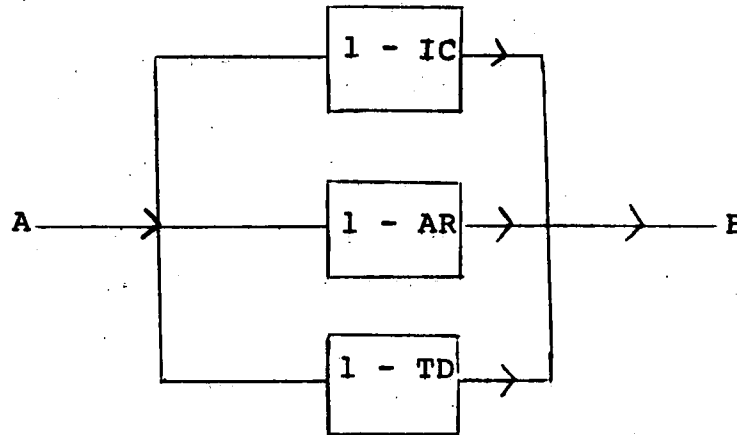
$TD = 1 - \text{confidence level of the statistical test} = \beta \text{ risk of incorrectly accepting a population having a material error.}$
 Note that if all tests have been performed and evaluated, then the planned confidence level for the statistical substantive test of details $= 1 - \frac{UR}{IC \times IR}$. This formula follows directly from formula (2). The formula indicates how to set the statistical confidence level for a substantive tests of details given that the auditor performed other audit procedure related to the particular account balance or class of transactions.

The confidence level so desired can be used to determine sample size and evaluate sampling results respectively, of substantive tests of details of individual account balances or transaction streams. One advantage of dollar-unit sampling is that it provides assurance that actual $TD \leq$ planned TD, thus helping assure that actual $UR = \leq$ planned UR. This illustrates the usefulness of having some conservatism in the audit process.

Although SAS No. 39 is less unequivocal regarding the implications of its formula for other statistical tests, it is

possible to derive the general implications implied by its Formula (2).

First, it may be useful to note that formula (2) represents the probability that the audit procedures fail and that such an audit process may suggest a parallel structure as follows.



In such a representation, each box or component represents different kinds of audit procedures, each related to a different risk component, that may exist in the audit. The expressions in the box indicate the probability these procedures have of detecting material errors under conditions specified in SAS No. 39. The audit procedures "fail" if they can get to point B without discovering a material error. The only way this can occur in a parallel system is if all routes to point B fail, i.e., if all audit procedures fail to detect a material error. Hence the audit process reliability can be improved by increasing the reliability of any single audit component (e.g., 1 - AR) or more than one component. Conversely, audit reliability may be maintained by reducing the reliability of one component, but having a compensating

increase in another component. There is a branch of statistics, reliability theory, which explicitly models the structure of the system in measuring the probability of failure, or its complement, the probability of correct processing. I am suggesting here that perhaps such models may be useful for illustrating the relationships of audit procedures.

Note that the structure of the components says nothing about the independence or dependence of the components on one another. In fact, however, the definitions of AR, TD, and IC in SAS No. 39 suggest that the probabilities involved are conditional probabilities, conditional probabilities which imply a fixed sequencing of audit activities as follows: internal control evaluation, analytical review, and substantive tests of details. This sequencing does not mean that all of these procedures must be performed or relied upon, however. Moreover, in theory there should be no reason why a different sequencing should be disallowed if the auditor finds it more useful. For example, an auditor may prefer to perform analytical review before any other audit procedure.

The parallel structure reflects the fact that there can be different sources of evidence supporting the overall assurance level. Thus, the audit fails only if all the audit procedures: internal control evaluations, supplemental audit procedures, and tests of details fail to detect a material error. The product rule of formula (2) works in such a way that the risk of an audit procedure failing to detect a material error can be

compensated for by reducing this risk for other audit procedures. For example, if less reliance is to be put on internal controls, then the confidence level, and hence the sample size, for the substantive test of details may be increased to compensate for the lack of assurance from internal controls. Statistically, there is nothing to prevent this kind of tradeoff among any of the three procedures indicated by formula (2). In fact a cost efficient audit would use this tradeoff within the constraints indicated by SAS No. 39 to minimize total costs for a given planned UR.

However, while the formula allows the auditor to specify risks associated with different audit procedures at the planning stage, this formula may be inappropriate for conditionally revising the values after the auditor performs one of these procedures. Kinney (1983b) shows that such conditional revision may result in realized UR well in excess of planned UR. Ways of reducing such realized risks include use of conservative assessments of these factor risks (e.g. use of dollar unit sampling to help assure that achieved TD = planned TD) and/or putting a ceiling on the allowable risk associated with each factor (e.g. SAS No. 39 the Appendix to Table 2 indicates that the maximum value for TD is .55). In practice, it does not appear that firms literally use the UR formula to conditionally revise the amount of substantive testing to do as a result of internal control reliance (e.g. see Holstrum and Kirtland (1982; p. 16) or Elliott and Rogers (1972) for the use of "grades of internal control" in evaluations).

Because of these practices (which probably reflect conservative evaluation strategies) and limitations on the literal use of the formula to cover all possible values of IC, AR, and TD, the realized risks in practice may be well under that predicted by Kinney. However, theoretically, at least, realized risks may be much higher than planned with conditional revision.²

The problem is that with the concept of joint risk, conditional revision leads to even larger realized risks than planned. Moreover, by including the component IR the auditor may be encouraged to conditionally revise the extent of audit procedures on the basis of the value assigned to IR.

In order to get around this problem of conditional revision Kinney (1983b), has suggested that auditors adopt a Bayesian approach. Kinney argues that conditional revision is tantamount to use of prior information and one way of doing this is through use of Bayes Theorem.

Leslie et. al. (1979) and Leslie (1984) have long advocated risk models which reflect Bayesian revision. Leslie (1984) argues that the real risk of auditing is the Bayesian posterior risk of a material error and that this "real risk" may be much higher than either UR or joint risk. Moreover, Leslie (1984), shows that OR is simply the posterior risk of a two state Bayesian model which treats IR as prior information. Because of this correspondence with Bayesian models, Leslie (1984) argues that SAS No. 39 and SAS No. 47 should be replaced with OR from the EAT study. Leslie (1984, p.14) may even be suggesting that UR is worse than nothing at all because it can be so misleading with regard to these "real" audit risks.

The use of the term "real" audit risk is at the crux of the Leslie (1984) criticism of SAS No. 39 and UR. The "real risk" may be a function of how willing an auditor is to incorporate prior as well as sample information in computing the risk. A related issue is whether this information can be quantified in a form that allows an auditor to make use of Bayesian revision. Leslie obviously feels that at least IR can be quantified as prior information. However, for auditors who may feel IR is not separately quantifiable with any degree of accuracy, using a

Bayesian approach with IR as prior information may not be valid.

It is important to recognize that a Bayesian methodology computes a posterior distribution based on a combination of prior and sample information. The weight and values assigned to the prior information may thus be very significant in affecting the posterior distribution. In fact the most extreme differences between Bayesian and classical methods occur when the prior information is allowed to dominate or "overwhelm" the sample information. Leslie (1984; p. 11-12, 28) uses such situations to illustrate maximum differences between UR and the "real" risks. He then argues that the "real" posterior Bayesian risk is the relevant one for auditing.

Behavioural research on professional judgement, however, indicates that professionals in general may not always revise their prior beliefs consistent with Bayesian theory, (see Scott (1983) for a good review of the literature). For example, instead of revising their priors by combining prior and sample information using Bayes theorem, auditors may instead tend to be influenced by the ordering of the evidence so that the prior may carry too much or too little weight relative to what Bayesian version. The end result is that the posterior distribution is something other than that obtained by strictly following Bayes theorem. This is not to say that Bayesian revision is never relevant in auditing, only that it may not always be consistent with auditor judgement, even within the statistical sampling framework used by Leslie (1984).

Interestingly, OR is Bayesian only with respect to IR. That is, the allowable priors relate only to the auditor's assessment of IR. The product rule used by UR and JR in relating AR, IC, and TD is maintained in OR as well. Leslie (1984; pp. 18-20) may even find useful the product rule for relating different preventive controls and inherent risk to prior probability of error. Yet a complete Bayesian audit model should allow the incorporation not only of IR as prior information, but also, depending on the stage of the audit, IC and AR as well. Thus OR is only a partial Bayesian model in which IR is the only prior information reflected in a Bayesian manner. (Leslie et al (1979; pp. 303-304) recognizes that the audit may be a sequential Bayesian process and thus the prior information, depending on the stage of the audit, may take on different forms.)

Ironically, IR appears to be the one factor that some auditors do not feel they can assess with any degree of accuracy.

"Conceptually, to measure IR independently, we would need to estimate the probability distribution of errors or irregularities arising from the flow of transactions through the accounting system, exclusive of any consideration of internal control procedures. However, in a practical (or empirical) sense, it is not possible to measure or objectively estimate such a probability distribution of errors or irregularities. This is because there is no existing population of transactions that are processed through the accounting system without being subject to the client's existing internal accounting control system, since some of the control procedures (primary controls) are applied during the processing of transactions. Therefore, we normally do not give explicit recognition to an evaluation of inherent risk in our applications of the audit risk model.

In situations where we perceive an unusually high level of inherent risk, we may judge that a special audit risk exists. The identification of and responses to special audit risks are discussed later in the paper".³

Note that such auditors would not assess IR as priors even if they were Bayesian. Instead it appears that at least some auditors would prefer to incorporate IR subjectively in the evaluation of IC. Perhaps this helps explain why SAS No. 39 ignored IR to start with.

On the other hand, Leslie (1984, p. 10) feels that auditors "must address IR when planning and evaluating an audit". (emphasis added) This requirement along with the form of the OR risk equation (IR is the critical factor in distinguishing OR from UR or JR) indicates that the most important prior information may be the auditor's assessment of IR.

It thus appears that there are two major philosophical differences between using UR and OR to represent audit risk. First, OR leans more toward Bayesian theory in its justification while UR relies more on the classical statistical interpretation of audit risk. Second, OR requires that the auditor explicitly and realistically consider IR in measuring audit risks while UR allows the auditor to effectively ignore it or to implicitly consider it in setting IC.

SECTION IV

Other criticisms of the UR risk model of SAS No. 39 have come from a variety of sources. Cushing and Loebbecke (1983), point out several deficiencies of the model. In particular they illustrate many potentially important factors not incorporated by UR (and JR and OR, for that matter), including many which require subjective assessments. However, there is some question whether any single model will ever successfully ever address all the issues raised by Cushing and Loebbecke.

As noted earlier, Kinney (1983b) points out the problems associated with conditionally revising a factor level from UR after having observed the results from another audit procedure, (e.g. revising TD after observing the achieved AR based on performing analytical review). Kinney (1983a) develops a normal distribution based Bayesian model which works with the mean and standard deviation of monetary error. He compares the risk of this Bayesian model with UR and a modified risk product formula. Unfortunately, the model has not yet been validated using realistic accounting error patterns. Hence, while in theory the model may look attractive, in practice it may prove to have serious shortcomings. In fact this highlights a major shortcoming of all Bayesian models proposed in the literature: the need for validation before implementation would be feasible. However, the same may also be argued for UR and JR. Such validation has not yet been provided and this is certainly

an important area of audit research. There is no unique Bayesian model of the audit process. Some such as Kinney's are based on the normal distribution, others such as Leslie's are based on a discrete distribution, still others are based on combinations or mixtures of distributions. Which model is the "best" and reflects the "real" risk is a function of future research.

Gaber and Lemon (1983) performed a survey of current practice regarding audit risk models. Some relevant findings from their study are that (1) there is considerable variation in what auditors in practice consider acceptable levels of audit risk, and (2) inherent risk is frequently ignored in practice. These findings along with Leslie (1984), and Holstrum and Kirtland (1982) indicate there is a great diversity in practice concerning the need to assess IR. These findings also indicate that perhaps a fundamental need in audit practice is to develop guidelines concerning audit risk, including its definition and whether and how IR fits into this definition. Clearly there appears to be a lack of consensus of acceptable levels of audit risk, although this may be due to uncertainty about how the risks should be computed, (e.g. OR, JR, or IR). (e.g. OR, JR, or IR).

Summary and Conclusions

In choosing between any models, the criteria should be specified. Leslie (1984) uses the predictive-ability criterion where the prediction of interest is the "real" audit risk experienced by the auditor. However, risk is a function of the philosophy one is willing to follow in mixing subjective probabilities with frequency probabilities in computing risks. In a single person decision making role, Bayesian statistics and the Bayesian philosophy makes a lot of sense. Also auditors need to use different sources of evidence in forming an opinion and thus they feel naturally attracted to the Bayesian concept of prior information.

On the other hand, the social aspects of audit decision making should also be considered. In defending his decisions in court or to his peers, the auditor may find useful, objective evidence based on classical statistical theory. In fact, objective control of sampling risks is one of the primary reasons auditors have turned to statistical sampling in the first place. Such objective evidence is useful for reporting purposes and is the basis for the development of a discipline into a science. ASOBAC has indicated that auditing parallels scientific evidence gathering in many ways.

Although a consensus may eventually develop concerning use of a Bayesian philosophy in auditing, there will remain several contentious issues to deal with. As Leslie (1984)

has pointed out, the real risk is a function of the Bayesian model use. Bayesian models can differ according to the number of possible states that are represented, the likelihood functions that are used, and the type of assessments auditors must make in their priors. There is no unique Bayesian model of auditing and therefore there is no unique "real" risk. Real risk is a function of each individual auditor's judgement and his philosophy concerning modeling.

A general characteristic of Bayesian models is that they require auditors to, in the words of Scott, (1983; p. 26) be "pushed back to more 'primitive' levels. The more primitive the level, we suggest, the more insightfully and consistently the judgement can be applied, since more primitive judgements may receive more thoughtful auditor consideration, possibly at a firm wide level". Thus an advantage of Bayesian methods is that they impose a certain discipline on auditors; they may force auditors to explicitly consider factors that they otherwise may ignore. Certainly, this is a major point made by Leslie (1984), concerning the need for auditor assessments of IR.

However, there is probably a limit to which such modelling can be successfully done. For example some firms argue, as discussed earlier, that IR already represents such a limit. At the other extreme Bayesian models exist which split up IR into at least two distributions, one on the error rate of dollar units, and one on the average tainting of dollar units. (e.g.

see Cox and Snell (1979). More refined models split up taintings into groups (100% taintings and all others) and/or model other aspects of the distribution of taintings. At some point, at some primitive level, it appears that the modelling will have to stop simply because auditors may no longer be able to reasonably assess priors for the various factors. Thus the question of the "right" Bayesian audit model can only be answered with additional research and practical experimentation on the usefulness of the models.

It may turn out that a consensus will develop and that OR or a more complete Bayesian model will marshal enough support within the profession to replace UR and JR in auditing standards. However, I strongly feel that UR should not be dropped unless such a replacement risk model is identified and adopted. The reason for this is mainly political.

Although there may be many valid criticisms of the UR risk model, I feel that having such a model in auditing standards is better than having no model. Because of the widely publicized limitations of UR, it may be useful to review the advantages of such a model. First, the model is simple and has some intuitive appeal. As pointed out earlier, even its "quanto" critics have found certain aspects useful, or useful under certain conditions. Thus use of the model with a proper understanding and training still can bring advantages to auditors. I have personally found the model useful for illustrating the general relationships of

various audit procedures in the classroom.

Second, one can view the controversy surrounding UR as an advantage. SAS No. 39 has had a dramatic impact on the thinking of at least several large auditing firms. I would venture to guess that SAS No. 39 has had more impact on audit practice and auditing theory than any other single standard. There has been a major reassessment of what auditing is about as a result of SAS No. 39 and this can only be viewed as a positive development.

Finally, I would caution all "quanto" critics of SAS No. 39 who feel it is a "retrogressive" step that there is a very large segment of the profession, the "judgos", which wants to leave auditing more rather than less unspecified. For those who feel that at least some risk models are "advances in theory and practice" the political danger of dropping UR without a replacement is that the "judgos" hand may be strengthened to the point where no further progress on risk models would be possible. Moreover, there is the danger that by dropping UR without a replacement, many practitioners may take it as a signal that they should be less concerned about audit risk issues. I don't see how such a development could be considered "progress" in the auditing profession.

FOOTNOTES

1. The presumption in this definition is that if the audit procedures signal a false alarm, i.e., the auditor incorrectly concludes there is a material error, then the auditor will increase his work to the point of realizing that there is no material error.
2. With non-sampling errors, the maximum risk may really be that planned with full reliance on other audit procedures, but this is the topic of another paper.
3. Holstrum and Kirtland (1982; pp. 279-280).

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**THE BEHAVIOUR AND DISCLOSURE OF
DEFERRED INCOME TAXES IN A
RECESSIONARY ENVIRONMENT**

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The Behaviour and Disclosure of Deferred Income Taxes in a Recessionary Environment

INTRODUCTION

The 1982 recession created an economic environment which, it has been suggested, could result in an increase in the quantity and amount of deferred tax drawdowns. Furthermore, previous empirical studies have tended not to focus on drawdowns resulting from the reduction of losses as permitted under paragraph 3470.48 of the CICA Handbook (see Appendix A). The economic conditions of 1982 provided a unique opportunity to examine the behaviour and disclosure of deferred taxes in a severe recession, a period during which both of these events occurred.

In spite of considerable rhetoric and many theoretical and empirical studies, the problem of accounting for income taxes remains an issue of interest and dispute, in particular, the problem of whether financial statements should be prepared using comprehensive tax allocation, partial tax allocation or the flow through method. For examples of recent literature addressing the subject, one need only read some recent issues of two professionally oriented journals: the CA Magazine and the Journal of Accountancy (Note 1).

The Accounting Standards Committee (AcSC) of the Canadian Institute of Chartered Accountants (CICA) is currently studying the issue of accounting for corporate income taxes with the intent of reviewing current financial accounting standards in this area. In this regard, it commissioned a Research Study by Thomas H. Beechy entitled "Accounting for Corporate Income Taxes: Conceptual Considerations and Empirical Analysis". After an extensive review of the literature, theoretical analysis, and an empirical study, Beechy

The authors appreciate the comments of two anonymous reviewers, Ross Archibald and others. The responsibility for any weakness or shortcomings is ours alone.

concluded that the current disclosure standards should be changed. Basically, he recommended a reduction in the number of items for which tax allocation would be applied and an increase in disclosure (Note 2). A study of this area is also being undertaken in the United States by the Financial Accounting Standards Board (Note 3).

The empirical data on the 36 companies used by Beechy covered the 13 year period up to and including 1980, just prior to the onset of the 1981-82 recession. It was in this context that he made the following statement:

"It might be argued that extension of this study for a few more years may reveal a greater incidence of drawdowns due to the severity of the current slowdown." (Beechy, 1983, p. 112).

He went on to say:

"The evidence suggests that many companies will experience losses, and that the losses will be reduced by writing off CCA [Capital Cost Allowance] tax deferrals, with no need to pay taxes thereon. While some companies may welcome the opportunity to use deferred taxes to reduce accounting losses, it is difficult to justify this result of full allocation as an accurate portrayal of the economic impact of taxes on the corporation." (Beechy, 1983, p. 122).

We directed our research to addressing two questions related to these statements.

1. Was the incidence and size of the drawdowns greater than that reported in previous studies?
2. Were the drawdowns the result of inadequate availability of CCA or the result of applying Section 3470.48?

The first question addresses an issue of interest to those opposed to full tax allocation who have pointed to prior empirical studies that have indicated a relatively infrequent number of drawdowns and an even smaller dollar amount of these drawdowns to support their position. However, it has been suggested that economic conditions might well be an intervening variable. It has been assumed by some

that there is a greater possibility of a drawdown of the deferred tax credit where a constant level of investment is not maintained (Davidson, 1958; Livingstone, 1967, 1967b, 1969). These authors also infer drawdowns are due to reversals not losses. A recessionary economy could be expected to cause such an interruption in a policy of investing in depreciable assets.

Exhibit 1 shows three economic indicators for 1981, 1982, and half of 1983. These indicators clearly portray the severity of the 1981-82 recession. The six successive quarters of negative change in real GNP and the negative change in non-residential fixed investment in 1982 would appear to set the stage for the predicted drawdowns in the deferred tax credit balance.

INSERT EXHIBIT 1

There are two situations which the CICA Handbook indicates can lead to a drawdown. The first such situation is the reversal of timing differences in the normal course. For example, if inadequate CCA is available to offset the depreciation expense added back to taxable income. The second situation allowed by section 3470.48, is the reduction of losses by drawing down deferred tax credits. This second means of reducing deferred tax credits has rarely been the focus of empirical research. Past empirical research has not clearly and completely established the cause of the drawdowns they observed. Beechy (1983) came the closest but, due to the timing of publication, he was unable to investigate deferred tax behaviour during a severe recession.

Proponents for and against full tax allocation should be prepared to test their assumptions against this data.

SAMPLE SELECTION

The sample used in this study was selected as part of a previous study (Lanfranconi and Robertson 1983). The sample was selected so that those companies which had a broad investor base and a significant impact on the economy were included. To ensure that the companies

had a significant economic impact, we selected our final sample of 34 companies by first randomly choosing 73 companies from the top 400 Canadian companies listed in the July, 1982, issue of Canadian Business. Crown corporations, banks, insurance companies and other financial institutions were listed separately by the magazine, allowing them to be conveniently excluded. This exclusion was appropriate as "the Recommendations [of the CICA] do not necessarily apply to the special problems of banks and insurance companies" (CICA Handbook, p. 9).

Companies were ranked by Canadian Business on the basis of revenues shown in their most recent annual report. Typically this ranking was based on a company's 1981 fiscal year, but in some cases 1982 financial data was used when the company had a January year-end. For some Canadian private corporations, where sales figures were unavailable, earlier data was used and a few very secretive companies were not ranked.

When a company was first selected, a check was made to see if, according to Canadian Business, one shareholder owned 100 percent of the common stock outstanding. Consistent with our aim of selecting companies with a broad investor interest, the 34 companies that had a single, voting shareholder were eliminated. Our previous study required a comparison of financial statement data between 1976 and 1981. Therefore, two corporations which were formed after December, 1976, were excluded from the sample. Furthermore, a check was made to see which of the remaining 37 companies were listed on the TSE at December 31, 1981, by reference to the Review, published by the TSE. This resulted in the elimination of three additional companies, which were not listed on the TSE or any Canadian public stock exchange. Exhibit 2 reconciles the original sample of 73 companies to the final sample size of 34 companies (Appendix B), and gives reasons for the eliminations.

INSERT EXHIBIT 2

ANALYSIS

Exhibit 3 contains statistics which describe the income statement effects of deferred tax on our sample of companies for 1982, 1981, and 1980 (Note 4). We also included the data from two recent studies for comparative purposes.

INSERT EXHIBIT 3

The Drummond and Wigle and the Beechy columns in Exhibit 3 are both for 1980, and therefore, comparable to our 1980 column. The Drummond and Wigle sample consisted of 70 of the largest public companies in Canada whose financial statements were available for the years 1970, 1975, and 1980 (Drummond and Wigle, 1981, p. 59). The Beechy sample consisted of 36 companies that were also not chosen randomly, as those chosen agreed to provide details related to transactions in their deferred tax accounts (Beechy, 1983, pp. 74-75). The accumulated deferred tax balance, as a percent of shareholders' equity and total assets, is somewhat higher in our sample than in either of the other studies.

There was an increase in both the number and size of drawdowns from 1980 to 1981. However, the change was small in comparison to the increases that occurred between 1981 and 1982. The number of drawdowns increased from 8 to 18 and the average amount from \$10,138,000 to \$18,378,000. During this same period, the number of buildups decreased from 28 to 16 while the average of the buildups remained relatively constant, \$26,459,000 in 1981 and \$26,405,000 in 1982.

Therefore, we observed behaviour in the deferred tax account consistent with that predicted in a period of economic recession. But the question still remained as to the factors that led to the drawdowns.

The main objective of our investigation of the 18 drawdowns was to determine if they resulted from involuntary reversals (e.g. CCA/ depreciation) or, were the result of current accounting losses. This

second use of deferred taxes can occur when a company is recognizing the tax benefits of losses, as is recommended in paragraph 3470.48 of the CICA Handbook. In the first instance, an involuntary reversal, the total tax expense per the income statement is lower than the amount actually payable for the year. This first case has a current economic impact and is the main scenario used by some to describe the need to create the deferred tax account. In the second situation, the company is recognizing that there will be no need for the drawn down portion of the deferred tax account because it can offset the tax impact of not claiming CCA with loss carry-forwards. If the increase in drawdowns is attributable to this second cause, the increase in the drawdowns which we observed would not be viewed by those who advance the indefinite reversal argument as evidence against their position.

The 18 drawdowns that occurred in 1982 (Exhibit 5) ranged in amounts from \$1.2 million to \$93.5 million. This was a substantial increase over prior years in number and amount, representing on average 54% of net income or loss after tax and 164% of income or loss before tax. It could be expected that a significant number of these drawdowns would qualify as material amounts. The increased number and size of these drawdowns led us to investigate whether there was disclosure as to the causes. We found no special attempt to explain these events. There was very little disclosure aimed at helping the users to determine if the drawdown resulted in an outflow of the firms resources. With the continued use of the standard 'accounting policies' note,

"the company follows the tax allocation method of accounting. The deferrals arise substantially from the company claiming capital cost allowance and deferred expenses for income tax purposes in excess of depreciation and amortization charged to consolidated income."

One would expect that the reversal would result in the payment of taxes in excess of the current income tax expense. Eleven of the 18 drawdown companies made this statement somewhere in their financial statements (see Exhibit 4). Whether this was, or was not, the economic event that was primarily occurring was certainly not clearly disclosed, at least in our sample of companies.

After reviewing the financial statements of the drawdown companies, we concluded that it was not always possible to specify the cause of the drawdowns. For this reason, we will provide the reader with the data that we believe to be relevant, while acknowledging that additional investigation is required to specify the underlying factors.

INSERT EXHIBITS 4 AND 5

Exhibits 4 and 5 show that seven of the 18 drawdown companies incurred a current tax expense for 1982. If these companies consisted of only one legal entity, operating in only one tax jurisdiction, we could reasonably conclude that they did indeed have a reversal as envisioned by traditional deferred tax accounting. Unfortunately, we cannot make this statement because we used publicly available consolidated financial statements and did not contact the companies directly. We also note from these exhibits that 14 of the drawdown companies incurred a loss before provision for income taxes and extraordinary items. Of these 14 companies, three had a current tax expense and 11 had a current tax recovery or zero current tax expense.

In four of the five companies that disclosed the make-up of their deferred tax drawdowns, a portion of the drawdown was the result of recognizing the tax benefit of the loss. In one of these four cases, the company took more CCA than depreciation. In the three other cases, the company recorded less CCA than depreciation, and therefore the tax loss was reduced. There are at least three reasons why this occurred. The reversal could have been caused by an insufficient balance in the CCA pools. A second related possibility was the federal government's decision, in their November 1981 budget, to limit CCA in the year of acquisition to half that normally allowed. The third possibility is that the company could have decided not to take the maximum allowable CCA deduction. In the fifth case, company 13, the drawdown relates to inventories and thus appears to be an involuntary reversal.

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Analysis of the remaining 13 companies is difficult as they did not make any disclosure of the reasons for their drawdown in deferred tax. Exhibit 5 provides the reader with some data which may permit speculation as to possible causes of the drawdowns. Our best guess, based on our examination of the data, is that in the 11 companies having a recovery of current taxes (see Exhibit 4), at least a portion of their drawdown was based on the recognition of losses. In the case of three companies that had a current tax expense while incurring a loss on their financial statements, we suspect that at least part of the drawdown was related to their loss. In the four remaining companies that had current tax expense and a profit while having a drawdown, it is much more difficult to speculate as to the factors that led to the drawdowns. From the disclosure made by Company 13 (Exhibit 5), we know that at least one of these four companies did not recognize any losses. In the case of Company 1, we know that \$9,608,000 of the \$20,948,000 drawdown relates to non-current items and we therefore suspect that the current portion of the drawdown relates to involuntary reversals. As for the non-current portion, we can only point out that the company acquired a greater dollar amount of fixed assets than they recorded in depreciation (Exhibit 5) and had done so in the prior two years at a minimum; therefore, it did not appear that they were running out of adequate CCA to offset recorded depreciation. We thus suspect that this drawdown was caused by some factor other than a CCA/depreciation reversal. A similar comment can be made for the two other companies (numbers 14 and 18).

The above analysis has focused on net reductions in deferred income tax as disclosed on the income statement. An additional point of interest is the case of one company in our sample that had a build-up in deferred tax. Although the amount was large (\$26,269,000), the notes to the financial statements indicated that a \$150,733,000 netting had occurred in their deferred tax expense for the current year in order to recognize business losses recoverable. For this reason, it may be possible that more losses were recognized by drawing down deferred taxes than is apparent by simply looking at the number of companies experiencing a net drawdown on their income statement.

ANALYSIS OF DISCLOSURE

Although we used only publicly available financial statements, we were able to judge the adequacy of current disclosure at least for the purposes of our attempted analysis.

Our interest in the adequacy of disclosure in Canada is consistent with a similar concern regarding deferred tax disclosure in the U.S. Professor Schwartz (1983) attempted to reconcile and understand the 1979 deferred tax balances and the changes of 200 of the Fortune 500 companies. He concluded that current disclosure falls far short of meeting the FASB's stated primary objectives of financial disclosure (p. 251). In his recommendations he went on to say that "...a clear and complete explanation of the accounting for deferred taxes seems warranted" (p. 252).

Reconciliation of 1982 Changes In Deferred Tax Accounts

We first attempted to analyze the financial statements in order to reconcile the changes in the deferred tax accounts. Using the income statement, the statement of changes in financial position and the notes to the financial statements, we were unable to reconcile the 1981-82 change in the deferred tax balance account for 13 of our 34 sample companies. In seven of the companies, the unreconciled difference was small and could be explained by the existence of an undisclosed current deferred tax account. However, in the six remaining companies there were significant differences for which we could find little reason. Therefore, in 18 to 38 percent of the companies in our sample, a financial statement user would have to go beyond the statements to reconcile these accounts. However, in this procedure we were not trying to determine the causes for the changes, but wished merely to reconcile the amounts.

Disclosure by the Drawdown Companies

Exhibit 6 summarizes the disclosure related to taxes made by our 18 drawdown companies. Of particular interest to this study are items B and C.

INSERT EXHIBIT 6

Five of our subgroup of 18 companies provided a breakdown of the components of the deferred tax drawdown. For example, one of our sample companies indicated that they decreased the deferred tax account as a result of CCA being less than depreciation as well as reducing it by recognizing the tax benefits of a loss. However, they did not indicate whether the amount of CCA claimed was restricted by the balance of undepreciated capital cost or was a management decision. Therefore, although we might know the amounts of the drawdowns we do not know the reasons for them.

Part C in Exhibit 6 addresses the issue of loss carry-forwards. We had intended to determine the extent to which the drawdowns were the result of recognizing the tax benefits of losses. Part C in Exhibit 6 indicates that in four cases the company disclosed only the amount of their losses or investment tax credit carry-forward that had not been recognized in the financial statements. In two cases, the amount still available for tax purposes was disclosed. In one case, both the amount not yet recognized and the amount not realized was disclosed. In the last three, we were not certain whether the amount disclosed was the unrecognized portion of the loss carry-forward or the portion that is unrealized. This data did not appreciably aid us in our attempt to determine the reasons for the drawdowns.

SUMMARY CONCLUSIONS AND RECOMMENDATIONS

The data does not permit a resolution of the debate over whether the current use of deferred taxes justifies a requirement for tax allocation. Our data indicates that the problem is much more complex, requiring a different type of approach. The following summarizes our findings:

1. Professor Beechy's expectations as to the increasing incidence of deferred tax drawdowns during the 1982 recession were confirmed. The number of drawdowns increased substantially and the average amount approximately doubled over the prior year. Fifty-three

percent of our sample had drawdowns with an average amount of \$18,378,000.

2. Although our data does not permit us to specify the reasons for all drawdowns, there is considerable evidence that a substantial part was due to a recognition of the income tax benefits of losses rather than the reversal of timing differences.
3. Current disclosure does not permit the user of financial statements to clearly interpret the underlying economic event. For example, is the drawdown an indication of a cash outflow?

Therefore, we recommend that to fully understand the impact of tax allocation accounting further research should be undertaken. This would require obtaining directly from companies data which would include the entries or transactions that gave rise to the changes to deferred tax accounts. One objective of such a study would be to clearly identify those changes in the deferred tax accounts which are the result of involuntary timing reversals and those changes which result from other factors. With this data, we would be able to evaluate whether the measurement and disclosure of these other factors are consistent with our current accounting model. Secondly, with no, partial, or full allocation what disclosure, if any, is necessary for users to understand the underlying events.

EXHIBIT 1
ECONOMIC AND FINANCIAL
INDICATORS¹

QUARTER	1981				YEAR 1981	1982				YEAR 1982	1983	
	1	2	3	4		1	2	3	4		1	2
% CHANGE GNE/GNP (CONSTANT PRICES)	8.1	4.4	-2.7	-3.3	3.4	-8.4	-5.6	-3.1	-2.8	-4.4	7.6	7.5
% CHANGE NON RESIDENTIAL FIXED INVESTMENT	33.9	25.7	2.5	21.6	20.2	-8.8	-15.3	-27.1	4.3	-3.6	-10.4	1.6
% CHANGE CORPORATE PROFITS BEFORE TAX	-6.5	-12.4	-44.6	-40.1	-11.4	-62.3	-22.2	-5.5	75.3	-36.1	132.3	46.1

¹Bank of Canada Review, September 1983, all on a seasonally adjusted basis,
the % change is what the annual rate would be if these level of changes
occurred over the total year.

EXHIBIT 2

RECONCILIATION OF SAMPLE SELECTED

Firms originally selected at random	73
Firms not listed on the TSE	<u>36</u>
	37
Firms formed after December, 1976	2
Firms subject to U.S. accounting rules	<u>1</u>
Final sample	<u><u>34</u></u>

EXHIBIT 3
CHANGES IN DEFERRED TAX ACCOUNTS

1980, 1981 & 1982

	<u>LANFRANCONI & ROBERTSON</u>		<u>DRUMMOND & WIGLE¹</u>		<u>BEECHY²</u>
	<u>1982</u>	<u>1981</u>	<u>1980</u>	<u>1980</u>	<u>1980</u>
Sample Size	34	34	34	70	36
<u>Deferred Taxes as a Percent of Shareholder's Equity</u>	22.23 (37.14)*	28.84 (20.68)*	28.66 (21.07)*	23.46	19.6%
<u>Deferred Taxes as a Percent of Total Assets</u>	8.42 (6.30)*	9.25 (5.87)*	9.57 (5.43)*	9.31	8.6
<u>Drawdowns</u>					
Number	18	6	3		4
Total Amount (000's)	330,814	60,828	11,412		
Average	18,378	10,138	3,804		
<u>Build-ups</u>					
Number	16**	28	31		32
Total Amount (000's)	422,478	740,862	709,187		
Average	26,405	26,459	22,877		
<u>Build-ups Drawdowns</u>					
Number	.89	4.67	10.33		
Total Amount	1.35	12.18	62.14		
Average	1.52	2.61	6.01		

¹Christina Drummond & Seymour L. Wigle, "Let's Stop Taking Comprehensive Tax Allocation for Granted", C.A. Magazine, October 1981, pg. 56 - 61.

²Thomas A. Beechy, Accounting for Corporate Income Taxes: Conceptual Considerations and Empirical Analysis, C.I.C.A., Toronto, 1983.

* - Standard Deviation

** - Includes a '0'

EXHIBIT 4

SAMPLE COMPANIES HAVING A DRAWDOWN

		Current Income Tax	
		Expense	Recovery
Level of Statement Income*	Profit	4	0
	Loss	3	11**

*Statement income was defined as income before tax and extraordinary items. It would likely differ from accounting income which is used to determine total tax expense for accounting purposes because of the existence of permanent differences.

**One company had zero provision for current tax expense.

EXHIBIT 5
SELECTIVE FINANCIAL STATEMENT DATA
DRAWDOWN COMPANIES
(,000 OMITTED)

COMPANY	1982				FIXED ASSET (4) 1982	ADDITIONS (4) 1981
	(1) DEFERRED TAX DRAWDOWN	(1) CURRENT TAX PAYABLE (RECOVERY)	(2) PROFIT (Loss)	(3) DEPRECIATION		
1 - AHCA INTERNATIONAL LIMITED	\$(20,948)	\$ 16,598	\$ 43,733	\$ 25,530	\$ 29,858	\$ 51,000
2* - CANADA CEMENT LAFARGE LTD.	(14,401)	(6,353)	(32,798)	67,097	48,849	52,185
3 - CANRON INC.	(8,800)	(5,500)	(30,500)	6,500	5,500	14,200
4 - DAON DEVELOPMENT CORPORATION	(42,000)	(2,000)	(129,500)	7,400	379,900	702,500
5 - DRUMMOND MCCALL INC.	(2,760)	(492)	(13,900)	2,610	3,203	3,680
6 - FRASER INC.	(3,746)	(847)	(9,354)	21,718	114,157	73,513
7* - HUDSON BAY MINING & SMELTING CO. LTD.	(23,470)	2,900	(84,767)	24,192	43,285	80,310
8 - INTERMETCO LIMITED	(1,190)	433	(2,909)	1,779	1,403	4,211
9* - MACMILLAN BLOEDEL LTD.	(93,500)	(1,800)	(188,600)	82,200	206,800	307,900
10 - REICHOLD LIMITED	(4,923)	115	(9,157)	5,277	4,689	8,091
11 - SLATER STEEL INDUSTRIES LTD.	(1,678)	(2,110)	(65)	5,287	5,019	7,809
12 - STELCO INC.	(50,349)	(14,493)	(105,657)	101,037	154,107	212,300
13* - TEXACO CANADA LTD.	(2,000)	391,000	664,000	72,000	141,000	160,000
14 - TRIMAC LIMITED	(12,351)	6,630	9,195	42,331	102,691	120,382
15* - TURBO RESOURCES LTD.	(6,518)	(662)	(123,398)	50,371	195,209	326,199
16 - UNION CARBIDE CANADA LTD.	(22,313)	0	(40,220)	36,964	67,609	74,100
17 - WELWOOD OF CANADA LTD.	(16,677)	(813)	(33,409)	18,031	3,169	18,960
18 - WOODWARD STORES LIMITED	(3,190)	2,168	7,414	12,581	40,353	65,496
AVERAGE:	\$(18,378)	\$ 21,376	\$(4,438)	\$32,384	\$85,933	\$126,824

- (1) FROM COMPANIES INCOME STATEMENT OR STATEMENT OF CHANGES IN FINANCIAL POSITION.
 (2) PROFIT OR LOSS BEFORE INCOME TAX AND EXTRAORDINARY ITEMS.
 (3) FROM INCOME STATEMENT OR STATEMENT OF CHANGES IN FINANCIAL POSITION (INCLUDES DEPRECIATION, DEPLETION AND AMORTIZATION).
 (4) FROM COMPANIES STATEMENT OF CHANGES IN FINANCIAL POSITION.

EXHIBIT 6
SELECTED FINANCIAL DISCLOSURE
FOR THE 18 SAMPLE COMPANIES
HAVING A DRAWDOWN IN 1982

- A. 11 of 18 companies provided a note indicating that tax allocation had been followed.
- B. 5 of 18 companies provided a breakdown of the components making up their deferred tax drawdown.
- C. 10 of 18 companies provided some data on carry forwards of operating losses and investment tax credits.
 - 4 of 10 disclosed only the amount that had not been recognized.
 - 2 of 10 disclosed only the amount that existed for income tax purposes.
 - 1 of 10 disclosed both the amount that had not been recognized and the amount that exists for income tax purposes.
 - 2 of 10 it was not clear which figure they disclosed.
 - 1 of 10 only indicated that it existed.

NOTES

Note 1: In October, 1981, the CA Magazine published an article by Drummond and Wigle entitled "LET'S STOP TAKING COMPREHENSIVE TAX ALLOCATIONS FOR GRANTED". In their article, they were quite critical of comprehensive allocation and argued for a re-examination of the current situation. Shortly thereafter their article resulted in a significant number of letters both for and against their position. In a subsequent article entitled, "COMPREHENSIVE TAX ALLOCATION: LET'S STOP TAKING SOME MISCONCEPTIONS FOR GRANTED", Alex Milburn (1982) took a contrary position which did not go unnoticed in the letters to the editor column. In the February, 1983, issue of the Journal of Accountancy, Rosenfield and Dent, in an article whose title is self explanatory, "NO MORE DEFERRED TAXES", argued against tax allocation. The letters to the editor section of the September issue of the journal was full of "Congratulations..." and "We were shocked...".

The January issue of the Journal of Accountancy carried an article by Beresford, Best and Lawrence, entitled, "Accounting for Income Taxes: Change is Coming". There was also another article in the March, 1984, issue of the CA Magazine written by Baines, Dieter and Stewart, entitled, "Tax Allocation Revisited."

Note 2: It is interesting to note in light of our experiences that Beechy recommended "substantial supplemental disclosure". These include "all material timing differences" and "all material permanent differences" as well as anticipated changes in these differences. (Beechy, 1983).

Note 3: As of the time of writing this paper the FASB had issued a Discussion Memorandum, An Analysis of Issues Related to Accounting for income Taxes (August, 1983) and a Research Report, Accounting for Income Taxes: A Review of Alternatives (July, 1983).

Note 4: The existence of a drawdown or a buildup was determined by examining the companies' income statement or statement of changes in

NOTES (cont'd.)

financial position. Because Section 1580.48 of the CICA Handbook permits deferred taxes of a purchased subsidiary to be added to the deferred tax of the parent company, it was deemed inappropriate to use the balance sheet approach to determine buildups or drawdowns. Our inability to reconcile the change in the balance sheet accounts for deferred taxes in several cases provides additional justification for our choice.

APPENDIX A

Mechanics of Recognizing Accounting Losses by Drawing Down Deferred Income Taxes

Under paragraph 3470.48 of the CICA Handbook, a company not meeting the virtual certainty tests of paragraph 3470.43 should recognize at least a portion of the tax benefit of a non-capital loss carry-forward by drawing down existing deferred tax credits.

"In situations where conditions relating to virtual certainty of realization are not otherwise present, the unrecorded tax benefit of the loss carry-forward should be recognized to the extent of any reductions in accumulated deferred income tax credits available in the carry-forward period by claiming less capital cost allowances than depreciation recorded or by making other adjustments of a similar effect. The amount of the reductions recognized in the period in which the loss occurs should be reflected in the income statement before "income before extraordinary items" or, if it relates to an extraordinary item, as a deduction therefrom. It should be reflected in the balance sheet as a reduction of accumulated deferred income tax credits." (par. 3470.48)

Paragraph 3470.46 appears to allow this treatment even in situations where virtual certainty is considered to exist.

The following example will be used to illustrate how this can occur. Exhibit 1, shows a company that had income of \$10,000 in 19A and a loss of \$25,000 in 19B. Permanent differences are not considered to simplify discussion. It is assumed that the company recorded \$4,000 of depreciation in both years and will continue to do so in the future. In 19A the company took the maximum CCA possible of \$7,500, but choose not to take any CCA in 19B, although it could have recorded up to \$6,000. At the beginning of 19A the balance in the accumulated deferred tax account was \$17,000 and represented \$41,000 of accumulated timing differences.

EXHIBIT 1
Drawdown Due to Loss

	19A	19B
Accounting income (loss)	\$10,000	(\$25,000)
Depreciation	4,000	4,000
Capital cost allowance	<u>(7,500)</u>	<u>0</u>
Taxable income	<u>\$ 6,500</u>	<u>(\$21,000)</u>
Taxes payable (40%)	<u>\$ 2,600</u>	<u>\$ 0</u>

Accumulated Deferred Taxes		
*Beginning of year	\$17,000	\$18,400
Addition (reduction) for year	<u>1,400</u>	<u>(7,650)</u>
End of year	<u>\$18,400</u>	<u>\$10,750</u>

*represents \$41,000 of accumulated timing differences caused by CCA/depreciation differences. The average rate of accumulation is 41.46% (17,000 - 41,000) at the beginning of 19A and 41.35% (18,400 - 44,500) at the end of 19A.

Income Statement

	19A	19B
Income (loss) before tax	<u>\$10,000</u>	<u>(\$25,000)</u>
Taxes		
Current provision (recovery)	2,600	(2,600)
Deferred	<u>1,400</u>	<u>(7,650)**</u>
	<u>4,000</u>	<u>(10,250)</u>
Net income (loss)	<u>\$ 6,000</u>	<u>(\$14,750)</u>

** Represents the drawdown in deferred tax to reflect the \$4,000 excess of depreciation over capital cost allowance and recognition of the tax loss carry-forward. See Exhibit 4 for computations.

The year 19A portrays a straight forward build-up in deferred taxes. The company recorded \$3,500 more CCA than depreciation and, assuming a 40% tax rate, it would record a \$1,400 provision for deferred taxes. In 19B, the \$25,000 accounting loss is reduced to \$21,000 for tax purposes when depreciation is added back. Exhibit 2, indicates how this loss may be recognized even though the full tax benefit of the loss is not yet realized. First, the company must carry the loss back one year; thus, \$6,500 of the loss is carried back resulting in a tax refund of \$2,600. The \$4,000 of depreciation in excess of CCA recorded in 19B is recognized by drawing down deferred taxes by \$1,654. The remaining loss is available for application against future years income.

The company is allowed under paragraph 3470.48 to recognize the tax benefit of the carry-forward by drawing down its deferred tax by the lessor of:

EXHIBIT 2
Recognition of Accounting Loss

(\$25,000)		
Loss Carry-back		Loss Carry-forward
\$ 6,500		
x 40%		
<u>\$ 2,600</u>		
	\$ 4,000	\$14,500
	x 41.35%	x 41.35%
	<u>\$ 1,654</u>	<u>\$ 5,996</u>

-
- (1) The balance in the deferred tax account (\$18,400 - 1,654 = \$16,746).
 - (2) The amount of the timing differences that could be reversed in the loss carry-forward period times the average rate of accumulation (\$4,000 x 5 x 41.35% = \$8,270).
 - (3) The amount of the loss carry-forward times the average rate of accumulation (\$14,500 x 41.35% = \$5,996).

In this example the company should draw down its deferred tax by \$5,996 to reflect the benefit of the loss carry-forward. Thus, in 19B, the company would recognize the full tax benefit of its loss and report a net loss of \$15,750. The only disclosure that would be required under current Handbook provisions is an explanation of why the company's effective tax rate of 41% differs from the assumed statutory tax rate of 40%. Because the full tax benefit of the loss has been recognized in the financial statements the firm is not required to disclose the \$14,500 of loss carry-forward that has not yet been realized.

APPENDIX BFIRMS INCLUDED IN THE SAMPLERANK(s)

341	ALGOMA CENTRAL RAILWAY
38	AMCA INTERNATIONAL LIMITED
192	BRALORNE RESOURCES LIMITED
202	CAMPEAU CORPORATION
81	CANADA CEMENT LAFARGE LTD.
1	CANADIAN PACIFIC LIMITED
126	CANRON INC.
178	CARLING O'KEEFE LIMITED
256	CONSUMERS GLASS COMPANY LIMITED
109	DAON DEVELOPMENT CORPORATION
226	DRUMMOND MCCALL INC.
294	FEDERAL INDUSTRIES LTD.
394	FOODEX INC.
155	FRASER INC.
156	HUDSON BAY MINING AND SMELTING CO., LIMITED
333	INTERMETCO LIMITED
9	LOBLAW COMPANIES LIMITED
32	MACMILLAN BLOEDEL LIMITED
273	MARITIME TELEGRAPH AND TELEPHONE COMPANY, LIMITED
357	MURPHY OIL COMPANY LTD.
89	NORCEN ENERGY RESOURCES LIMITED
114	PANCANADIAN PETROLEUM LIMITED
170	REICHOLD LIMITED
10	SHELL CANADA LIMITED
309	SLATER STEEL INDUSTRIES LIMITED
152	SOBEYS STORES LIMITED
35	STELCO INC.
12	TEXACO CANADA INC.
148	TRIMAC LIMITED
124	TURBO RESOURCES LIMITED
87	UNION CARBIDE CANADA LIMITED
76	UNION GAS LIMITED
140	WELWOOD OF CANADA LIMITED
70	WOODWARD STORE LIMITED

(a) rank according to CANADIAN BUSINESS, July, 1982.

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Economic Analysis of Audit Contracts

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Abstract

This paper presents some insights into the type of incentive contracts that investors would strike with auditors of firms. First we show that in any firm, where production decisions are delegated to managers, and investors cannot observe the productive acts, investors demand accounting information. Then we show that if this information is supplied by a third party such as an auditor, a complex organizational structure arises amongst investor, manager and auditor. We show that if this structure has a unique equilibrium, then part of the auditor's compensation depends on a due care standard established by regulatory bodies. In the event that the game has multiple equilibria, there would often arise a demand for auditor judgment.

May, 1984

Economic Analysis of Audit Contracts

by Amin H. Amershi

1. Introduction. If one strips away the institutional impositions on the audit function and auditor's report, then purely economic reasons for the existence of audits remain.

Audits are performance information mechanisms not under the control of the evaluated entity providing verified performance information to interested third parties. Though brief, the description delineates the essential purpose of audits. Further, within this conceptualization we can fit both internal and external auditing.

Observe that our definition of audit information has implicit in it a presumed demand for such information. This point is of fundamental importance in an economic study of auditing. Without demand, economics is meaningless. Thus, an economic analysis of audit contracts must proceed as follows:

(1) First, it must be shown that the demand for audits arises endogenously in productive contractual arrangements without the intervention of regulatory institutions that may mandate audits.

(2) Second, it must be shown that the supply of audit information, provided by a rational auditor subject to shirking, carelessness and so on, is itself marginally more valuable than no audit information.

(3) Third, it must be demonstrated that it is in the self-interest of auditors to provide due care to the audit. We can then explain the characteristics of auditor liability, due care standards, liability insurance, judgment and reputation.

(4) Fourth, the emergence of regulatory institutions affecting the supply, demand and form of audit contracts must be explained in terms of a demand for such institutions.

Consider each of the four steps in turn. Neoclassical economics (see, e.g., Debreu (1959)) considers a firm as an automated machine consuming inputs to produce marketable outputs. Under certainty, an economy characterized by such firms does not require accountability information (in the sense of Ijiri (1983)) but only bookkeeping input/output information. Since no performance information is required, none is supplied and auditing has no value within the neoclassical economic paradigm under certainty.

Now introduce uncertainty. Uncertainty can arise in many ways that we shall elaborate upon further later. For the moment, assume that each firm is owned and operated by a single individual. The suppliers of capital have no uncertainty regarding the inputs supplied by the entrepreneur. There are no taxes. Then in such an economy, there is no demand for performance information or valuation information about the assets. The only demand is for information that reduces the future uncertainty about natural events (such as the weather, new inventions and so forth). Of course these natural events affect the generation of future cash flows by the assets under the control of the owner-manager, and, therefore, affect their valuation. But this natural uncertainty information is clearly in the domain of statisticians and probabilists because it is decision-facilitating information (as Demski and Feltham (1976) called it). Its impact on valuation of assets is somewhat roundabout and the valuation may be provided by other information specialists such as financial analysts who would have a better grasp of asset markets

under risk. We do not normally ascribe such decision-facilitating information function to the auditor, although such use may be incidental to its purpose.

It follows, then, that the demand for audit information must arise from the contractual process itself. That is, when several parties come together to draw up productive contracts, the final disbursement of assets at the termination of the contract must depend on mutually observable ex post information. Again, this demand must arise because all parties to the contracts do not have the same information at all instants in time. Some parties must have different information that they may use to better their position at the expense of the others. That is, there are information asymmetries among the parties that could be potentially detrimental to the welfare of some of the parties to the contract.

To illustrate, suppose a landowner hires a sharecropper to work on a piece of land. Barring the improbable event that the landlord is present on the land every minute, there arises an information asymmetry between landlord and tenant regarding the factor inputs that result in the crop output. Is the poor crop the result of bad weather or shirking? Is the good crop the result of good luck or hard work? This information asymmetry is called moral hazard - the landlord cannot disentangle from the final observable crop output, the part attributable to luck and the part attributable to work.

For another illustration, suppose the entrepreneur claims that he has almost a new machine at his disposal and solicits capital on that claim to continue production. Unless the owners of capital are sure that the entrepreneur's claim is true, there exists an information asymmetry called

adverse selection between the owner of capital and the entrepreneur.

In short, then, whenever there are information asymmetries in a contractual process, a demand for mutually observable, contract facilitating information arises from those parties adversely affected by the asymmetries. This is the genesis of audit information, which falls within the broad range of accountability (or stewardship) information as defined by Patton and Littleton (1949) Ijiri (1983) and others. Observe also that since these information asymmetries exist in almost all contractual arrangements, the demand for accountability information is an endogenous phenomenon, and not primarily the product of institutional intervention. To be sure, the nature of the institutions that enforce the contracts may affect substantially the form of the information, but the information itself is demanded by the contracting parties.

Our study of audit contracts takes off from this premise. Chapter II of the monograph which we shall describe in more detail later, addresses the issue of choice of performance monitor under moral hazard. A demand for performance information is demonstrated in this chapter.

Chapter III introduces a rational auditor as provider of this performance information. By rational we mean that he will evaluate the performance of the manager not necessarily to the extent demanded by the owner, but only to the extent dictated by his self-interest. Put another way, the auditor is not a machine. But now, if we are to make any analytical headway, the situation has to be modelled as a nontrivial three-person decision structure (game) in which the owner writes separate contracts with the manager and auditor and plays off one against the other to better his position. The game model is similar in many respects to Antle's ((1980) (1982) model, but with some major differences. This Chapter is described in

more detail in Section 3 of this paper.

Chapter IV continues the investigations in the game model of auditing developed in Chapter III. We discover that even in a simple one-period setting, if the owner pursues litigation of the auditor, then it appears as if the court sets due care standards to help the owner and auditor structure their litigation and audit strategies with this standard in mind. Also, if the game becomes so complex that no sensible equilibrium emerges, then the auditor cannot determine the manager's and owner's best responses, and this gives rise to auditor judgemental procedures and a demand for them. Section 4 of this paper describes these results.

Chapter V, which is not yet written shall investigate the game model in a multiperiod setting. We believe that the phenomenon of auditor reputation (see Wilson(1982) and the demand for liability insurance can be non-trivially investigated in this setting.

These five chapters shall constitute the monograph. What we shall not be able to pursue here, though ultimately this is of primary importance, is Step (4) listed at the beginning of this section, namely the emergence of institutions and markets. Almost nothing exists in the literature on this topic, except one paper by Scott and Taylor(1983). Further, there is very little, if anything at all, in the literature on information economics that addresses the phenomenon of institutions emerging as a result of demand by the economic agents. We leave this to future work.

The monograph also contains three mathematical appendices that shall help the reader understand the economics of decision-making under

uncertainty (single and multi-person) that is accessed by our study.

2. Value of Accountability Information

In this section we shall describe the intuitive economic content of Chapter II of the monograph. Consider a simple production setting agency in which the capitalist (the principal) lends capital to a manager (the agent) who will take productive actions to produce some output of saleable goods. Assume that the net asset market value of the firm at time 0 is x_0 and at time 1 is x . Also assume that the firm liquidates at the end of one period.¹ Now if the owner can observe the productive actions, then he can price out each productive act at the margin and pay the agent for the productive act. The simplest situation occurs when the principal is risk-neutral. In this case the principal will pay a fixed salary $C(a)$ to the agent for each action a the agent takes. For example, imagine $A = \{0 \text{ hours}, 5 \text{ hours}, 8 \text{ hours}\} = \{a_1, a_2, a_3\}$. Let the possible outputs be $x_1 = \$0$, $x_2 = \$1000$ and $x_3 = \$2000$. If the agent puts in 5 hours of effort, then the principal promises a wage, say, $C(a_2) = \$100$ and keeps the residuals, $x_1 - \$100$, $x_2 - \$100$ or $x_3 - \$100$, whichever x occurs.²

But now suppose that the principal cannot observe the actions a ; he can only observe the output x . In this case, what would happen if he were to pay the agent \$100 assuming that the agent will be nice enough to put in the 5 hours?

-
1. Actually, this is not necessary. All we have to assume is that the principal may pay the agent long before he knows the actual net worth of the firm.
 2. We are assuming that the output is risky. Otherwise there is no problem and any demand for accountability disappears.

If the hours of effort cause pain to the agent and each output (\$0, \$1000, \$2000) is possible under any of the actions, if the principal has a contractual agreement to pay \$100 no matter what happens, then clearly it is in the agent's self-interest to put in 0 hours of effort. Of course, 0 hours of effort may cause net worth to be $x_1 = 0$ more often than 5 hours of effort. But when the principal observes $x_1 = 0$, he cannot determine whether the 0 output was due to bad luck and 5 hours of effort or just bad effort. In short, a fixed wage provides no incentives to the agent to put in anything more than the minimal effort when he can hide behind the output. This well-known phenomenon is called moral hazard. The modern literature on agency (see Baiman(1982) for an excellent survey) has investigated this phenomenon and its effect on contractual forms in some depth.

Therefore, we conclude that when moral hazard is present, it is silly for the principal to absorb all the risk and provide riskless compensation to the agent. By imposing some of the risk in the output on the agent, it may be possible to induce more effort on the part of the agent (and this is exactly what the literature finds - see Holmstrom (1979)).

If we denote the compensation to the agent contingent on x , as $Z(x)$, then the principal's residual now becomes $x - Z(x)$. The important point to observe here is that the principal has to utilize the expost information x non-trivially in the scheme $Z(x)$.

In general, incentive and risk-sharing contracts in agencies will depend on the expost information available to the principal. Suppose now that the net asset figure x is composed of y_1 , the value of saleable goods, and y_2 , the value of the used capital asset (machine). Now the question arises

as to whether the optimal contract based on x or y_1 alone, or y_1, y_2 as a vector would produce the better contract from the principal's perspective. For example, suppose the principal observes $x_2 = \$2000$, $y_1 = \$1800$ and $y_2 = \$200$. If the expected value of y_2 is say \$800, then on observing $y_2 = \$200$, the principal may conclude that the goods output of $y_1 = \$1800$ was pure luck or overuse of capital and still penalize the agent for bad effort at maintenance.

We now enter the heart of accountability and the design of performance monitors for better accountability. The question posed is that when the principal has access to multiple expost signals as above, which aggregation would act as the best performance monitor?

In Chapter II we pose this question to discuss some aspects of historical cost versus exit value accounting statements. Go back to the example above. Clearly, if $x = y_1 + y_2$, and y_2 is the market value of the asset at time 1, then ignoring time value of money for the moment, $x - x_0 =$ exit value income number. If the standard straight line depreciation of the capital asset was, say, d , then the number

$$I = y_1 - y_{01} - d$$

called the historical cost income (if y_{01} - value of non-capital assets put into production) is also a performance monitor. Then the historical cost - exit value debate can be recast into the agency framework in terms of whether contracts $Z(x)$ based x or $Z(I)$ based on I are superior. Observe that we have different aggregations of y_1, y_2 in x and I .

In Chapter II we find that we cannot say categorically that exit value is better than historical cost under all circumstances. It depends, as Demski(1994) points out, on the marginal informativeness of one given the

other. Amershi(1984)and Holmstrom(1979)have shown that marginal informativeness is crucially dependent on the sufficiency of x or I in statistical terms.

In the context of the historical cost and exit value performance, the implication is that, at least in a one period setting, one cannot categorically say one is better than the other in all settings.

3. Model of an Auditor Providing Accountability Information

In Chapter III, we enlarge the model by introducing a rational economic agent rather than a machine who provides corroborative accountability information. This person is termed the auditor. The organizational structure is now a non-trivial three-person game.

Briefly, the model consists of a principal (owner) who lends capital to a productive employee called the agent (manager). The principal cannot observe the agent's effort, and, as in Chapter II he relies on mutually verifiable information to write the contracts. However, a significant difference now is that the ex post information reaching the owner from the manager is under the control of the manager and subject to distortion by him. The principal knows that he cannot rely on the information provided by the manager because the manager, if moral hazard obtains, would only report the most favourable signal in the context of his compensation contract. This implies that the manager could at most receive a fixed wage (see Ng and Stoeckenius (1979) But a fixed wage contract is useless in reducing moral hazard as shown in the literature (see Baiman (1982)). It follows that the owner must access other sources of information to verify the manager's communications. Enter the auditor who supplies an alternative report to the owner to supplement the manager's report. The owner takes these two reports and uses them to compensate the manager and auditor. But, the auditor herself

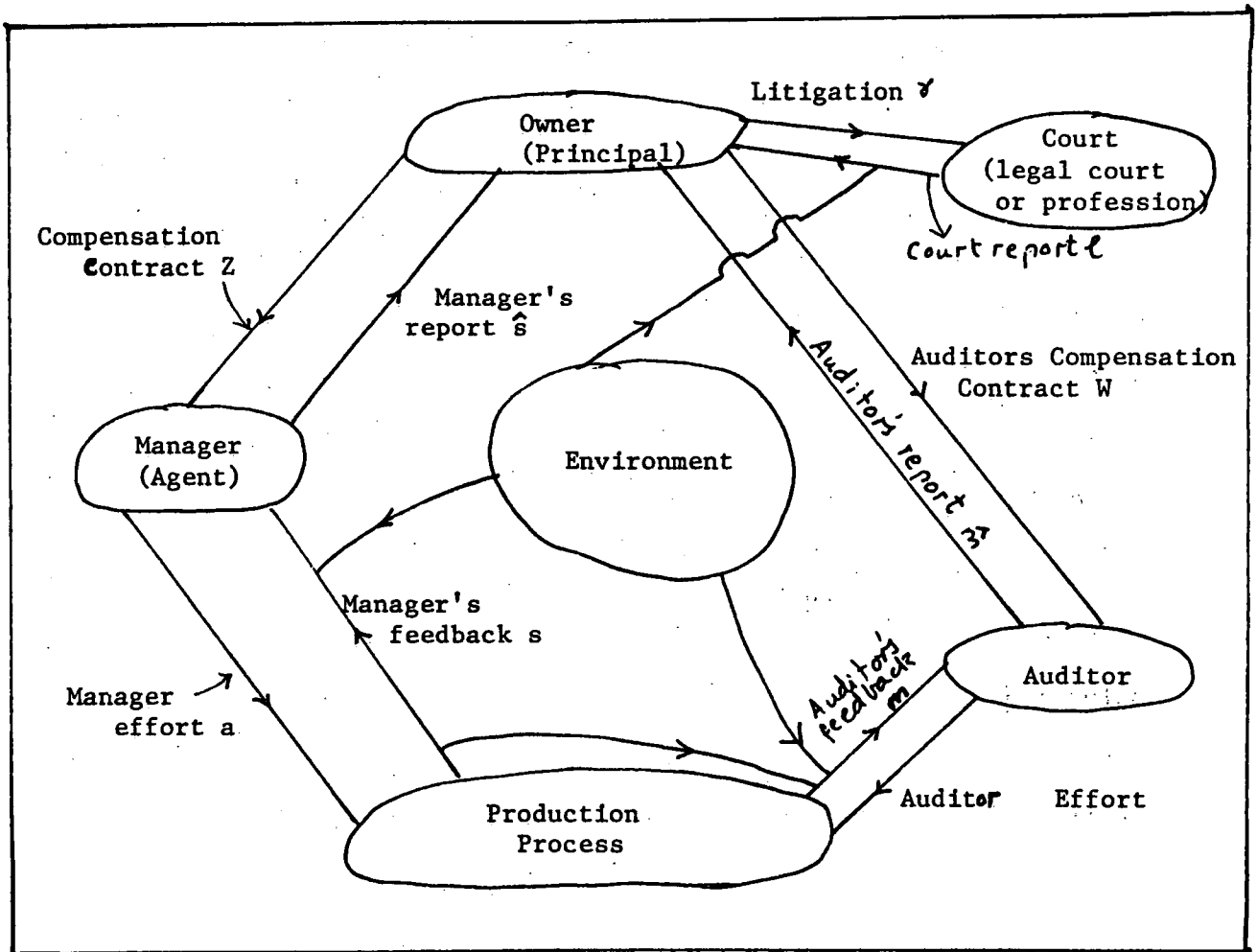


Figure 1

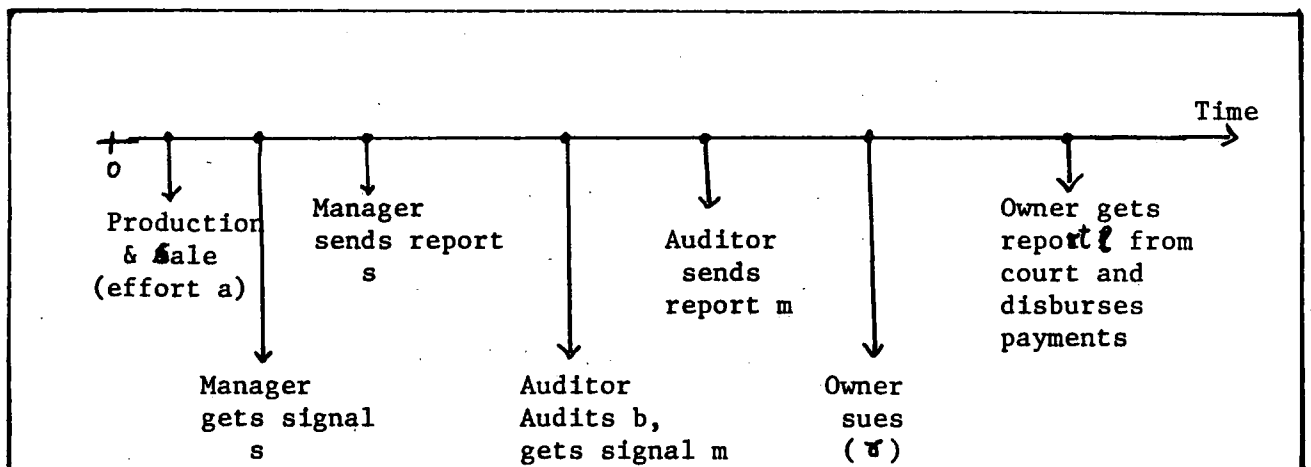


Figure 2

is averse to effort and so a moral hazard problem concerning the auditor's audit effort arises.

The principal realizes this and plays off the manager against the auditor. For additional incentives against auditor shirking, the owner can institute "litigation" against the auditor. The word "litigation" here is used in a broad sense to include both an actual legal suit and a review process. Thus the word "court" should also be broadly interpreted to include the profession.

We now develop the structure of the owner-manager-auditor agency that lasts for a single period. Figure 1 illustrates the resource and information inputs and outputs in the agency and Figure 2 provides the time diagram of the events as they occur in the agency. Our development closely parallels, that of Antle (1980) with some important differences.

By casting this general game model as a mathematical optimization problem using a result from game theory called Myerson's (1979) Revelation Principle, we derive some of the insights on due care standards in Chapter IV. The other insights on auditor judgement are derived from the general game model.

Finally, one point³ needs some clarification. Observe that the model has an auditor and a "court" where the owner "sues" the auditor. One can argue that the owner can "sue" the manager directly and thus obviate the need for an auditor. This argument is incorrect as we shall now show.

3. This issue was raised during the presentation of this paper in Guelph at the CAAA conference.

First, the argument interprets the words "court" and "litigation" literally, and hence narrowly. As mentioned before, these stand for a third party independent of both manager and auditor that reviews the facts of the situation. Hence it includes also a professional peer review process, which, of course, wipes out any management litigation.

Second, the court review is not infallible. Thus, if the owner were to sue the manager directly, the court would have to first appoint an auditor from its own staff to check out the facts. This is because at the time of suit, the court has no more information than the owner. It is this point that is crucial. Clearly, whether the first audit is court conducted or privately conducted, the auditor is still subject to shirking and carelessness. Therefore, to reduce this, the court will need a supervisory report on its own auditor.

It is now clear that whether the owner sues the manager directly or not, an initial audit will have to be made. Therefore, one can expand the legal system into a massive bureaucracy that includes auditors on its staff, or delegate auditing to private firms who would then be sued if the need arises. Since we do observe private auditing in capitalistic economies, it means that both economic common sense and market forces (such as decreasing returns to scale) have dictated that the court be only the arbitrator of last resort, and leave the initial audit as a marketed good.

4. Insights from the Model in Chapter III.

Chapter III developed a game-theoretic model that reasonably represents the observed economic characteristics of audit engagements. However, it is a single-period model in that the economic phenomena arising out repeated engagements with the same client or multiple clients cannot be

captured. Thus the emergence of the reputation of an audit firm and the rents derived thereof cannot be analysed endogenously within the model of Chapter III. These extended and complex models we shall leave to Chapter V. Very little of both the underlying theory of multiperiod games and its relevance to audit contracts is available (see Dattar's (1984) recent thesis, however). Yet these issues are of primary importance to a proper understanding of the manner in which different auditors differentiate their products in the market place.

Nevertheless, even in the limited one period setting we are able to derive several insights into the nature of audit contracts using the game form of Chapter III.

The insights we derive explain:

- (a) the incentive effects of the auditors legal liability;
- (b) the existence of a "due care" standard enforcement by a court or peer review process; and
- (c) the demand for auditor judgemental techniques.

We show that in the general setting of the organization developed in Chapter III, in order to induce truth telling by the manager and auditor, it is necessary to have some payments contingent on signals not under the control of the agent concerned. Since the litigation process produces a signal that is correlated with the activity of both manager and auditor and yet not under their control, the owner may be able to provide fixed fee (or wage) payments prior to litigation and contingent payments after litigation to produce both truth-inducing and incentive effects. This indicates that the fixed fee contracts observed may be really part of a more complete contingent contract.

If the principal is risk-neutral and the auditor (or manager) has constant absolute risk-aversion the owner makes full use of the signal

produced by litigation to reward or penalize the auditor. Indeed, we derive the actual form of the post litigation reward function and show that it is a log function of the litigation signal, divided by the auditor's aversion to risk. If we assume that the litigation produces higher signals for higher levels of audit care, then a log function clearly implies the possibility of a "due care" standard dictating the signals produced by the court. Thus, it appears that the litigation process does enforce a due care standard endogenously.

In Section 4 of Chapter IV we show that the owner-manager-auditor game can become so complex, that the problem of multiple Nash equilibria forces the game to become logically unsolvable. That is, a priori, the owner, manager or auditor cannot expect that any particular Nash equilibrium will prevail endogenously (in the sense developed in Amershi (1983)). It follows that each player in trying to manipulate the others to his advantage forces an infinite logical cycling, and so no rational strategy is apparent. This forces the auditor to use judgement to decide what steps he ought to take in the particular situation. But judgement is a task-oriented skill and this implies that auditors may derive rents more from experience rather than logical skills. Thus the progress towards senior partnerships in audit firms may be slow, which is what we observe. Similarly, there will be a market for purchase and exchange of judgemental techniques. Demand for certification by other experienced auditors would arise by owners who are faced with an adverse selection problem. Professional bodies to exchange ideas and enforce certification would also arise.

Observe that we have made no behavioural assumption (see Libby that the auditor has bounded rationality of any sort. In our setting, judgement arises endogenously to compensate for logical indeterminacy of the game form. To this extent, then, the results are robust to increases in computational power and analytical ability. That is, no amount of increase in computational power would solve the game, and judgement is a permanent rather than a temporary phenomenon.

5. Conclusion

Although we have generated the general game model for the owner-manager-auditor agency, different variations of this model can be used to study different aspects of the auditor-client-manager relationships in the economy. Essentially four major variations of this theme can be studied:

(a) A partial equilibrium model of a simple audited agency of one principal, one manager and one auditor which lasts for only one production-sales cycle. (This is what we have described and studied in Chapters II to IV.)

(b) A partial equilibrium model of a simple audited agency of one principal, one manager and one auditor which lasts for several periods. (This shall be analysed in Chapter V of the monograph.

(c) A general equilibrium model of several audited production agencies of one manager, several owners (owning a portfolio of securities of different firms) and several auditors (who audit several different firms) with the whole economy lasting for a single period.

(d) A general equilibrium model similar to that in (c) but with the economy lasting multiple periods.

To date, the only variation that has received research attention is (a) in a thesis by Antle(1980) and our work here. Currently some work is in progress on (b) (see Datar (1984)) but almost no work has been done in (c) and (d) (see, however, Scott and Taylor 1983 for a first attempt at (c)).

Variation (a), as Antle(1980) and we have shown, affords the researcher insights into the nature of such concepts as due care standards, auditor independence and legal liability and how these are included in the audit contracts. Variation (b) should afford some insight into the formation of auditor reputation and rents derived thereof, as well as the tradeoff between loss of reputation and increased management consultancy services. Models of the (c) and (d) type would explain the emergence of social institutions regulating audit contracts, and whether economies of scale leads to a decrease in competition in the audit industry and emergence of dominant audit firms.

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**CORPORATE ACCOUNTING FOR PENSION
COSTS AND LIABILITIES: SOME
KEY ISSUES FOR RESOLUTION**

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The Working Paper series is intended as a means whereby a faculty researcher may communicate his thoughts and findings to interested readers for their comments. The paper should be considered preliminary in nature and may require substantial revision.

Corporate Accounting for Pension Costs and Liabilities:

Some Key Issues for Resolution

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ABSTRACT

Corporate accounting for pension costs and liabilities has surfaced as a highly controversial financial reporting topic. Satisfactory resolution of the multitude of accounting standard setting problems will require numerous decisions on many key issues, some of which are currently unfamiliar to large groups of accountants and other interested parties.

The main goal of the presentation and the attendant document is to foster informed discussion, as a route to developing better methods of reporting pension costs and liabilities. In the paper, the author identifies what he regards as a group of the key and in some cases the most controversial issues under discussion.

At the outset three fundamental issues are identified as vital to understanding the economic realities of the pensions. They are:

1. The role of the actuary and the role of the accountant;
2. The deferred wage concept;
3. The going concern assumption.

Subsequently four crucial areas of controversy are specified as:

1. The proper target for accounting allocations;
2. The nature of actuarial obligations and accounting liabilities;
3. The legitimacy of salary projection;
4. The underlying characteristics of accrued benefit versus level contribution actuarial valuation methods.

The author analyzes the fundamental issues and key areas of controversy presenting his personal conclusions in an effort to aid the process of enhancing accounting standards for the financial reporting of pension costs and liabilities.

CORPORATE ACCOUNTING FOR PENSION COSTS AND LIABILITIES:
SOME KEY ISSUES FOR RESOLUTION

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In the more distant future, the decade of the '80's may be recalled as the ten year battle over how corporations should account for their pension costs and liabilities. For a number of years, various accounting bodies have been wrestling with the highly complex problem of developing pronouncements on how companies should account for and disclose the events reflecting their pension costs and liabilities. A clear turning point in the United States was the issuance, in 1980, of FASB Statement #36 Disclosure of Pension Information [FASB, 1980]. The debate became more intense with the issuance of FASB Discussion Memorandum Employers' Accounting for Pensions [FASB, 1981] and the momentum was substantially augmented with the publication of, "Preliminary Views" [on] Employers' Accounting for Pensions and Other Postemployment Benefits. [FASB, 1982].

In Canada, we too have been wrestling with the same problem. The Accounting Research Committee (recently renamed The Accounting Standards Committee), Canada's counterpart of the FASB, has been heavily engaged in the problem since the late '70's. Two research documents were published in 1980, Pension Accounting by Ross Skinner [Skinner, 1980] and the Canadian Institute of Chartered Accountants (CICA) sponsored study Accounting for Pension Costs and Liabilities by me. [Archibald, 1980]

A quick perusal of the recent journal writings and responses to the FASB Discussion Memorandum and "Preliminary Views" testifies to the fact that considerable controversy abounds. Because I have developed some strong opinions during the research lying behind my own study of the topic, I am quite anxious to see certain certain key

issues fully aired and discussed. I believe that a clear understanding of these issues is crucial to eventual resolution.

KEY AREAS OF CONTROVERSY AND FUNDAMENTAL ISSUES

Key Areas of Controversy

Obviously, there are a multitude of problems and issues that require resolution. However, I have identified four areas that in my mind are crucial. They are:

1. The proper target for accounting allocations;
2. The nature of actuarial obligations and accounting liabilities;
3. The legitimacy of salary projection;
4. The underlying characteristics of accrued benefit versus level contribution actuarial valuation methods.

Before one is able to attack the key controversial areas, it is necessary to put to rest or at the very least, consider, three fundamental issues:

1. The role of the actuary and the role of the accountant
2. The deferred wage concept
3. The going concern assumption

Personal Conclusions

Before proceeding with this analysis, in deference to full disclosure, it makes sense to state my personal conclusions up front in order to alert readers to my personal biases. The conclusions relevant to this article are as follows:

1. All actuarial funding methods are not necessarily compatible with the accountant's income determination task.
2. Economically, pensions are best viewed as a deferred wage.
3. Going concern values, not wind-up values, are relevant to pension accounting.
4. The proper target for accounting cost allocations is the total benefit earned by the employee.
5. Unfunded past service obligations qualify as true accounting liabilities.

6. Salary projections are necessary to properly measure the period expense and liability.
7. The actuarial funding method most compatible with the existing accounting model is an accrued benefit method with salary projection (preferably ABVM/K\$B).
8. Level contribution methods (LCVM), perhaps more commonly termed, projected benefit methods, are generally incompatible with conventional accounting characteristics.

Fundamental Issues

Over the recent months I have reviewed a number of documents that are in serious conflict with the conclusions stated above. Furthermore, I recognize the fragility of the support I am able to mount behind some of my conclusions. Nevertheless, I believe it is important to state and support my biases as best I can, with the main goals of fostering informed discussions and developing better methods of reporting accounting costs and liabilities.

Different Tasks - Actuaries and Accountants

In order to obtain advice regarding the funding payments required to support the promised pensions, a plan sponsor is required to retain an actuary. In carrying out his role, the actuary assembles and analyzes employee and other data, performs appropriate calculations and reports on the assets and obligations and the future contributions necessary to fund the pension plan promises. This is an exceedingly complex task and the actuarial quantities developed in the actuarial valuation reports are most certainly highly credible numbers developed by members of deservedly respected profession.

Accountants are quite familiar with the term "different costs for different purposes". This phrase brings to mind the unfortunate reality that it is a rare number, created for one purpose, that can be turned around and used, with no adjustment whatsoever, for another purpose. The veracity of this truism is well illustrated with the actuary's funding numbers, because the differences amongst actuarial methods and attendant underlying assumptions can result in substantially different actuarial quantities in identical economic circumstances.

The accountant's primary task is generally regarded as income measurement, but concomitant with income measurement is the determination of balance sheet quantities. The development of these data constitutes an entirely different task than the funding advice role played by the actuary. It should come as no surprise to accountants that the number developed for funding purposes is not necessarily compatible with their own accounting goals.

Deferred Wage Concept

The FASB Discussion Memorandum [FASB, 1981] introduced some questions about the validity of the deferred wage concept. The essence of this concept is that the employee is willing to trade his services for two compensation factors, one which he receives in his periodic paycheque and the other which he receives after retirement [see also de Roode, 1913]. Most pension contracts, both written and implicit, are related to the service life of the employee. It would not seem to be too much of a stretch of the imagination to conclude that an employee regards the pension as part of his total earnings for services rendered, albeit, the later amount is not received until after some designated retirement date.

We have long since passed the time when a pension was a gratuitous gift by some grateful monarch, lord-of-the-manor or, for that matter, employer. In a contemporary economic sense it is rather difficult to imagine the managers of a corporation bestowing pensions unless they believed was there some benefit flowing from it. If the employer or employee regards the pension as anything but part of the bargained wage, I have yet to see any convincing analysis supporting another alternative.

Furthermore, "Preliminary Views..."[FASB, 1982] accepts the description of pensions as a form of deferred compensation. Thus, I will proceed with the deferred wage concept as an analytical model, even though it would not appear to be necessary precept for my following analysis of pension costs and liabilities. In any event, there has been serious economic study completed which should bring a better understanding of this concept. [Pesando and Clarke, 1983]

Going Concern Assumption

Perhaps it is useful to begin this section by commenting that the accounting pronouncements today are required to fit into the existing accounting historical-cost-based model. There have been legions of complaints about the current accounting model. For instance, it does not take into account price level changes or specific value changes. Furthermore, the model "dares" to allocate costs in a variety of manners e.g., over time and over diversified segments. But nevertheless this is the contemporary model and we must live with it (until advised otherwise.)

One of the fundamental precepts in accounting is that we account for going concerns. Thus it came as a great surprise to me that the bulk of the arguments underlying the existing methods of accounting for pensions, and particularly pension obligations, seem to be predicated on wind-up values. [Hicks, 1966] It is vital to recognize that when accounting for pensions or any other event for that matter, the fundamental underlying assumption is that of a going concern. If there is any reason to doubt that the organization under account is not going to continue as a going concern, then obviously other ground rules will take precedence.

With these few comments on some basic but vital issues, it is now time to turn to the key areas over which considerable controversy appears to be developing.

Target for Accounting Allocations - The Pension Benefit

When it comes to determining pension expenses and liabilities, at least two targets for accounting allocations become obvious. First, pension benefits or entitlements may be allocated, with costs becoming the fallout of the benefit allocation. Second, pension costs could be allocated directly. Because the approaches give very different results as is discussed subsequently, the issue of the accounting target must be addressed.

So, what are the quantities that must be accounted for? Alternatively, what is the appropriate target that the accounting numbers should reflect? Some suggest that the most important number to account for is the cost, but quite quickly that statement leads another query, the cost of what? What is the economic item that the employer has promised in the details of the pension plan. A considerable literature review would lead one to the conclusion that what the employer must provide eventually is a benefit to the employee group.

Obviously this benefit is highly uncertain for any single individual but for a large group, the total benefit can be determined with a considerable degree of confidence. Perhaps it is unnecessary to demonstrate that the accounting target is the total benefit due an employee group. The accounting literature does not appear to reveal that there is any other appropriate target.

However, one analogy is that of the fixed asset. When a corporation buys a fixed asset, the major accounting problem is to allocate the total dollar paid for that asset over its useful life. The expensing of the asset gives rise to depreciation. The cost per period, depreciation, is an allocation directly related to the original amount paid for the asset. It does not help to bring to light Art Thomas' dictum that all allocations are incorrigible [Thomas 1969 and 1974]. Everyone now realizes allocations are incorrigible. The unfortunate problem yet remains because the existing accounting model requires allocations; therefore, accountants allocate.

It then follows, that with pensions, the same issues must prevail. The main question comes down to, what is the item for which we are attempting to account? If it is not the total benefit, then what is the target. I conclude that accountants are attempting to allocate the costs of the total amount of the benefit to be paid to the employee, or more properly, the employee group, and allocate the the total amount in some systematic and rational manner to their working careers - the period over which they earned that benefit.

Whether the reader is willing to accept or not accept this conclusion of mine, is not as important as the fact that the issue itself is made explicit. If there is another appropriate target for accounting allocations, it would be highly beneficial to learn about it.

Actuarial Obligations and Accounting Liabilities

Many of my personal conclusions stated at the outset are open to challenge. It is because they have not been adequately supported (but most certainly not refuted) that I wish to bring them into clear view. I believe their resolution will shape accounting standards for pensions in the near and distant future.

Fortunately in the determination of an accounting liability, as opposed to an actuarial obligation, we can bring to bear considerable support. As it now stands, accounting does not generally recognize actuarial liabilities on the balance sheet. The question is, should this be so?

My own personal conclusion, as stated previously, is that the portion of the actuarial obligation which is attributable to employee services rendered to date, and which are not funded, do qualify as accounting obligations or true accounting liabilities.

It would seem that, to a certain extent, accounting has chosen to ignore a liability for pensions because as Harold Langenderfer puts it, they do not know what to do with "the embarrassing debit" [Langenderfer, 1965]. There can be no question that the accounting personality likes to stay in balance and if there is going to be a credit for a pension liability there must be a counter-balancing debit somewhere on the left hand side of the balance sheet (in North America at least). Personally, I do not care what one calls the debit, goodwill, employee loyalty or whatever. The fact remains, if a corporation such as Inco Ltd. improves its pension from \$8 a month per year service to \$10 a month per year service, the inevitable conclusion is that there is an incremental amount that the corporation has committed itself to, now! The fact that the amount will eventually be funded in

the future can hardly over-ride the reality that the Corporation has increased its existing obligations to the employees.

The main arguments against the recognition of a liability for pensions seems to come from actuaries but many accountants argue in a similar fashion. Part of the problem for concerned individuals attempting to understand the conflicting arguments stem from the fact that actuaries are futurists. No actuary (or North American regulatory environment for that matter) will permit a Corporate pension plan to operate on a schedule where the plan will never be funded in the long run. The actuary ensures that eventually, whatever outstanding unfunded obligations currently exist will be eliminated by the funding plan. From the actuaries' viewpoint, the unfunded obligation is a pension fund asset, in essence a long term receivable. Consequently, actuaries do not regard a temporarily unfunded obligation as a true liability. Indeed, this perception is reality from a long run funding point of view.

But here we run into the paradox of the difference between actuaries and accountants. Perhaps an illustration will help. If I correctly interpret an often heard argument, one would conclude about a bond that requires a sinking fund, that no obligation ever need be shown on the balance sheet because eventually, the sinking fund created would extinguish the bonds at the required dates. From an accounting viewpoint, the fact remains that no matter how rapid the cumulation of sinking fund balance, once the contract had been entered into, the outstanding amount would appear on the balance sheet, in full, as a liability. As sinking fund payments were made, these would be adjusted appropriately. However, as long as an obligation existed, the outstanding balance would be reflected fully in the financial statements as a liability.

I have heard some accountants argue, as well, that the pension obligation is merely a contingency because, the firm is free to change the pension obligation at the next contract or alternatively, if the firm goes bankrupt, it will not have to pay all the pensions anyway or

alternatively, if the employee leaves the firm prior to vesting or dies prior to retirement, the fund will not have to pay any benefits [Lorensen and Rosenfield, 1983]. None of these contingency arguments truly bear on the nature of the pension liability. As stated earlier, accounting is predicated on the going concern. Furthermore, in this day and age it is hard to imagine firms reducing, ex post, the pension benefit promises they have made to their employees. In addition, the statistical reality is that the amount of a pension promise, which is highly uncertain for any one particular individual, can be determined with high degrees of confidence for large groups. Actuarial science has been developed to the extent that the actuaries are capable of providing actuarial quantities for large groups of employees that one can view with a great deal of confidence.

It is also important to point out that a definition of unfunded actuarial obligations, based on past services rendered, in no way qualifies under common definitions of executory contracts. In the year 1984, a promise to pay Wayne Gretsky \$2 million for the 1995/96 hockey season, if he plays, is significantly different from the promise to pay Pierre Trudeau an (indexed, yet) pension based on his 16 years of service. A pension obligation is not normally a promise for a promise. Pierre's service has already been rendered and, subject to certain qualifying regulatory requirements, (recognized in the actuarial valuation quantities) specifies a clear employer obligation. Canadians are obligated to pay for the pension promises related to Pierre's years of service.

The Legitimacy of Salary Projection

I believe that in final pay and career average plans, salary projection is necessary to establish the period expense and the accounting liability. After much consideration I have come to the position that in a final or highest pay plan, any interim salary is irrelevant to the eventual pension benefit. Therefore I conclude that the only legitimate target for developing pension quantities is the best estimate of the amount upon which the pension benefit will be based.

When the common, years-of-service allocation basis is used with projection, it is easy to become uncomfortable with the implied result. Certainly, I am somewhat disturbed about the fact that salary projection results in the situation where an employee who moves from office girl to president, her first year of work earns her the office girl salary plus one thirty-fifth of the pension due to a woman retiring as president. Unfortunately, whether that seems logical or not, that is exactly what she eventually received for her first year of service. Fortunately, for accounting logic sake, not all office girls become president.

I am somewhat more comforted by the results of projections when I place myself in the position of a potential buyer of a company which I intend to continue to operate, in large part, because of the valuable employees who have a pension plan based on final salaries. As a buyer, I would be insane to ignore the fact that the true pension liability at time of purchase is based on the future salary, not the current level. Hopefully a rational economic decision maker would take that reality into account.

I have heard serious arguments that no company has an obligation greater than that calculated on the salary to date. Future salary increases are irrelevant to the measurement of today's liability and expense. My own preference is to take the best estimate of the real basis for the eventual benefit, the final salary, and determine expense and liability on that amount.

The best analogy I can create is that of a newly hired school board director of education, 14 years from retirement, who is promised a pension of \$5 a month per years service for each average inch of the graduating grade XIII class in his retirement year. I find it hard to imagine that in calculating the cost of the pension in the kindergarden year, I would measure the average height of the attending children and set aside the amount that would present value to the annuity of the pension that 39 inches would bring. Hopefully I would realize that these children would grow to perhaps 69 inches and that the eventual pension is based on that height, not some irrelevant interim number.

In final pay-type plans, it would seem difficult to ignore the concept of projection for measuring expense and liability.

Accrued Benefit Versus Level Contribution Methods

Level contribution seems to be a better descriptive phrase for what many people term, projected benefit methods, largely because a commonly-used family of accrued benefit methods also projects the final benefit.

Because I am concerned with clarifying confusing terms I should also alert individuals to the potentially misleading dichotomy which describes level contribution methods (LCVM) as the cost approach and accrued benefit methods (ABVM) as the benefit approach. The reality is that both methods distribute benefits and allocate funding contributions (costs). As long as one is fully aware that the word approach means entry point or primary goal, nothing is lost. Accrued benefit methods are designed to distribute benefits over service careers but the method simultaneously allocates contributions (costs) to periods as well. In the same manner, level contribution methods are designed to allocate contributions (costs) to periods but inevitably they must also distribute the benefits over the service career as a natural fall out. [See Archibald, 1980, pp. 73-77]. You just can't have one without the other as a necessary byproduct.

There are two distinguishing characteristics of level contribution methods. First is the focus on the value of the final benefit earned by the employee group. The other universal characteristic is that the method allocates those funding benefits in a formula which spreads the necessary contributions in a level manner, level, either as a percentage of salary or as a constant dollar amount, over the employees' assumed careers. Therein lies the seductive appeal of this method. For some reason, certain people become enamoured of a constant percentage of payroll. The reality is that a constant percentage of payroll or constant dollar amount results in nothing more than another accounting cost allocation.

It is very important to recognize the essential simplicity of LCVM methods. The first task is to project the eventual total benefits. The second task is to select a contribution pattern that is constant, in most instances, constant as a percentage of salary, across an assumed working career. The fallout of the relatively simplistic algorithm leads me to the conclusion that this method is absolutely unacceptable for accounting purposes.

A number of authors have shown the implications of the LCVM family of methods [for example, see Winklevoss, 1977]. There is no need to go into detail here because the facts have been well documented. The essential reality is as follows: level contribution methods, relative to accrued benefit methods, are heavily front end loaded, requiring contributions or funding payments which are translated into accounting expenses that are perhaps more analogous to triple declining balance depreciation as opposed to straightline. Furthermore, the liabilities developed under this method take into account, not only the past services rendered by the employee group, but to a certain extent pensions which will eventually be paid for the future services of that same employee group.

This happens because LCVM methods make no attempt to fund or accrue liabilities for pension entitlements as they are earned. The LCVM methods simply fund a level percentage amount annually, with the result being that contributions paid in the first few years of an employee's career often eventually pay for a large portion of the cost of the employee's pension.

When one thinks about it, LCVM is an extremely simple minded method. The only issues that most common LCVM methods are programmed to accomplish is funding the projected benefit on the basis of a constant contribution. The fact that this can result in funding half of the final pension benefit in the first six years of a 35 year career is a real but not a planned outcome of the method [Archibald, 1980, pp. 65].

Thus, in my opinion, level contribution methods not only throw out ridiculous liabilities, from an accountant's perspective, they call for normal contributions which are converted as accounting expenses that are exceedingly high in the early years of employees' careers.

It is the treatment of the actuarial obligation that for me is the most convincing argument as to why LCVM methods ought not be used for accounting purposes. Pure and simply, they take into account a portion of the value of pensions expected to be paid for future services. We do nothing else in conventional accounting that takes into account expected future services.

Some may level the charge that the projected variations of the accrued benefit method also take into account the future. They do this by projecting salary growth rates in effect before retirement for purposes of estimating the pensions which will eventually be paid for past services. However, I clearly distinguished between looking ahead to the future in order to make an estimate of the total costs for past services from looking ahead to the future to estimate a portion of the costs of the future services. For example, accountants will accrue expenses and the associated liability for a warranty on products sold but they will not account for warranty costs on products as yet unsold, unbuilt or for that matter, still on the drawing board.

Why Constant Dollar Benefit?

My conclusion, that the accrued benefit method which allocates the constant dollar benefit to each year of employee service, rests fundamentally on its simplicity. I understand Arthur Thomas' arguments that all allocations are false and no doubt incorrigible. However, accounting currently requires allocations. Consequently, with his dictum, "If one must allocate, keep it simple" [Thomas, 1975], I find it hard to imagine what method could be simpler than allocating the same amount of benefit to each year of the employee's working career.

Although I settle on an accrued benefit method allocating projected benefits as a constant dollar amount, I also recognize that a number of

informed researchers, in particular Hall and Landsittel [Hall and Landsittel, 1977] favour the allocation on a basis related to salary. Personally, I reject this method for two reasons but I regard the difference as being more a judgement call than anything else.

The first reason may be regarded as slight frivolous but nevertheless I regard it to be true. If the pension is based on the highest or final average pay, as the Financial Executive's Institute surveys show most corporate pensions are, truly, any interim salary is totally irrelevant to the eventual pension benefit. In other words, any pension quantity developed on the basis of an interim salary is essentially developed on an irrelevant number. The question which then comes to my mind is, why base your calculations on a number you know is irrelevant when at least you can target an estimate on the truly relevant number, the final pension benefit, and allocate the resulting amount over the total years the benefit was earned? The fact that the final benefit, as commonly calculated, is nothing more than a cumulative geometric progression of a group of interim salaries, undercuts my argument somewhat. But nevertheless the fact remains that interim salaries are irrelevant to pension benefits under the common final pay plans.

For me, the second argument is more important. Although, accountants have yet to mount sufficient studies to understand the sensitivity of the various actuarial quantities under various assumptions, the main message of the charts developed by Winklevoss [1977] and by Marvin Ens for my study, indicate, that for final pay plans, there is very little difference between an accrued benefit method without projection and the accrued benefit method based on a constant percent of salary. Winklevoss also indicates that the accrued benefit method is very close to plan termination or windup amount and consequently, the constant percent salary method is of the same ilk. Thus, at least as far as the available data go, for accounting purposes, I am hardly more enamoured of the constant percent of salary benefit method than I am of the classic accrued benefit method.

This leads me to my personal conclusion, that the highly simplistic algorithm, that charges to each year the cost of providing the same dollar benefit to each employee, is, at the very least, a logical and pragmatic accounting alternative.

Some critics have suggested that it is not necessary that the pension be linked to years of service, but then, what other measures could one base a pension on. Perhaps some groups could argue for a pension based on corporate profits or a smooth earnings per share or a pension in the nature of a gratuitous payment from a benevolent employer. But even then, I find it difficult to imagine that a diligent accountant would not seek to split up the total benefit on the basis of an amount per year of service for the employee group. Let us face the fact, in many aspects of the craft, accounting is the science of allocation of the unallocatable.

Conclusion

There can be no question that the pension area is fraught with enormous controversy. In this paper, I have attempted to identify a few key issues that I believe are crucial to the resolution of these pension accounting problems. I have also chosen to select areas where I have somewhat firm beliefs. My fervent hope is that other individuals concerned with these same problems will show me the error of my ways, or conceivably generate additional support for my conclusions.

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A SURVEY OF PREFERENCES ABOUT PENSION ACCOUNTING IN CANADA*

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Statement of the problem

The fundamental objective of this study was to obtain the opinions of some knowledgeable Canadians on possible alternative approaches to employers' accounting for pension. A second objective was to determine if the preferences expressed by these knowledgeable Canadians were consistent with those described in the FASB Preliminary Views, Employers' Accounting for Pensions and Other Postemployment Benefits.

Many views exist about the appropriate methods of measurement of the pension liability and the periodic expense. Archibald (1980), Skinner (1980), Mielke (1981), Financial Accounting Standards Board (1981 and 1982), and Pesando and Clarke (1983) have provided a useful analysis of the basic questions which are essential for a solution to the pension accounting problem. Despite this fact, empirical data on preferences for alternate solutions is virtually nonexistent. This study has addressed that issue.

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Methodology

Data for this study were obtained from a questionnaire distributed to a selected sample of the following groups: (1) 200 chief financial officers, (2) 200 partners and managers of national CA firms, (3) 200 financial analysts (CFAs), and (4) 200 accounting faculty members from Canadian universities. A summary of the response rate appears in Table 2.

Unfortunately, the financial analyst group had to be excluded from the analysis. An extremely low response rate on the original study and some follow up investigation resulted in the conclusion that the CFA group was inappropriately identified as knowledgeable on the pension accounting topic.

For the three remaining groups, the specific hypotheses that were investigated are as follows:

- 1) There are no significant differences in the preferences of the knowledgeable groups for alternative answers to some basic questions related to employers' accounting for pension costs and liabilities.
- 2) There are no significant differences between the preferences of the knowledgeable groups and the proposal expressed by the FASB Preliminary Views, Employers' Accounting for Pensions and Other Postemployment Benefits.

The test of the first hypothesis focused on the determination of the preferences of the test groups on the major issues related to employers' accounting for pension costs and liabilities. For each major issue, there were several possible alternatives as outlined in Table 1. The objective was to obtain the relative position or placement of each alternative on a single underlying continuum, judged in terms of preferences. These scale values were determined using the method of paired comparison under the assumptions of a Case V solution. To test the hypothesis, the total number of times each alternative was selected over the other alternatives was determined separately for each of the three test groups. Mean group values (mean preference scores) for each of these totals were computed and examined for statistical difference using the analysis of variance and a multiple-comparison of means test when necessary. A comparison of the results obtained in testing the first hypothesis with the FASB proposed requirements was used to test the second hypothesis.

Hypothesis One: Results

Scale values of each alternative for each major issue are presented numerically and diagrammatically in Tables 3 to 9. A direct comparison of scale values between groups allows certain observations to be made.

Nature of Pension Plan Arrangements

Tests of the hypothesis concerning group preferences for the theories explaining the nature of pension plan arrangements revealed

differences on two of the theories, namely the gratuity theory and cost savings theory. Examination of the relative scale positions of the deferred wages theory (Table 3) shows that there appears to be unequal endorsement of this theory by the groups in relation to the other theories. Such differences may be a function of the evolution of thought about pension accounting.

The deferred wages theory has supplanted the gratuity theory as a modern explanation of the nature of pension plan arrangements. It is thus not surprising to find that the gratuity theory is in second place for both the chartered accountants and financial officers. The second place status accorded to the cost savings theory by the academics may be due to the intrinsic relationship between this theory and the deferred wages theory. In fact, Mielke (1981, p. 105) argues that the cost savings theory is broad enough to include the deferred wages theory as a separate case. This intrinsic relationship renders the appearance of the lesser preference for the cost savings theory by both the chartered accountants and financial officers as inconsistent. This is not necessarily so. In fact, since the cost savings theory is a relatively new concept and thus has not received as much exposure as the other two theories, it seems possible that the lesser preference expressed by both the chartered accountants and financial officers reflects a lower level of knowledge about the cost savings theory.

Pension Liability

Tests of the hypothesis concerning group preferences for the various approaches for determining the amount of pension liability reached the same conclusion; there are no differences in the preferences of the three test groups toward each of the five advocated possibilities.

The rank ordering (see Table 4) of the five alternative methods of determining the liability is different for each group. However, all groups give the highest rank to "the amount attributed to employee service to date". The distance between the most preferred alternative and the second most preferred one is clear and definite for each group.

These preferences expressed for "the amount attributed to employee service to date" rule out all the present dilemma about the unfunded pension liability, since everything will be part of the liability in the balance sheet.

Pension Expense

A direct comparison of scale values between groups (Table 5) shows that there is no consensus among the three test groups toward the three alternatives advocated for determining the amount which should be recognized as periodic pension expense in the employers' income statement. However, these differences are generally not statistically significant. Only group preferences for "the amount of contributions to the plan" differed.

"The amount of contributions to the plan" was the most preferred alternative by financial officers whereas it was the least preferred by both academics and chartered accountants. Compared with the scale positions for the pension liability (Table 4), the preferences of the financial officers appear to be inconsistent. In fact, they prefer "the amount attributed to employee service to date" as the preferable amount expressing the pension liability over "the amount of contributions to the plan". The opposite is held for the preferences about the periodic pension expense. A possible explanation may be that the financial officers are more concerned with the impact of pension accounting on the bottom line figure. Although they recognize the amount attributed to employee service to date as a true liability, they might prefer to consider the amount of contributions to the plan an expense, on the basis of a distinction between the recognition of a debt and its attribution to the income statement. If the amount of contributions to the plan is perceived as lower than the amount attributed to employee service to date, then the former might be preferred due to its lower impact on the income statement. This might be true even if there is no relationship between the contributions to the plan and the recognition of the periodic pension expense.

As to the scale positions of the two other alternatives advocated to determine the periodic pension expense, their positions are closely related. This may be explained by the intrinsic relationship between them. In fact, if the pension liability is based on the amount attributed to employee service to date, then the periodic pension expense will be the same using either the amount attributed to employee service during the period or the amount of increase in the pension liability.

In conclusion, whereas the positions are well-defined about the pension liability, the three test groups are divided about the determination of the periodic expense.

Measurement

The tests of the hypothesis concerning group preferences lead to the conclusion that there are no differences in the preferences of the three test groups toward each of the five attribution approaches.

Based on an examination of the relative scale positions of these approaches (Table 6), the rank ordering of the attribution approaches by both the academics and chartered accountants is the same; whereas the rank ordering by the financial officers differs only for the cost/compensation approach. Nevertheless, all groups place the highest preference on benefit/years-of-service approach. Also, the benefit approaches are rated higher than the cost approaches, except in the case of the financial officers who give the cost/compensation approach as a second choice.

Plan Changes

Only the alternative labelled "immediate recognition of a pension liability with a prior period adjustment" yielded differences. This difference involved the chartered accountants and financial officers. A possible explanation for the difference may be that the chartered accountants were affected by the present CICA Handbook recommendations dealing with prior period adjustments. Because this pension item does not

meet the criteria for a prior period adjustment, the chartered accountants may have rejected it. On the other hand, the financial officers may have considered it to be a prior period adjustment in essence and therefore supported the alternative.

Nevertheless, an examination of the relative scale positions of the four alternatives (Table 7), reinforced by the test of the hypothesis, shows that all groups gave the highest preference to an immediate recognition of a pension liability. Since both the second and fourth possibilities are closely related for the financial officers, it seems that the fourth possibility, labelled "immediate recognition of a pension liability and an intangible asset", reflects a potential consensus among the three test groups.

Actuarial gains and losses

Group preferences regarding the accounting alternatives for actuarial gains and losses differed on two of the four alternatives, namely "no immediate recognition of a pension liability (asset) and expense (revenue)", and "immediate recognition of a pension liability (asset) with a prior period adjustment" which are respectively the first and third alternatives.

The relative scale positions of the third alternative (Table 8) show that the differences are between the preferences of chartered accountants and those of the two other groups. Such differences may be, again, a function of the total rejection by the chartered accountants of the third possibility

due to the present requirements of the CICA Handbook which do not allow a prior period adjustment treatment for actuarial gains and losses.

With respect to the first alternative the difference is between the academics and chartered accountants. A possible explanation can be found in the logical process used by both groups in expressing their preferences. In fact, the chartered accountants seem to have systematically ruled out the third alternative because of its prior period adjustment component. Only after this rejection have they considered the other alternatives. On the other hand, the academics appear to have thought about the merits of a recognition versus non-recognition of a pension liability (asset).

Nevertheless, it is evident that all groups gave their greatest preference to the immediate recognition of a pension liability (asset). Since both the second and fourth possibilities are closely related for the academics, it seems that the fourth possibility, labelled "immediate recognition of a pension liability (asset) and an offsetting debit (credit)", reflects a potential consensus among the three test groups.

Disclosure

Tests of the hypothesis concerning group preferences regarding the possible additional disclosures yielded differences on two of the five proposed disclosures, namely information about funding and information about some ratios.

The relative scale positions of the five possible additional disclosures (Table 9) show an overall closeness in the preferences expressed by the financial officers as opposed to more clear cut preferences expressed by the two other groups. It seems possible that the perceived information content of the five possible additional disclosure was different for the financial officers than for the two other groups. Since the proposed additional disclosures may be part of the annual report and not necessarily part of the financial statements themselves, any generalization about the preferences expressed might be hazardous. Nevertheless, although unanimity was not reached about the most preferred additional disclosures, there is a tendency to prefer three of them, namely actuarial information, information about funding, and information about pension funds.

Hypothesis Two: Results

The preferences of the three test groups are in agreement with the FASB proposed requirements concerning the following three major issues:

1. The deferred wages theory explains the nature of pension plan arrangements.
2. The amount attributed to employee service to date must be used in determining the pension liability.
3. If the pension liability and/or the pension expense is recognized based on employee service, then the benefit/years-of-service approach must be used.

The preferences of the three test groups are not totally in agreement with the FASB proposal on the following three major issues:

1. The amount of increase in the pension liability might be used to determine the periodic pension expense¹.
2. Accounting for plan changes might be based on a recognition of a pension liability and an intangible asset.
3. Actuarial gains and losses might be accounted for by a recognition of pension liability (asset) and an offsetting debit (credit).

Finally, as in with the FASB proposal, the three test groups have expressed concern for additional disclosures about actuarial information, information about funding, and information about the pension fund.

1. In fact, if the pension liability is based on the "amount attributed to employee service to date", in such case the periodic pension expense will be the same using either the "amount attributed to employee service during the period" or "the amount of increase in the pension liability". Since the three groups most preferred the "amount attributed to employee service to date" as the pension liability, a consensus might be reached about the periodic pension expense.

Recommendation

This study has revealed a high level of uniformity within and among each group about the nature of pension plan arrangements, the pension liability, and measurement of pension costs and liabilities. Although the three test groups have expressed different preferences on the other major issues related to accounting for pension costs and liabilities, this study revealed a high level of uniformity within each group in the expression of greatest preferences. Furthermore, the preferences expressed by the three test groups appeared to be generally in agreement with the proposal given by the FASB in November 1982.

Consequently, it appears that if a new Canadian pronouncement about pension accounting would differ from the preferences outlined in this study there would be a high level of criticism. This study provides insights to the views of three groups of knowledgeable Canadian persons. These opinions may not dictate the action to be taken by the Canadian standard-setting body but should be helpful to this body in preparing its presentation and arguments about any new Canadian requirements related to pension accounting.

The opinions expressed by corporate financial officers, chartered accountants, and academics across the country are consistent with the FASB proposal of November 1982. Despite the potential underlying differences in legal and regulatory environment, it is recommended that the Canadian standard-setting body give serious consideration in its deliberations to the FASB proposal.

Qualifications of the Study

The results and conclusions of this study must be interpreted with care. The rate of response is relatively low (under 20%). A major drawback of this study is that the inferences to be drawn must be limited. The results obtained represent only the views of the participants. These are indicative of the views of the sampled populations only to the extent to which the participants are representative of their respective populations.

Also, since the participants were directed to give their preferences on what was the more preferable alternative for dealing with pension accounting, it is not possible to distinguish if their preferences were expressed in terms of what is the more preferable alternative in theory vis-a-vis in practice. Some responses may have been biased in favor of what would serve the interests of the respondent.

Suggestions for Further Research

This study used a conceptual approach to find out the preferences of Canadians related to pension accounting. It would be of interest to use a practical approach for the same purpose. In fact, there is a possibility that a numbered example would express different preferences. Such an approach would have the added advantage of assessing the preferences not only of the three test groups of this study but also of the financial analysts.

Another possibility would be to provide the figures for a number of Canadian firms based on the preferences expressed in this study. This would permit corroboration or rejection of the claims that adoption of new requirements would result in adverse financial implications.

TABLE 1

SUMMARY OF MAJOR ISSUES RELATED TO EMPLOYERS'
ACCOUNTING FOR PENSION COSTS AND LIABILITIES
AND POSSIBILITIES ADVANCED TO DEAL WITH
THESE ISSUES

A. The Nature of Pension Plan Arrangements

- A.1 Gratuity theory
- A.2 Deferred wages theory
- A.3 Cost savings theory

B. The Pension Liability

- B.1 The amount attributed to employee service to date
- B.2 The amount of contributions to the plan
- B.3 Termination liability
- B.4 The amount of vested benefits
- B.5 The amount payable to retirees

C. The Pension Expense

- C.1 The amount of increase in the pension liability
- C.2 The amount attributed to employee service during the period
- C.3 The amount of contributions to the plan

D. The Measurement of Pension Expense and Liability

- D.1 Accumulated benefits approach
- D.2 Benefit/years-of-service approach
- D.3 Benefit/compensation approach
- D.4 Cost/years-of-service approach
- D.5 Cost/compensation approach

TABLE 1 (Cont'd)**E. Plan Changes**

- E.1 No immediate recognition of liability or pension cost
- E.2 Immediate recognition of liability and
 - E.2.1 Recognize expense
 - E.2.2 Prior period adjustment
 - E.2.3 Recognize an intangible asset

F. Actuarial Gains and Losses

- F.1 No immediate recognition of liability or pension cost
- F.2 Immediate recognition of liability and
 - F.2.1 Recognize expense
 - F.2.2 Prior period adjustment
 - F.2.3 Deferred offsetting debit or credit

G. Disclosure

- G.1 Actuarial information
- G.2 Information about funding
- G.3 Information about the pension fund
- G.4 Information about the plan provisions and employees
- G.5 Information about some ratios

TABLE 2

SUMMARY OF THE RESPONSE RATES

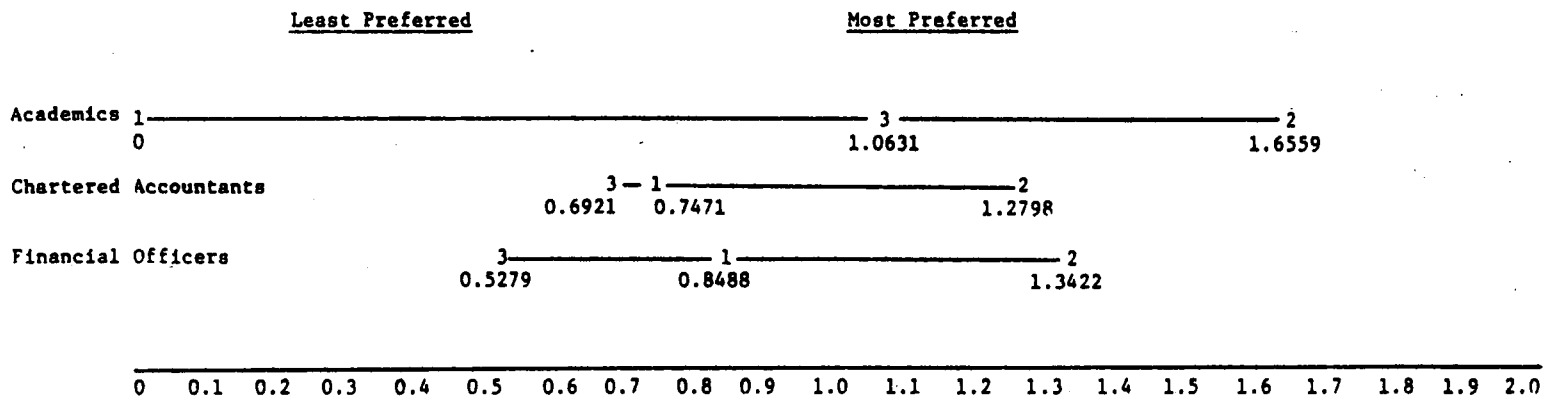
	Academics	Chartered Accountants	Financial Analysts	Financial Officers
Questionnaire mailed	200	200	200	200
Less: returned to sender	<u>2</u>	<u>1</u>	<u>1</u>	<u>5</u>
Adjusted	<u>198</u>	<u>199</u>	<u>199</u>	<u>195</u>
Questionnaire received from	<u>40</u>	<u>35</u>	<u>7</u>	<u>35</u>
Response Rates	<u>20%</u>	<u>18%</u>	<u>4%</u>	<u>18%</u>

To overall response rate excluding the financial analysts is 19%

(Note: The number of responses used for the statistical test will be different from those as summarized in this table. This is due to the fact that some participants have not completed all the sections of the questionnaire. Thus, for statistical test, only the number of useful responses will be computed).

TABLE 3

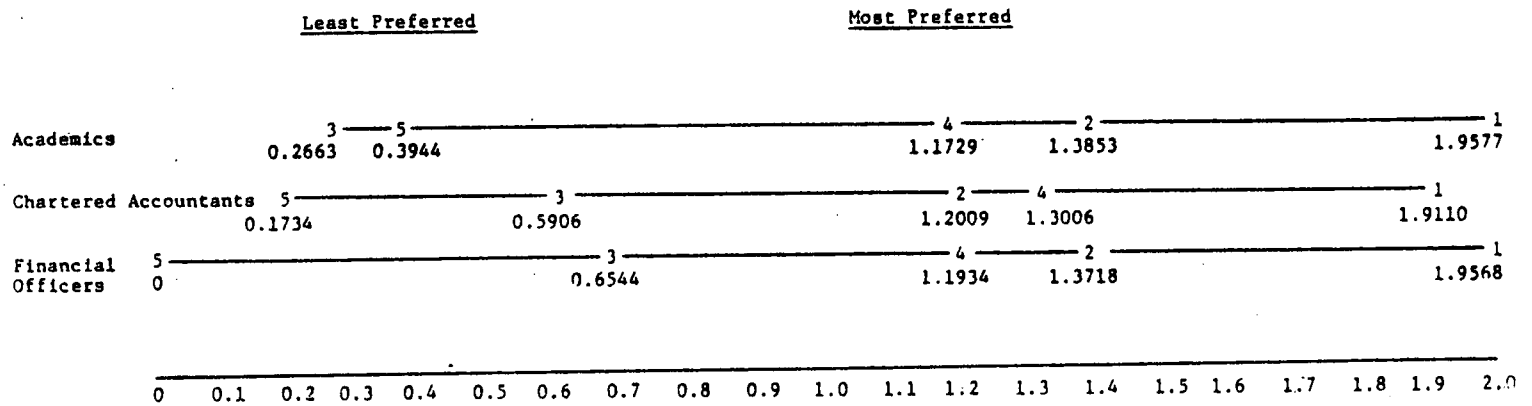
NATURE OF PENSION PLAN ARRANGEMENTS - COMPARATIVE POSITION OF SCALE VALUES



Key: 1- gratuity theory, 2- deferred wages theory, 3- cost savings theory

TABLE 4

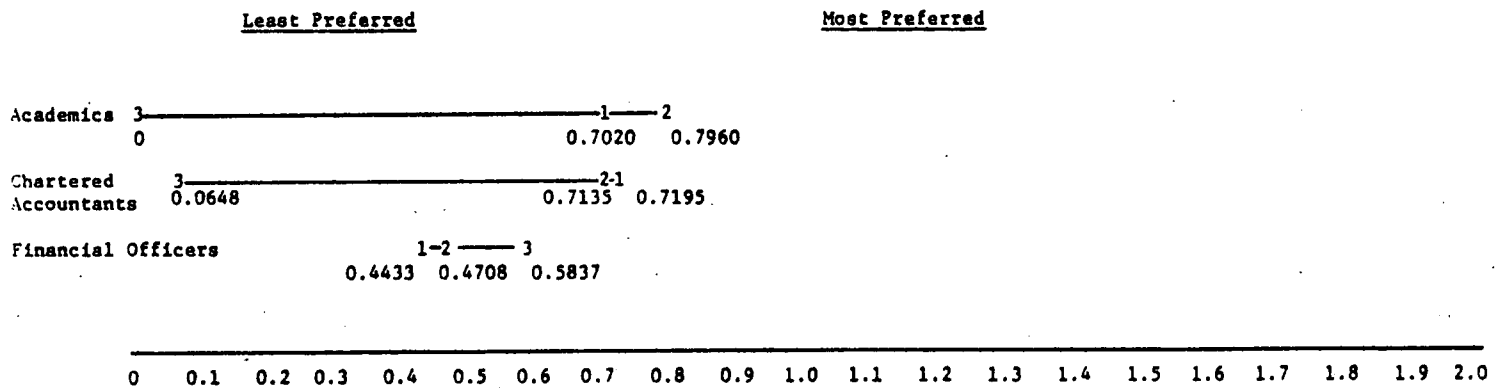
PENSION LIABILITY - COMPARATIVE POSITION OF SCALE VALUES



Key: 1- amount attributed to employee service to date, 2- amount of contributions to the plan, 3- termination liability, 4- amount of vested benefits, 5- amount payable to retirees

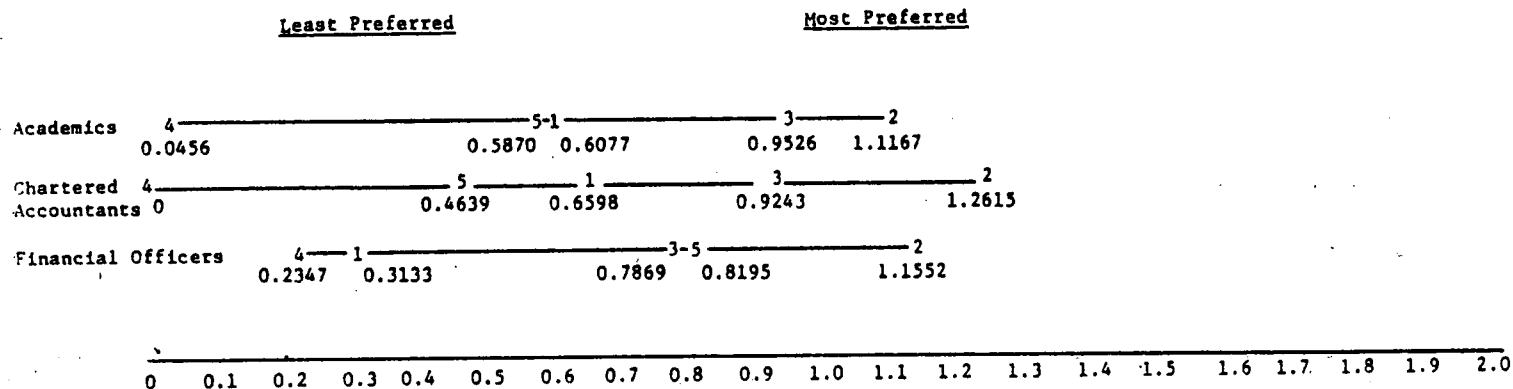
TABLE 5

PENSION EXPENSE - COMPARATIVE POSITION OF SCALE VALUES



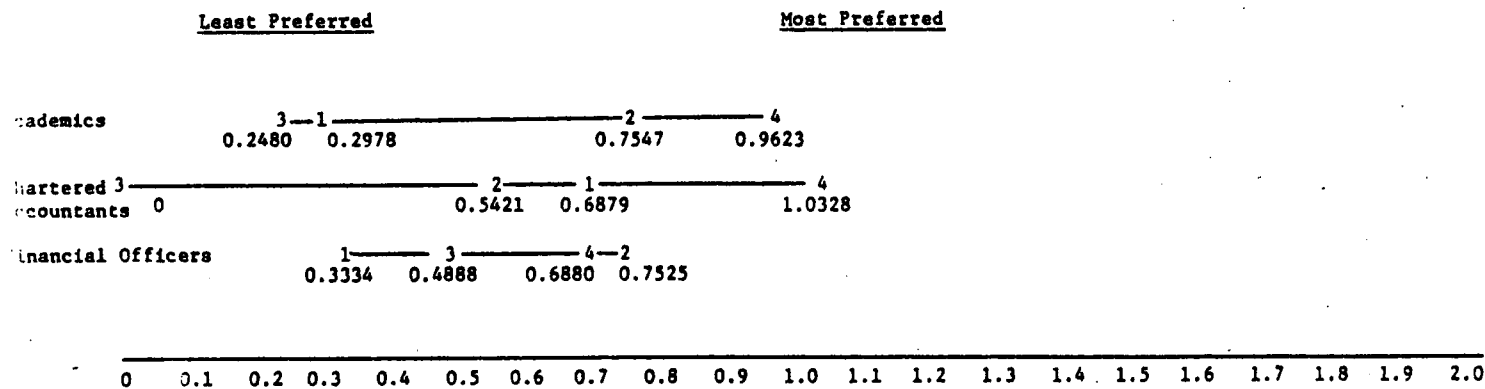
Key: 1- amount of increase in the pension liability, 2- amount attributed to employee service during the period, 3- amount of contributions to the plan

TABLE 6
MEASUREMENT - COMPARATIVE POSITION OF SCALE VALUES



Key: 1- accumulated benefits approach, 2- benefit/years-of-service approach, 3- benefit/compensation approach,
4- cost/years-of-service approach, 5- cost/compensation approach

TABLE 7
PLAN CHANGES - COMPARATIVE POSITION OF SCALE VALUES



Key: 1- no immediate recognition, 2- immediate recognition - recognize expense, 3- immediate recognition - prior period adjustment, 4- immediate recognition - recognize an intangible asset

TABLE 8

ACTUARIAL GAINS AND LOSSES - COMPARATIVE POSITION OF SCALE VALUES

	<u>Least Preferred</u>										<u>Most Preferred</u>										
Academics	1-----3-----4-2																				
	0.1611				0.5327						1.0904				1.1230						
Chartered 3	-----1-----2-----4																				
Accountants 0								0.7711			0.9765				1.1596						
Financial Officers	3-----1-----2-----4																				
					0.3946	0.4805					0.9256			1.1065							
<hr/>																					
	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0

Key: 1- no immediate recognition, 2- immediate recognition - recognize expense, 3- immediate recognition - prior period adjustment, 4- immediate recognition - deferred offsetting debit or credit

TABLE 9

DISCLOSURE - COMPARATIVE POSITION OF SCALE VALUES

	<u>Least Preferred</u>										<u>Most Preferred</u>														
Academics	5									4					1			3			2				
	0.0809									0.8631					1.1625			1.3584			1.5715				
Chartered	5									4					3			1					2		
Accountants	0									0.7308					1.1538			1.3946					1.7573		
Financial Officers								5				4				1				2				3	
								0.6565				0.8302				1.0080				1.2011				1.3406	
<hr/>																									
	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0				

Key: 1- actuarial information, 2- information about funding, 3- information about pension fund, 4- information about plan provisions and employees, 5- information about some ratios

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VOLUNTARY DISCLOSURE OF UNFAVORABLE PRIVATE INFORMATION:
AN EMPIRICAL EXAMINATION

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INTRODUCTION

Information asymmetry between top managers (who may also be "inside" shareholders) and general "outside" shareholders is a dominant feature of the modern large corporation. Given this asymmetry, a crucial question arises: Is there sufficient incentive for management-insiders to voluntarily disseminate information about the firm to the general market so that allocative efficiency at the macro level would be enhanced? Free market proponents answer this question in the affirmative, while regulators, emphasizing various kinds of market failures, take the answer to be clearly negative. A contemporary test of the capacity of free market forces to lead to voluntary disclosure of private information would have to be restricted to a specific information category and must necessarily be conditional upon existing regulations that already require substantial disclosure of historical data. We have chosen management forecasts of annual earnings, for which disclosure is not currently mandated, as a vehicle to study this issue.

Gonedes, Dopuch and Penman (1976) discussed several alternative motivations for management's earnings forecasting activity. Using Spence's (1974) signalling theory framework, Penman (1980) conducted an empirical study and concluded that firms with "favorable" news, on average, reveal their forecasts, hence "full disclosure," which would enable ranking of all firms in the market, does not result voluntarily. We think that this conclusion was somewhat premature, both from a theoretical standpoint and also due to (what we believe were) possible

measurement problems in Penman's study. To seek resolution, we partially replicated Penman's study, using a different sample of firms and modifying the research design and the measurement of a crucial independent variable. Our results indicate that corporate earnings forecasts are not one-sided, that both "favorable" and "unfavorable" prospects appear to be revealed voluntarily, with the capital market significantly revising firms' market prices in upward and downward directions, respectively.

HYPOTHESIS

There are two primary reasons that guard against one-sided information revelation, that is, disclosure of favorable information and suppression of unfavorable news. First, currently existing mandatory disclosure in the form of quarterly and annual reports, as well as extant S.E.C. reporting requirements, ultimately ensure the revelation of all information. Hence, outside shareholders (and the S.E.C.) would hold management directly responsible for suppressing negative information that resulted in adverse portfolio decisions by these shareholders during the suppression period (where insiders could profit at the expense of the unknowing outsiders). Also, the strict S.E.C. rules governing insider trading tend to substantially mitigate, although not eliminate, blatant profiteering from inside information. Second, there are other competing and competent searchers of information about the firm--viz., financial analysts, who formulate and issue their own earnings forecasts for virtually all large firms. Hence, negative information cannot be expected to remain secret for long. Also, there is a significant mutuality of interests between top company officials and financial analysts. Managers seek the good graces of financial

analysts to "recommend" their firm and to keep it "visible" with clients, while analysts need firm-specific information to update their own forecasts, which can only come from insiders (Axelson 1975, Lees 1981). Thus, deceit on the part of management, on a continuing basis, is simply untenable. The above discussion leads to the hypothesis that observed management forecasts will include, in addition to favorable forecasts, a significant proportion of unfavorable forecasts. And further, the favorableness/unfavorableness of the forecast information will be reflected in capital market valuation, i.e., favorable (unfavorable) forecasts will lead to upward (downward) revision in firms' share prices.

METHOD

Since our study was a partial replication, the general method used was similar to that of Penman (1980), but with the following significant modifications. Penman characterized a management forecast as favorable/unfavorable in relation to an expectation of earnings based on a mechanical model using past earnings data only. Several studies (Brown and Rozeff 1978, Fried and Givoly 1982) have shown that this procedure may cause severe classification biases in the measurement of this crucial independent variable. To capture the updated market expectation at the time of issuance of the management forecast, we used instead the latest financial analyst forecast (within 3 weeks prior to the management forecast). The other major difference in research design was that Penman examined market reaction during a constant 12-month period from January to December of year (t) for forecasts made some time during year (t), while we used a constant 13-month period from March of year (t) to March of year (t+1) for forecast announcements that were

restricted to the period April to December of year (t). This procedure eliminated the impact of actual earnings announcements for year (t-1) that appear in the first quarter of year (t) and also allowed us to capture the effect of errors in the management forecast for year (t) that become progressively revealed until actual earnings for year (t) are announced during the first quarter of year (t+1).

Sample Selection and Research Design

Management forecasts of annual earnings per share (e.p.s.) for NYSE listed December 31 fiscal year firms were gathered from the Wall Street Journal Index for years 1970 to 1973 (Penman used data for years 1968 to 1973). Analysts' forecasts were taken from the Earnings Forecaster, and stock returns data was taken from the monthly CRSP tapes. The experimental sample consisted of 123 forecasts over the 4-year period. The two independent variables capturing the ex-ante tenor of the managements forecast (M) and its associated ex-post error (E) were defined as (for each forecast/firm i):

$$M_i = (\text{management forecast} - \text{analyst forecast}) / (\text{analyst forecast}) \quad (1)$$

$$E_i = (\text{actual} - \text{management forecast}) / (\text{actual}) \quad (2)$$

All forecasts and actual figures refer to e.p.s. values. Our expectations were that we would find a significant incidence of both positive and negative values for the forecast variable M. Further, we expected that positive values of M would lead to upward revisions in market prices and negative values of M would lead to downward price revisions. Similarly, the ex-post error E was defined such that positive (negative) values of E were expected to lead to upward

(downward) price revisions. Thus both variables M and E were expected to be positively correlated with market reaction.

The variable of primary interest was M, while E controlled for the effects of other information (beyond that contained in M) that became available during the 13-month period of price reaction that was studied. Information beyond both M and E that may have impacted the 13-month period was assumed to be randomized, given the relatively large sample of 123 firms spread over a 4-year calendar period.

The dependent variable--unexpected returns over the 13-month accumulation period--was measured as follows. Market model residuals u_{ik} for firm i for month k were calculated for each of the 13 months ($k = 1, \dots, 13$). These were then scaled by the estimate of the standard error during the 48-month estimation period to yield standardized unexpected returns V_{ik} . An average monthly return over the 13 months for each firm was calculated as \bar{V}_i . It was expected that \bar{V}_i would be positive (negative) when variable M was positive (negative), and a similar relationship would hold simultaneously for variable E. Hence, the hypothesis was tested using the following linear multiple regression model:

$$\bar{V}_i = a + b_1 M_i + b_2 E_i + e$$

It was expected that the coefficients b_1 and b_2 would both be positive and statistically significant. The number of observations for the regression was 123 (the number of forecasts).

RESULTS

The distributions for the independent variables M and E , and the dependent variable \bar{V}_i in terms of quartiles, are shown in TABLE 1. The distribution for the primary forecast variable M is quite symmetrical, with a significant (and almost equal) incidence of both positive and negative values, as per our expectation. We did not have any a priori expectation for the distribution of E . Note also that the unconditional distribution of \bar{V}_i has a large proportion of significant negative market reactions. It remains to be shown that the negative (positive) values for \bar{V}_i were conditional upon negative (positive) values of the forecast variable M (and a similar relationship for the control variable E). The two independent variables M and E had a correlation of 0.104, not significant at conventional levels ($p = .24$).

TABLE 2 depicts the estimated coefficients for the regression model, along with their t -values and significance levels. The values for both b_1 and b_2 are positive and highly significant. Thus, our results clearly show that "unfavoarble" private information is voluntarily disclosed. Further, the results indicate that the market views it accordingly, that is, revises prices downward in such instances. These results are therefore contrary to those reported by Penman, who found slightly positive returns (though not different from zero) for his "unfavorable" group, and therefore concluded that, on average, only "favorable news" firms issue forecasts.

TABLE 1

Minimum, Maximum and Quartile Values of Distributions
for Independent (M,E) and Dependent (\bar{V}) Variables

Variable	Minimum	1st Quartile	2nd Quartile	3rd Quartile	Maximum
M_i	-0.316	-0.018	0.000	0.036	0.212
E_i	-1.382	-0.016	0.002	0.032	0.384
\bar{V}_i	-1.394	-0.151	0.038	0.214	0.683

TABLE 2

Regression Results

$\bar{V}_i = 0.0235$	+	$0.8424 M_i$	+	$0.8652 E_i$	
$t = 0.85$		$t = 2.23$		$t = 5.57$	$R^2 = 0.25$
(0.3963)		(0.0279)		(0.001)	

The numbers in parentheses are the significance levels for the t-values.

CONCLUDING COMMENTS

Our partial replication of Penman's study, with certain modifications in research design and measurement (of a crucial variable), led to results and inferences different from those reached by Penman. Our theoretical priors supported the proposition that, given existing environmental forces (the current reporting requirements, and the potent financial analyst community), corporate managers do not have incentives to reveal only favorable information and to suppress unfavorable news. Rather, when forecasts are issued voluntarily, both favorable and unfavorable news are more-or-less equally likely to be disclosed, with the market adjusting in the appropriate direction. Thus, voluntary disclosure of private information through corporate earnings forecasts appears to be "fuller" than that envisioned by Penman. We note that in his supplementary analysis on daily data, Penman does find that unfavorable forecasts are associated with negative market reaction.

A more extensive companion study undertaken by us (1984, forthcoming) critically analyzes the forecasting environment in which financial analysts and corporate managers are the principal actors. The mix of economic incentives and disincentives leads managers to prefer an "indirect" mode (through financial analysts) for disclosing earnings forecasts. However, "direct" forecasts are issued by managers primarily (albeit infrequently) when there is a strong likelihood of investor dissatisfaction resulting from their decisions based upon unrealistic market expectations (represented by prevailing analysts' forecasts). Our results in this companion study also indicate that the market

responds symmetrically to the direction and the magnitude of management's forecast signals.

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WHY LOOK AT PRODUCTIVITY MEASUREMENT MODELS

by

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INTRODUCTION

Although the topic of productivity is not new, it is only in the last decade that productivity issues have taken on a position of significance in the eyes of academics, managers, and consultants. Unfortunately, there is only one point of agreement among all the parties. Productivity is a ratio of output to input. Beyond that, there is strong disagreement regarding what output is, what input is, how either flow should be measured, over what time period the measurements should be made, how the measures should be used, or even how to interpret them. Thus it is not surprising to discover that there is a great deal of controversy and confusion regarding the use and application of productivity measurement models within firms.

Productivity has been regarded by some as the panacea to all the ills that appear to plague the North American economy. Everyone is eager to learn how to get more for less, how to compete effectively with the Japanese and our other trading partners. However it is becoming apparent that the fundamental assumption that long term productivity gains can be achieved at the level of the firm by merely introducing Japanese techniques such as quality circles or Canban programs is not valid. Despite the use of such techniques, firms are still not becoming highly productive. Instead, management is learning that there is a need to develop a corporate culture capable of placing productivity in its proper perspective within the firm. In their book, In Search of Excellence, Peters and Waterman explicitly point to the antiquated view that by giving people big monetary incentives to do right and to work smart, the productivity problem will go away.(1) It is becoming very clear that the pursuit of productivity gains at the level of the firm involves an evolutionary process as opposed to the introduction of mere techniques.

The productivity slowdown of the seventies has raised the consciousness level of managers, and analysts to the role that productivity plays in the fortunes of the firm. For the firm, productivity has been hailed as the means by which they can become more competitive in the world economy, they can utilize technology to introduce better products, and can grow and prosper. For the individual, productivity is perceived as providing more disposable income, lower prices, and a greater array of goods, not to mention more leisure time. Needless to say, these are tough promises to keep.

Unfortunately, productivity is not a well understood concept by many people. The list of disagreements presented earlier attests to that.

Efforts to relate the productivity performance of an individual firm to the productivity measures reported for the entire country are almost totally futile. It is very difficult to relate productivity to the level of company profits (2). There is very little guidance to help managers link productivity to the service functions in their firms (3). The relationship between productivity and the actions of the individual is not clear (4). Efforts to link productivity to the motivation of individuals is almost impossible at this point in time (5). Regardless of the level of analysis or the focus of the effort, the relationship between productivity and other relevant dimensions for the manager are not very clear.

The national productivity measures concentrate exclusively on labour productivity. For many firms, labour is but a small component of the inputs that the manager must concern himself with. Many firms devise multiple measures to handle almost any situation that could possibly occur. The result is an array of forty, fifty, or even sixty productivity measures within the firm that are completely unrelated to any external standard for the company, industry, sector or economy. This makes it very difficult for the manager to use these tools or to apply the measures and concepts to his particular situation.

If productivity is to help our economy move out of the doldrums that it has been in for the past several years then the productivity gains will have to be achieved by each of the individual firms in our economy. To do this, the managers must be able to understand the concepts of productivity, to employ the most relevant measures of productivity, and be able to manage the process. These results can only be attained when we have resolved several of the critical issues that still exist with respect to productivity and its application at the level of the firm.

ISSUES

The creation of a corporate culture is significantly dependant upon the measurement approach that the firm adopts. Through the measurement of productivity, management will respond to signals and make changes that ultimately influence the results that are attained. Thus, the success of the productivity efforts in the firm for the long run will necessitate a clear understanding of the issues involved in measuring productivity.

The first issue involves the low level of agreement regarding what elements of productivity should be included in the measures and how they should be quantified. One school of thought regards productivity as a physical flow phenomena. As such, the only items that should be measured are flows that are actual physical movements of items. The difficulty with this approach is that managers often must try and manage flows that are not physical in make-up such as capital. Another approach sees productivity as a form of efficiency. In this case, the measurement approach is analogous to variance analysis. Yet, in some situations it is almost impossible to identify an appropriate standard or target. A third approach is to measure all flows in dollars or some such unit of currency. While it is possible to express all of the flows in a common unit, the approach suffers when the currency unit is

unstable over time due to inflation. Thus the way in which the flows are to be measured is an important issue of productivity definition to address.

A second issue of importance in this regard is the fact that there are a number of different productivity measurement models available for use in firms. An investigation of these models reveals that they exhibit all of the problems that were listed at the start regarding the state of productivity measurement at the level of the firm. The models all define productivity in a slightly different way and measure the input and output flows in different ways. This poses problems for the manager who wishes to select and use a productivity measurement system that is most suitable for his firm. What system should he select?

The third issue involves the relationship between the productivity measures and the profitability measures that are used to define the performance of the firm. While there is belief that highly productive firms will also be profitable there is no clear evidence to date to support that belief. As much of the behavioural literature in accounting has shown, managers and all others will respond to information and take actions and decisions that are in their own best interests. Let us assume that the manager of a firm is evaluated and rewarded on the basis of the financial performance measures in his firm. If the productivity measures do not coincide with the financial performance measures, we can expect the manager to give more consideration, in his decision-making to the impact the decisions will have on the financial measures than on the productivity measures. Thus it is important to understand how the two types of measures work in relation to each other. If productivity is so important, then we had better be certain that these two measurement systems are in agreement. In other words, it is essential that the productivity measurement system bridge the gap between itself and the conventional financial performance measures.

MEASUREMENT MODELS

MACRO The most common productivity measurement model is the macro economic models developed in labour economics(6). These models constitute the basis for the productivity measures that are reported in the press by Statistics Canada. The measures concentrate totally upon labour productivity measures. The most common measures of productivity report the relative rate of change in labour productivity for the country or industrial sector for some specified time period. For example, it was reported that the relative growth in Japanese labour productivity for the 1970's was 7.3% while the growth in labour productivity for the United States in the same period was only 2.5%. But this is only half of the story. The other half involves a measure of the absolute labour productivity in both countries. Thus, in 1979, Japanese labour productivity stood at \$6.00 per employee while the absolute labour productivity for the United States was \$9.00 per employee (7). The results are not conclusive as they would be if only one aspect was considered.

These measures hold very little relevance and applicability for the manager at the level of the firm. How can the manager of a firm use the labour productivity measurements reported for the entire country in a meaningful way to guide his decision-making behaviour regarding productivity issues in his firm? The measures are simply aggregated at too high a level to offer any help in application at the level of the firm. Moreover, the manager is faced with the task of having to manage other flows besides labour. In many of our firms today, labour is a relatively minor input flow. What relevance does the average labour level of the country have to a manager of a continuous flow firm where labour constitutes less than 10% of the inputs? While the macro economic models are useful for comparisons of labour productivity levels between nations, the resulting measures from these models are relatively useless for application at the level of the individual firm.

MICRO At the other end of the scale are the micro measurement models developed by Industrial Engineers (8). These productivity models are most often applied to individual workers, and separate work stations. These models concentrate on physical flows moving in and out of the unit being measured. In these models, productivity is defined to be physical units of output per physical unit of input. The most common application of these models occur at separate work stations where the output is often compared to the amount of time taken by the worker to complete the volume of units. The major difficulty with these models involves the inability of the model to aggregate measures at higher levels or to add different types of input and output flows together. In most firms, the manager is faced with the task of managing several different types of flows involving hours, dollars, weights, and volumes. The inability of the models to aggregate these flows makes them of limited use to a manager dealing with productivity at the level of the whole firm. As with the macro measures, these measures are not well adapted to productivity measurement at the level of the full firm. Unlike the smaller levels of analysis, the manager at the level of the firm has to manage flows that are not easily translated into a physical flow approach.

However there are several productivity measurement models that are designed to be used at the level of the firm. The remaining sections of this paper will be devoted to looking at some of them and the characteristics that they possess.

A P C MODEL

The American Productivity Centre (APC) model is probably the most widely used productivity measurement model (9). The Centre was created through the financial support of 125 of the largest corporations in the United States. The model is based upon measurement concepts developed by Hiram Davis (10). In its simplest form the measurement model is as follows.

$$\begin{array}{ccccc} \text{PROFITABILITY} & = & \text{PRODUCTIVITY} & \times & \text{PRICE RECOVERY} \\ \text{INDEX} & & \text{INDEX} & & \text{INDEX} \end{array}$$

It is important to understand that this model attempts to explicitly relate productivity and profitability in the manner described above. While earlier, it was stated that productivity was defined to be a ratio of output to input, the APC model refers to a productivity Index. In this terminology, an index is a ratio of ratios. In the operational form of this model the profitability ratio for the current period is compared to the profitability ratio for the base period. The resulting index relates the profitability of the current year and the base year into a single number.

The model suggests that there are two components to profitability in a firm. The price recovery component represents the extent to which all prices and costs have changed in the time between the current period and the base period. The productivity component represents the extent to which the volumes of inputs and outputs has changed in the time between the current period and the base period. Thus in very simple terms, the APC model defines productivity to be the volume variance associated with the profit changes that have occurred in the firm over the time period being analysed. In this model all inputs and outputs are measured in constant dollars. One of the most difficult inputs to measure in productivity is the capital input. The APC model treats capital as a consumption factor and measures it much like depreciation.

In a very simple way the APC model attempts to compare the output achieved this year in relation to the inputs consumed versus the output achieved last year in relation to the inputs used last year. To phrase it another way, the analysis tries to compare this years activity at last years prices. There are many people who suggest that this is a meaningless exercise. If you could get this years mix of outputs at last year's prices, the mix would have been different than it actually was. It is important to distinguish between simple inflation or deflation indices and the concept of price recovery presented and used in the APC Model.

CRAIG-HARRIS

This model was developed by the authors as a masters thesis at MIT when Craig was a student there (11). The Craig-Harris model is very similar to the APC model but does differ in some areas. Like APC, this model measures all of the inputs and outputs in dollars as opposed to physical units such as hours, area, or volume. To overcome the problem of inflation, the model also expresses all of the dollar flows in constant dollars. In terms of differences, the model defines productivity as follows

$$\text{TOTAL PRODUCTIVITY INDEX} = \frac{\text{ALL GOODS AND SERVICES}}{\text{LABOUR+CAPITAL+MATERIALS+SERVICES+OTHERS}}$$

This model focuses on total productivity at the level of the firm. The

productivity measure is referred to as a total productivity measure because the model relates total outputs to all inputs simultaneously. If the total productivity index was greater than one, the model suggested that the productivity of the firm was good. To achieve a measure greater than one, the total outputs would have to be greater than the total inputs used to generate the outputs. If the total productivity index was less than one, the model said that productivity was poor. In this case, the total outputs would be less than the total inputs used to generate them.

In addition to using the total productivity index, the Craig-Harris model also employed the partial productivity measures. In these measures, the total outputs were divided by a single input such as labour, or capital. These partial measures enabled managers to focus their attention to specific items in addition to the total measure. Unlike the APC model, the Craig-Harris model measures capital inputs on a lease equivalent basis. If the capital input is large, these two models will provide different information regarding the productivity of the firm.

W P G MODEL

A third productivity model that may be used at the level of the firm is the WPG Model (12). Unlike its predecessors, the WPG model measures all of the inflows and outputs in current dollars rather than constant dollars. The reason for this approach is that with few exceptions, the current dollars are likely to be most relevant to the manager as opposed to constant dollars. This model adopts a flow management perspective to the measurement issues of timing and level of analysis. The basic precept of the model is that if the flow crosses the boundary surrounding the unit under analysis it is counted when it crosses the boundary and only then. As a condition of the model, the total outputs must equal the total inputs for any period under analysis. In terms of the total productivity ratio described in the Craig-Harris model, the ratio will always be one. This condition is analogous to the law of thermodynamics which states that the total amount of energy is constant. Using this condition, the model defines productivity of the firm in the following manner

$$\text{PRODUCTIVITY} = \frac{\text{TOTAL OUTPUT}}{\text{RESIDUAL}}$$

The residual is defined in a particular way. Since all inputs into the firm are measured when they cross the boundary of the firm, and all outputs are measured when they cross the boundary out of the firm, at any period of time the two flows will not be equal to each other. Yet to hold the condition of outputs equal to inputs, the model defines the residual to be the balance such that

$$\text{RESIDUAL} = \text{TOTAL OUTPUT} - \text{ALL OTHER INPUTS}$$

As you can see the residual bears a very close resemblance to accounting profit. The two items would be the same if both models measured inputs and outputs in the same manner over the same time period. The intent of this model is to develop a productivity measure for the firm that is highly congruent with the financial measures used in a firm. The issue of the capital input is handled in a different manner than for either of the previous models. In the WPG model the capital input is measured in terms of the additional service flows that occur because of its existence and use. For example, the interest incurred, the capital cost allowance associated with assets purchased, and the impact on taxes represent the flows that constitute the capital input in this model.

GAINSHARING

Another type of productivity model that is commonly used at the level of the firm is Gainsharing. These types of models rely exclusively upon labour productivity and the overall performance of the firm. Using an historical performance criteria, the gainsharing models specify the profit in a base year as the standard of productivity or output. All increases in profits that occur above this base level are shared in some predetermined fashion (usually 50/50) between the firm and labour. The most common illustration of such a productivity model is Improshare (13). In this particular model, as the gains exceed the base profit by a previously agreed level (say 65%), the firm can usually "buy-back" the base amount and re-establish a new level beyond which the gains will be shared between labour and the firm.

RESULTS

Each of the models that have been described as being applicable at the level of the firm defines productivity in slightly, and not so slightly different ways. Which way is best or correct? The answer is as varied as the models themselves. For example, all of the models mentioned look at labour to some degree or another. Most models employ inflators and deflators to a different degree with the WPG model not at all. The establishment of a base year is common to most models but the subsequent adjustments can employ one of several techniques. Only the gainsharing models are explicit regarding how the results of the productivity efforts will be handled. All the models treat capital quite differently with gainsharing ignoring this input completely. Perhaps the best way to answer the question is to suggest that the definition of productivity that is most suitable to the needs of the manager and the firm determines the correct way to define productivity. This first issue of productivity definition becomes very important and worthy of management's efforts to do a good job here first.

The second issue raised in this paper regarding productivity focused on the selection criteria for a productivity model at the level of the firm. Current experience suggests that most firms who are considering

the use of a productivity model generally follow one of the following paths. For some, the model selected is based upon the track record and exposure that the model has. The APC model is an excellent example of a model that has received high exposure and application. For other firms, the choice of a productivity model is determined by the consultant that was hired to assist in the productivity project and the model that he advocated. In a similar vein, the choice of model may be based upon the experience that someone the manager knows has had or someone that the manager trusts. For still other firms, it is their belief that their particular firm has productivity issues and conditions that are so unique that they find it necessary to develop their own particular model. Thus, the selection criteria tends to become highly varied.

Consider the last issue regarding the extent to which these measures of productivity related to the conventional profitability measures of the firm. A quick look at the productivity measures from the traditional macro economic models indicate the severe limitation of this approach. The productivity measure only considers labour inputs as being relevant. It is common knowledge that the manager of a firm must deal with more than simply labour. As such, the macro model affords him no help in dealing with the other input flows such as materials, capital, services or management.

The micro measures suffer similar problems to those described for the macro models. Since the definition of productivity here is an efficiency measure and only in terms of physical flows, the manager of a firm is handicapped when the input or output cannot be captured in a physical sense. As an example, how does a manager measure output for the service firms using this micro model?

Although the APC model is widely used, it is still not without its faults. Recent investigation of this model has revealed that under selected circumstances, the productivity measures of the model are unable to distinguish between significantly different units having very different profitability and product characteristics. This presents a problem for the manager if the model is unacceptable to distinguish between different units.

In a study conducted on a small manufacturer using the Craig-Harris model, it was found that the performance reported by the model for productivity was very different than the profitability pattern that the firm was experiencing (14). The researcher also found that the indices and the data needed to employ the model were not available at the firm and had to be generated separately. However, the researcher also found that when the current dollar measures were used for the productivity model instead of the constant dollars, the pattern of productivity and profitability were very similar. When the APC method of measuring capital was employed in this firm, it was found that the results of the productivity measures were very different than when the conventional Craig-Harris measure of capital was used.

In a recent experiment using the WPG model in a computer simulation situation, the experimental group were found to have done relatively

poorly with respect to profit measures but eventually exceeded the control group in the productivity measures. As the productivity measures were aggregated over several periods it was found that the highly profitable teams and the highly productive teams converged (15).

CONCLUSIONS

AS this discussion points out, the models do not define or measure productivity in similar ways. Thus the results obtained from the measures are not consistent with each other. This can create difficulties for managers who wish to use some type of productivity measurement system in their firm. The discussion has also shown that the models are not totally consistent with the results indicated in traditional financial performance measures. Some models give signals that suggest that the firm is performing well in terms of productivity while they are rapidly becoming financial disasters. If the measures are to be useful to managers and are to help out firms remain competitive in the world economy, it is critical that we understand what the measurement models are measuring and how those measures should be used.

In early April the Canadian Government announced an award that would be given to a Canadian firm for its productivity performance. This award is similar to a recommendation made in the United States regarding a productivity-quality award to be issued (16). In Japan, the Award for quality is called the Deming Award. Today Deming resides in the United States and refers to himself as a quality-productivity consultant. It would appear that across the world, productivity is gaining recognition as an important factor for success of world-class firms. While it is fine to have an award for productivity available to firms in Canada, it is even more critical that the manner in which we measure and plan for productivity improvement be consistent and appropriate to the needs and best interests of the firm. To do this it is necessary to understand the issues that are most relevant to productivity at the level of the firm, how to obtain a meaningful measure of those issues and most importantly, how to manage the productivity process once the productivity measures are available. Will our award work toward recognizing "major advances in productivity through the effective use of labour, capital, technology and innovation"? (17)

For accountants, the issues of productivity measurement are extremely important. Productivity is a major management problem that requires our help to develop measures, and models that can assist the manager in making the best decisions regarding productivity issues in his firm. We provide the information that the manager uses in his decisions and models. If we give him the wrong information or the wrong models he will be more likely to make the wrong decision. Similarly, it is our responsibility to ensure that the productivity measures that the manager does use are congruent and related in some known and understood way to the conventional measures of performance that are used within the firm (18). This then is the challenge.

For these reasons, it is the intent of the Western Productivity Group

to commence a study examining the various productivity models that are used at the level of the firm and understand how these models relate to our conventional measurement systems so that we do not deflect our managers onto dysfunctional tangents. The first stage of this work will be a bibliography that covers the literature that has been devoted to these models. The other stages of the project will examine each of the models identified against a specified set of issues that are critical to managing productivity at the level of the firm. This project is tapping into an evolutionary process that is occurring around our firms. To-morrow, a new model will be developed, one that will make another gain in our understanding of these productivity issues. It is time to begin consolidating our knowledge and applying it to the opportunities that currently exist.

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"A Survey of Math Programs in Audit Staff Planning"

by

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ABSTRACT

Audit staff planning problem is the aggregate production planning exercise in an audit firm. Several math programming techniques, such as linear programming, goal programming, and multi-criteria programming have been applied to this problem. We critically survey the literature and suggest directions for future research.

1. INTRODUCTION

The staff planning activity is very important for any organization; however, it is even more important for service type organizations, such as auditing firms, where the volume, quality, and the economics of the revenue generating activities are almost entirely a function of the calibre and cost of the personnel.

Staff planning activity is important, in a CA firm, for several reasons. First and foremost, auditing activities typically account for the largest percentage of the total revenue of a CA firm, and these activities can be accomplished only if staff of adequate size and appropriate experience is present.

An audit firm operates in a competitive environment with other audit firms. It can achieve its desired market share only on the basis of a cost-effective differentiated product. In order to maintain its present clientele, the firm must guarantee that the audits will be completed as per agreed schedules and that the opinions pronounced by it will meet the statutory requirements of the regulatory bodies, such as profession itself (CA Institute), tax authorities. Furthermore, because the accounting information is used by the investors, it may impose additional constraints on the audit-report, such as the liability of the auditors in failing to either detect or report negligence or violations on the part of the management of the audited firm. This latter requirement usually will mean that more complex the audit, more experienced an auditor would be needed for the assignment.

Towards meeting its growth objectives, the audit-firm needs to develop the number of personnel and their skill levels that will be required, over and above the numbers needed for maintaining the present client-base, especially

and above the numbers needed for maintaining the present client-base, especially if the firm plans to move into new product lines, such as tax consulting.

The quality-assurance program which will ensure that the CA firm staff has the knowledge and tools that are current and appropriate also mandates the staff-planning exercise.

Thus, given the present tight market conditions for CA personnel, it is easy to see that staff-planning is a very important activity for the partner-in-charge personnel.

2. Staff Planning Problem

The activities of an audit staff personnel can be broadly defined into three categories, (i) revenue generating, such as an audit engagement, (ii) developmental, such as attending a seminar/a course towards professional development, or speaking to a group ex-gratis (Rotary Club, trade associations, students) with the hope of attracting future clients, and (iii) personal, such as vacation.

Similarly, the skill-level may be broadly defined and for the purpose of this paper, we shall follow the literature and define the levels as: (i) Partner, (ii) Manager, (iii) Staff Accountant/Auditor. It is obvious that there is no loss of generality by using the above classification; for example, we could nest each level by denoting Senior Partner as Partner A and Junior Partner as Partner B and modelling the work/activity workload for the two as two different skill levels.

The problem faced by the Partner (Personnel) can then be stated as: Given the various activities and the skill-levels needed, the projected workload for the immediate planning horizon, determine the number of personnel needed

to staff each skill-level, subject to objectives of profit maximization, professional development, etc.

It is obvious that it is a short-run aggregate production planning problem with the strategies available to the decision maker (Partner-in-charge personnel) being; hiring/lay-offs and overtime/undertime utilization of the staff.

The macro-problem of staff planning cannot be implemented without considering the concomitant micro-problem of staff assignment, who will do what (which personnel will be assigned to which activity, during the planning period). Thus, there are two approaches to solve the staff planning problem, (i) top-down -- where the macro-problem is modelled and solved and then the individual assignments are made, and (ii) the bottom-up -- where the micro-problem is solved and then aggregates provide the solution to the staff planning problem. Both these approaches have been used in modelling the problem.

The plan of the rest of the paper is as follows. In section 3, we shall present the Linear Programming Model of audit staff assignment of Summers (1972) which is historically the first paper, for our purposes. In section 4, we shall discuss the goal programming model (Killough, 1973; Welling, 1977), the multiple objective linear programming model (Balachandran, 1982) and integer programming model (Balachandran, 1981). In section 5, we shall present our conclusions and suggest directions for future research.

3. Linear Programming Model of Summers

The linear programming technique was applied by Summers (1972) to the audit staff assignment in a seminal paper that is the forerunner of most of the math program applications to the audit staff planning problem.

We shall present it in some detail as this will allow us to identify the math program structure of the problem.

Description of Variables: For the planning period,

- n : number of audit staff personnel to be assigned.
- m : number of activities in which staff personnel will engage (including audit engagements, professional education, vacation, idle time, etc.)
- x_{ij} : actual hours to be worked by the i th person on the j th activity.
- $b_{j\max}$: maximum "standard audit hours" that may be worked on the j th activity.
- $b_{j\min}$: minimum "standard audit hours" that must be worked on the j th activity.
- $e_{i\max}$: the maximum number of actual hours that i th person will be available to engage in all activities.
- $e_{i\min}$: the minimum number of actual hours that the i th person must work.
- a_{ij} : the ratio of the number of hours a "standard" auditor spends on the j th activity to the number of actual hours spent by the i th auditor on the same activity to accomplish the same work.

Purpose of a_{ij} is to equate the hours of work done by auditors of different productivity on the same activity. Thus, $a_{ij} = 1.2$, for example, would mean that the auditor i can perform activity j in one hour for which a "standard" auditor will take 1.2 hours.
- c_{ij} : an aggregate measure in dollar equivalents of the benefits to the firm as a result of the assignment of the i th individual to the j th activity, for one hour.
- r_{ij} : the hourly billing rate in dollars of the i th individual to the j th activity.
- s_{ij} : the dollar equivalent of the benefit to the firm of assigning the i th individual for one hour to the j th activity, because of the

individual's special expertise which will help him/her on this activity (such as the benefit of last year's senior on the job being this year's senior on the job).

t_{ij} : the dollar equivalent of the benefit to the firm of assigning i th individual to the j th activity for one hour, in order that he may acquire the experience this activity will provide him.

u_{ij} : dollar equivalent benefit to the firm of the i th individual working one hour on the j th activity, where such benefit is not based on experience. Thus, if i th individual is not to be assigned to j th activity, then u_{ij} for this pair of i and j can be assigned a large negative value.

Objectives: Summers identifies four sub-objectives of the decision maker, one monetary and three intangible benefits. These arise from the fact that only audit activities are directly billable to the client and thus produce monetary revenues. Other activities of the audit-staff, such as time spent in professional development or vacation, are directly non-billable and thus do not result in revenues to the firm but nonetheless are essential to the smooth operation of the firm. (These sub-objectives are combined to form the required single LP objective by expressing each in equivalent monetary terms).

$$\text{Objective function: Maximize } Z = \sum_{i=1}^n \sum_{j=1}^m x_{ij} c_{ij}$$

$$\text{where } c_{ij} = r_{ij} + s_{ij} + t_{ij} + u_{ij}$$

Constraints:

- (i) Maximum and Minimum number of total hours worked for each person are as prescribed.

$$e_{imin} \leq \sum_{j=1}^m x_{ij} \leq e_{imax}, \quad \text{for } i = 1, n$$

- (ii) Maximum and Minimum number of total standard hours devoted on each audit activity are as prescribed.

$$b_{jmin} \leq \sum_{i=1}^n a_{ij} x_{ij} \leq b_{jmax}, \quad \text{for } j = 1, m$$

- (iii) Limitations on the flexibility of staff assignments.

Five possible limitations are described.

1. A slack period has arrived in which it is desired that the staff as a whole take at least 1000 hours of vacation.

$$\sum_{i=1}^n x_{ij} \geq 1000$$

2. Bill Smith has requested that his entire annual vacation of 120 hours fall in the current planning period.

$$\begin{matrix} x_{\text{Bill Smith, Vacation}} = 120 & \text{or,} & x_{ij} = 120 \\ (i) & & (j) \end{matrix}$$

3. It is desired that only seniors should have any time off this period. This can be done in several ways, one of which is described here: Specifying $x_{ij} = 0$, where i is any subscript belonging to any individual

who does not have the position of senior, and j is the subscript of the activity, "time off."

4. It is desired that individual i work exactly 40 hours on activity j . This produces the constraint:

$$x_{ij} = 40$$

5. There is no minimum time to be worked on activity j . The constraint stating that a minimum must be worked would simply be omitted. This procedure would occur whenever for some reason a constraint is inapplicable in the current planning period.

It is clear that the decision maker will need to rely on his judgement, in providing the values for a_{ij} , s_{ij} , and t_{ij} . Since almost all firms keep performance records and perform annual/periodic employee performances appraisals, it might not prove difficult to obtain the values of a_{ij} . However, s_{ij} and t_{ij} might impose a greater cognitive burden on the decision maker.

Once the model has been solved, the activities can be re-grouped according to the skill levels (partner, manager, staff auditors) and the aggregates will then provide the required number of personnel. The dual variables values will indicate whether the size of the staff needs to be adjusted and if so, in which skill level(s) it should be done.

Summers besides applying a math programming technique to the staff planning/assignment problem, also clarified the objectives that need to be quantified and the constraints that ought to be considered, in a math program model.

The model is easy to solve because of the available efficient codes for LP. The dual variables provide the usual opportunity cost interpretation of the various assignments and thus, can be used to adjust the staff-assignments. Sensitivity analysis allows the decision maker to study the impact of changes in the parameters of the problem, especially any factor affecting c_{ij} .

Summers' model suffers from several weaknesses, some of which are the following. (i) In the objective function, while it may be easy to find r_{ij} , the billing rate; quantification of s_{ij} , the hourly dollar equivalent benefit to the firm of the assignment based on the past experience of the individual i , and t_{ij} , the benefit to the firm from future experience gained by the individual i , are difficult to quantify and will pose a major cognitive burden on the decision maker, especially since these need to be specified for all feasible i & j pairs. (t_{ij} is more difficult to gauge, because in the present tight market the individual staff person has far more opportunities to leave for better prospects.) It is easy to see that the optimal solution might change drastically with small variations in these judgemental inputs. (ii) The schedule produced may be fragmented, for example, auditor i may be scheduled to spend 1.04 hours on one activity, 2.18 on another, etc. (iii) It may provide inequitable assignments, for example, in the same skill category, it may assign overtime to one individual and none to another, or it may assign one individual to one activity and for another exactly similar activity several individuals. (iv) It may provide for concurrent assignment to two or more activities of the same individual. (v) Finally, as has been pointed out by Bailey, et al (1974) that CA firms have a hierarchy of goals which they seek to achieve in order of importance and a single objective function demanded by LP cannot allow the comparison of changes in the assigned priorities of these goals. Also, the LP objective function is a composite function which includes the

billing rate, and factors based on past experience as well as future experience, and requires that the three be expressed in the same unit (dollars), which is not easy to do. (Goal programming allows the expression of different goals in terms of different units.)

4. Other Math Program Techniques

The next technique suggested was goal programming and has been applied by Bailey, et al. (1974), Killough and Souders (1973) and Welling (1977). It is a top-down approach. The goals of the CA firm can be defined broadly as: job productivity (measured through total billings), professional development of the staff (measured with the number of hours spent in attending professional development seminars/courses, etc.), individual's job satisfaction (measured by the person's maximum time worked, maximum overtime worked), and organizational structure (for a certain number of staff auditors one manager should be there).

Because of similarities between goal programming model statement and the multiple objective programming model, we shall state the goal programming model here and use the same notations for the other later.

Notation:

- i : number of staff categories (for example, Partner, Manager, Staff auditor, etc.)
- j : number of types of jobs (audits, vacations, professional development, etc.)
- x_{ij} : number of total hours allocated to staff category i for the j th category job.
- a_{ij} : the hourly profit contribution for staff category i when working on job category j . Note that $a_{ij} = 0$ for all j values that do

a_{ij} : the hourly profit contribution for staff category i when working on job category j . Note that $a_{ij} = 0$ for all j values that do not yield revenues, for example, vacation, professional development seminars attendance, etc.

n_{1i} : number of present employees in category i .

n_{2i} : number of employees contemplated in category i .

d_i^- : underachievement of a goal.

d_i^+ : overachievement of a goal.

- (i) Job productivity goal: The total profit goal for the office is R .

$$\sum_i \sum_j a_{ij} x_{ij} + d_1^- - d_1^+ = R$$

We would wish to minimize d_1^- , the underachievement of the productivity goal.

- (ii) Professional development goal: The staff in category i should spend a certain number of hours say P_i , in professional development activities.

$$\sum_j x_{ij} + d_{2i}^- - d_{2i}^+ = P_i, \text{ for all } i$$

j = professional
development
activities

Here d_{2i}^- , the underachievement of professional development hours, ought to be minimized.

- (iii) Goal of feasible hours: Each individual can be expected to work only a certain number of hours (including overtime).

Thus for the staff class i , there is a maximum total time of feasible hours, F_i , which should not be exceeded.

$$\sum_j x_{ij} + d_{3i}^- - d_{3i}^+ = F_i, \text{ for all } i$$

Here, d_{3i}^+ , excessive hours (overtime), ought to be minimized.

- (iv) Goals of job satisfaction: These are modelled through keeping overtime, idletime, and changes in staff level (hiring/layoffs) to a minimum.

Overtime: The total amount of overtime for staff class i should not exceed, O_i .

$$\sum_j x_{ij} + d_{4i}^- - d_{4i}^+ = O_i, \text{ for all } i$$

Idletime: The total amount of idletime (under-utilization) of the staff class i should be no more than I_i .

$$\sum_j x_{ij} + d_{5i}^- - d_{5i}^+ = I_i, \text{ for all } i$$

Staff level changes: Changes in the number of staff persons in class i should be minimal.

$$n_{2i} + d_{6i}^- - d_{6i}^+ = n_{1i}, \text{ for all } i$$

We wish to minimize d_{4i}^+ (excessive overtime), d_{5i}^- (underutilization of normal hours), d_{6i}^- (layoffs), and d_{6i}^+ (hirings).

- (v) Organizational design goal: For staff class i , for every group of g_j employees at lower levels, a manager should be there. (For example, for every 10 employees at staff auditors level, a manager should be there.)

$$n_{2j} g_j \geq \sum_i n_{2i} \quad \text{for all } j = \text{managerial class}$$

$i = \text{lower level employees staff class}$

The goal programming solution method requires that the decision maker prioritize the goals to form the objective function. Here, for example, the priority list might be

<u>Goal</u>	<u>Priority Rating</u>
Productivity (achievement of profit)	1
Feasible hours	2
Staff level changes	3
Overtime	2
Underutilization (idle time)	4
Professional development hours	5

Thus, if we let P_i denote the differential priority weight accorded by the decision maker to goal i , then the objective function for the above formulation can be stated as:

$$\text{Min. } P_1 d_1^- + P_2 d_2^- + P_3 d_3^+ + P_4 d_4^+ + P_5 d_5^- + P_6 (d_{6i}^- + d_{6i}^+)$$

$$\text{where } P_1 > P_2 = P_3 > P_4 > P_5 > P_6.$$

A modified form of simplex method can be employed to solve the problem (Lee, 1971). This goal programming solution will tell us, which goals have been achieved, which have been underachieved and which ones have been overachieved ($d_{.i}$, $d_{.i}$ values). (It first achieves the most important goal to the fullest possible extent, then considers the next order goal, and so on.) Thus, the decision maker can observe the impact of his priority ranking of goals on the solution. Once the solution is obtained, we know the number of staff persons needed in category i (number of partners, number of auditors, etc.)

The criticism of goal programming method is basically the same as that of LP. Also, the solution is sensitive to the differential weights and the priority rating of the goals (P_i^g) and it is not clear if decision makers can specify them without a tremendous cognitive burden. Furthermore, the solution might indicate a fractional number of staff persons (say 2.08 partners) and it is not clear how could one implement this. Additionally, the opportunity cost and sensitivity analysis, advantages of LP formulation, are absent.

The above has led to the application of multiple objective linear programming (MOLP) to the staff planning problem, again as a top-down approach, by Balachandran and Steuer (1982). They have made the problem solution interactive and thus their formulation provides a decision support system.

The problem formulation is very similar to the goal programming approach, with one key difference that instead of a single objective function, the MOLP approach tries to optimize all objective functions simultaneously (vector optimization). Balachandran and Steuer consider the following seven objectives simultaneously: (i) Profit (in dollars), (ii) Projected bookings (in hours underachieved), (iii) Staff augmentation (in employees), (iv) Staff reduction (in employees), (v) Overtime above feasible hours (in hours), (vi) Underutilization¹ (in hours), and (vii) Professional development (in hours). (In all cases, the sum of underachievement should be minimum.)

Their interactive method is to generate a small group of solutions, and present it to the decision maker at each iteration, and get his/her preferred solution. These solutions are generated by maximizing a series of LP, formed

by taking various convex combinations of the seven objectives. As the decision maker points out his preferred solutions, they focus-in on his preferences in a revealed preference sense (*a posteriori*). The method may not reach the optimal solution and does require that the decision maker have considerable experience in filtering poor choices. It does impose a high cognitive burden on him/her, if quick convergence to a good solution is to be obtained. One distinct advantage of this approach is that the decision maker can learn about his/her weights (preferences) placed on the seven objectives and compare *a priori* weights to the ones revealed by his selection of a solution during the interactive session. Again, this approach can result in non-integer solutions.

The final math program technique we shall consider in this paper is the generalized assignment formulation of Balachandran and Zoltners (1981) for the staff assignment problem (bottom-up approach). Their objective function is a single objective, the total mismatch, where mismatch is defined as an individual assigned to a task for which either his experience and qualification or his prior performance is inappropriate/inadequate. They suggest that the *i*th staffman can be ranked, say m_i , on the basis of his performance evaluation on a scale of 1 to *p*. Similarly, task *j* can be ranked on the basis of task difficulty, say n_j . Then the mismatch coefficient can be defined as

$$c_{ij} = \begin{cases} (m_i - n_j)^{k^+} & \text{if } m_i \geq n_j \\ (n_j - m_i)^{k^-} & \text{if } m_i < n_j \end{cases}$$

where k^+ is a firm-specified exponent associated with making a "positive mismatch" by assigning an over-qualified auditor *i* to a less difficult task *j* (e.g., $k^+ = 2$). Similarly, k^- is a firm-specified exponent associated with making a "negative mismatch" by assigning an auditor *i* to a more difficult task *j* (e.g., $k^- = 3$). Usually, k^- is larger than k^+ and they are chosen to take into account the season, staff availability, work load, etc. If there is

no distinction between the mismatches, a default value such as $k^+ = k^- = 2$ may be used. Additionally, the coefficient c_{ij} can be set to a very large number whenever auditor i should not be assigned to audit-task j .

The decision variable is a 0-1 variable, x_{ij} ,

where $x_{ij} = \begin{cases} 1 & \text{if } i\text{th individual is assigned to the } j\text{th task} \\ 0 & \text{if otherwise.} \end{cases}$

Let t_{ij} : estimated time required to complete task j for the i th individual.

The model then is:

$$\text{Minimize } \sum_{i=1}^n \sum_{j=1}^m c_{ij} x_{ij}$$

subject to:

- (1) Time constraint on individual i for completing all tasks.

$$\text{Minimum Time available to } i \leq \sum_{j=1}^m t_{ij} x_{ij} \leq \text{Maximum Time available to } i, \quad \text{for all } i$$

- (2) Every task is completed exactly by one person

$$\sum_{i=1}^n x_{ij} = 1 \quad \text{for all tasks } j$$

- (3) $x_{ij} = 0$ or 1 for every i and j

ensures that tasks are not split amongst staff persons.

The advantages of this integer programming formulation are that there is assignment of one person to one task. Thus, it is easy to ensure that the problems associated with LP formulation will be avoided (though the model dimensions will increase). The authors have made their formulation as an interactive decision support system.

It is easy to see that the major cognitive burden is in coming up with the mismatch coefficient, c_{ij} , and involves the decision maker in a fairly

detailed implementation of the model, a task he/she may want the model to perform. The unitary objective function model will, of course, always suffer from the criticism that it fails to account for the hierarchy of goals and the trade-offs between them that are normally prevalent in CA firms.

5. Summary And Directions For Future Research

Several math program techniques have been applied to the professional manpower planning problem in a CA firm. We have reviewed the important ones: LP, goal programming, multiple objective linear programming, and integer programming. All the models are single period model and solve either the planning problem (total number of professionals needed in each category/level) or the scheduling problem (which individual will be assigned to which task). Ideally, the planning and the scheduling problem should be solved concomitantly. In the above models it is not so. The unitary objective models (LP, integer programming) require involvement of the decision-maker at the level of implementation details (for each individual i and each task j) and pose the cognitive burden at the detailed (micro) level, while the multicriteria models require the ability to differentiate (between solutions/goals) at the global level (aggregate level) and thus, pose a different kind of cognitive burden. Because the solution heavily depends on the cognitive input of the decision-maker, sensitivity analysis is useful and is generally available (except for goal programming). The same reason has also led to the recent models being developed as a decision support system.

Extensions of the present work suggested here are in terms of both modelling enhancements and enquiry into the robustness & stability of solutions. The

first extension suggested is to model the planning and the scheduling problem as one problem. Thus, the model will determine the manpower levels, schedule the overtime, and sequence the individual's schedules. Obviously, the problem will be more realistic if it is modelled as a multi-period problem. Hierarchical models of production planning (Hax, 1975; Graves, 1982) can be used.

The model solutions are likely to be heavily dependent on the cognition based inputs of the decision-maker; therefore, the robustness and stability of the solutions needs to be investigated. With later models being developed as part of decision support systems, this requirement becomes even more urgent.

The modelling effort places a great deal of cognitive burden on the decision-maker with two different types of burdens (aggregate versus detailed) associated with the two different approaches - top-down or bottom-up. A comparison of the cognition processing and which is easier for the decision maker should help in producing more useful decision support systems.

Finally, the modelling done is under purely static environment. A simulation type study would be needed to determine the applicability and efficacy of static modelling in a dynamic environment.

FOOTNOTES

1. Their definition of underutilization is different than the one we have used. For them, underutilization of a staff person occur when he/she is assigned to a job to which a person of lesser qualification/experience would be normally assigned. However, as they state, it could be considered as idle time also.

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NEW! IS IT NECESSARY?

AN EVALUATION OF THE FORWARD AVERAGING SYSTEM
OF THE FEDERAL INCOME TAX LAW

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ABSTRACT

The old general averaging provision and income-averaging annuity contract (IAAC) were recently replaced by the forward averaging provision. The Department of Finance gave examples which indicated that the IAAC was not significantly better than forward averaging. No comparison was made with the general averaging provision which was also removed.

This paper completes the examples by focusing the comparison on the general averaging provision and assessing the need for changing the law in respect to averaging. Additionally, examples are presented to show situations, in particular those related to deceased taxpayers, in which forward averaging may be considered.

It was found that general averaging was more attractive partly because it resulted in slightly less tax, but more importantly because of the non-tax considerations. The non-tax considerations are:

- 1) certainty of tax liability because it was done once and for all,
- 2) simple to apply because it was done automatically by computer,
- 3) non-discriminatory because it was applied automatically to all qualified individual taxpayers without the necessity of professional advice and without the need to make an election,
- 4) greater flexibility because it allowed backward as well as forward averaging as recommended by the Carter Commission.

It was concluded that forward averaging has dubious utility to the taxpayer because its application requires a consideration of uncertain future variables. The replacement of the old averaging system appears inconsistent with one of the recommendations by the Carter Commission that the hardship due to the interaction of progressive tax rates and uneven income flows over time should be substantially relieved by generous income-averaging provisions.

NEW! IS IT NECESSARY?AN EVALUATION OF THE FORWARD AVERAGING SYSTEM OF
THE FEDERAL INCOME TAX LAW

The complexity of the Income Tax Act has become a matter of concern to many Canadians. Calls for simplifying the tax law have been voiced by such influential organizations as the Chamber of Commerce (Globe and Mail, 1983) and the Canadian Tax Foundation (1983). In December 1983, the Honourable Mr. Brian Mulroney established a task force on tax simplification under the chairmanship of Mr. Clifford Rae. Also, a number of flat-rate tax proposals have been advanced as a means to simplify the tax law (Walker, 1983). Unfortunately, tax simplification involving wholesale changes to the Act is complex, as well as costly, due to the competing policy objectives and political realities. Perhaps the best approach is to explicitly make tax simplification part of the tax policy objective for future changes to the Act and to proceed toward simplifying the existing statute in more manageable portions. An initial step would be to identify and remove those provisions of marginal utility. One such provision is forward averaging.

Beginning with the 1982 taxation year, the old general averaging provision (G.A.) and the income-averaging annuity contract (IAAC) were replaced by the new forward averaging (F.A.) mechanism for individual taxpayers. Shortly before the F.A. provisions became law, the then Minister of Finance, the Honourable Allan MacEachen, released examples comparing the F.A. with the IAAC provisions (See Appendix I). The examples, by assuming the case of a farmer retiring and selling a farm for gross proceeds of \$250,000 with a capital gain of \$200,000, show negligible differences in after-tax cash flows between the new and the old averaging systems after taking into consideration the lower income tax rates contained in the November 12, 1981 Budget. This comparison is incomplete. It is incomplete because it ignored a direct comparison with the general averaging provision which, together with the IAAC provisions, was replaced by the F.A. provision. Also, it ignored the potential cash flows that would be generated from the re-investment of the net proceeds from the sale of the farm.

The old averaging system contained two distinct and separate parts. The first, being general averaging, was applied automatically to all individual taxpayers who received abnormal increases in income regardless of its source. This increase was averaged with past income to minimize the impact of the progressive tax rate structure. The second, income-averaging annuities, enabled certain types of income, such as the income from artistic, entertainment and athletic activities and capital gains, to be spread over a number of future years by the acquisition of an annuity contract. The two parts have been combined into one which is now the forward-averaging system.

This paper will compare the old and new averaging systems by specifically incorporating in the comparison the old general averaging provisions and more realistic future income flows. Examples will be presented to show situations in which F.A. may be considered. Moreover, an evaluation will then be made of the F.A. provisions in terms of the simplicity and utility criteria.

General Averaging Provision

In order for the G.A. provision to apply an individual must have been resident in Canada throughout the year immediately preceding the year of averaging and been in receipt of an abnormal level of income in the year of averaging as compared with certain preceding years. Specifically, the abnormal increase was defined to be the excess of income in the year of averaging over the greater of 110% of his income for the immediately preceding year and 120% of the averaged income of up to four consecutive preceding years. This excess is referred to as the averaging excess. It should be noted that the averaged income of the preceding years was not indexed to account for inflation.

The tax payable under the G.A. provision was the sum of:

- 1) the tax payable if the averaging excess was removed from taxable income, and
- 2) five times the difference between the tax payable if one-fifth of the averaging excess was included in taxable income and the tax payable without the averaging excess being included in taxable income.

In other words, the averaging excess would be taxed at the average marginal tax rate if the incremental taxable income was increased by one-fifth of the averaging excess.

The G.A. provision contained a number of positive features which are lacking in the F.A. provision. These include:

- 1) certainty of tax liability due to its past and present orientation without any future action necessary,
- 2) simple to apply because it was done automatically by computer,
- 3) non-discriminatory because it was applied to all qualified individual taxpayers who could benefit without the need to seek professional advice and without the need to make an election,
- 4) greater flexibility because it allowed backward as well as forward averaging as recommended by the Carter Commission (1967, p.152).

Forward Averaging Provision

In order to apply the F.A. provision, an individual taxpayer must be resident in Canada throughout the year of averaging and the two immediately preceding years. This provision does not apply automatically but requires an election by the individual taxpayer. The F.A. mechanism combines two parts into one provision. The first part applies to abnormal increases in income in the year of averaging regardless of source. The amount subject to averaging under the first part is the excess of the income in the year of averaging over 110% of the average adjusted income. The average adjusted income is the average of the income, indexed by the Consumer Price Index, for up to three preceding years throughout which the individual taxpayer was resident in Canada. The second part applies only to the specified types of income, namely: income from the production of literary, dramatic, musical or artistic work; income from activities as an athlete, a musician or a public entertainer and one-half of the net capital gain reserve included in income. The amount subject to F.A. cannot be less than \$1,000 nor more than the taxable income in the year of averaging.

The averaging amount the taxpayer elects on is deducted from net income in computing taxable income. Tax is calculated in the normal manner on this reduced taxable income.

The taxpayer is required to pay a refundable tax at the top federal marginal rate (currently 34 per cent) on the averaging amount. The taxpayer cannot use his dividend tax credit, foreign tax credit, investment tax credit, political contribution tax credit, or employment tax credit to reduce the forward averaging tax payable. The averaging amount is added to the accumulated averaging amount. The accumulated averaging amount is indexed every year based on the Consumer Price Index.

The taxpayer can elect for any year throughout which he was resident in Canada, to bring into income any portion of his accumulated averaging amount at the end of the preceding year. The amount elected on is added to net income in arriving at taxable income and taxes payable on this taxable income are computed in the normal manner.

The taxpayer obtains a credit against taxes otherwise payable for the taxes previously paid. The credit equals the amount of the accumulated averaging amount brought into income during the year times the top federal marginal rate of 34%. The amount brought into income reduces the balance of the accumulated averaging amount.

If the credit is in excess of the taxes payable (after deducting the applicable credits such as the dividend tax credit), the excess is considered to be an amount paid on account of taxes on April 30th and is refundable. The tax addition and reduction under the forward averaging provision form part of the basic federal tax payable upon which provincial and territorial tax is based. The mathematical formula for applying forward averaging is set out in Appendix II.

As can be seen, the application of F.A. is difficult and requires the consideration of uncertain variables such as future income flows, future tax rates, indexing factors and discounting rates.

Comparison of General Averaging and Forward Averaging

The following comparison will complement the example released by the Department of Finance referred to earlier. Specifically, the same basic assumptions utilized by the Department of Finance will be used to compare the G.A. and F.A. provisions. A more reasonable future cash flow, to take into consideration the investment of the sale proceeds, will be assumed in the comparison.

Insert Table 1 here

The federal and provincial tax of \$39,478 under general averaging in the year of sale, as shown in Table 1, has been calculated after taking into account the general averaging provision. In applying the G.A. provision, each of the four preceding year's income was discounted by the indexing factor from the other income in the year of sale. As in the IAAC examples (see Appendix I), the above example shows a slight advantage for the application of general averaging over forward averaging.

TABLE 1: COMPARISON OF GENERAL AVERAGING AND FORWARD AVERAGING

<u>Forward Averaging</u>	<u>Year of Sale</u>	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>
Proceeds From Sale of Farm	250,000	0	0	0	0	0
Taxable Capital Gain - All Forward Averaged	100,000	0	0	0	0	0
Taxable Amount Included From Forward Averaging	0	21,780	23,958	26,354	28,989	31,888
Other Income (Investment Income, OAS, CPP)	20,000	35,000	38,500	42,350	46,585	51,244
Personal Exemptions	6,670	12,331	13,564	14,921	16,413	18,054
Taxable Income	13,330	44,449	48,894	53,783	59,161	65,078
Regular Federal Tax Plus Provincial Tax	3,397	15,107	16,617	18,278	20,107	22,117
Refundable Tax Prepayment	49,980	0	0	0	0	0
Refundable Tax Credits	0	10,996	12,095	13,305	14,635	16,099
Cash Available	216,623	30,889	33,978	37,377	41,113	45,226
<u>General Averaging</u>						
Proceeds From Sale of Farm	250,000	0	0	0	0	0
Taxable Capital Gain	100,000	0	0	0	0	0
Other Income (Investment Income, OAS, CPP)	20,000	35,000	38,500	42,350	46,585	51,244
Personal Exemptions	6,670	12,331	13,564	14,921	16,413	18,054
Taxable Income	113,330	22,669	24,936	27,429	30,172	33,190
Federal and Provincial Tax	39,478	6,353	6,988	7,687	8,456	9,302
Cash Available	230,522	28,647	31,512	34,663	38,129	41,942
Net Difference in Cash Available Between G.A. and F.A. Provisions:						
Current Dollars	13,899	(2,038)	(2,038)	(2,038)	(2,038)	(2,038)
Constant Dollars	13,899	(2,242)	(2,466)	(2,714)	(2,984)	(3,284)
Present Discounted Value of Cash Available over Six Years:						
F.A. Provision	357,028					
G.A. Provision	360,737					
Difference	3,709	1.04%				

Forward Averaging in Year of Death

If a taxpayer is resident in Canada from January 1, in the year of death to the date of death, he is deemed to have been resident throughout the year, and accordingly, may be eligible to elect to forward average or to bring into income a portion of his accumulated averaging amount. The net income of the deceased taxpayer would be reduced by any amount on which he elected to forward average or increased by any portion of the accumulated averaging amount he elected to include in income. Taxes payable would be computed in the normal manner on the resulting taxable income. If the deceased elects to forward average, tax at the top rate is payable on the amount forward averaged. If the taxpayer elected to include in income a portion of the accumulated averaging amount, he receives a tax credit (at the top federal rate of 34 per cent) on the portion of the accumulated averaging amount he elected to include in income.

The taxpayer receives a tax credit (at the top federal rate of 34 per cent) on his accumulated averaging amount at the end of the year of death. The calculation of his accumulated averaging amount at the end of the year of death takes into account any amounts elected on or brought back into income for the year of death but is before indexing. Notional tax is then calculated on this accumulated averaging amount by assuming the deceased taxpayer's taxable income for each of the three preceding years had been increased by one-third of this accumulated averaging amount. The gross amount of tax (before any tax credits) is calculated on this taxable income using the rates for that year. If the preceding year is before 1982, the tax is calculated on the assumption general averaging did not apply. Tax in the same manner (before credits and without general averaging) is calculated on the actual taxable income for that year. The excess of the notional tax on the increased taxable income over the notional tax on the actual taxable income for each of the three years is added to federal taxes payable for the year of death.

If the deceased taxpayer's federal marginal rate of tax for the year of death is less than his marginal rate for each of the three preceding years, forward averaging will not be beneficial. If the marginal rate of tax for the year of death is greater than the marginal rate for each of the three preceding years or greater than the average of the three rates, forward averaging should be beneficial.

The following example, as developed by Deloitte Haskins & Sells, shows the methodology for the consideration of applying the specific F.A. provisions in respect of a deceased taxpayer.

Assumptions:

- 1) Mr. X has always been a resident of Canada
- 2) Mr. X dies in 1982
- 3) Taxable income for 1982 equals \$100,000
- 4) Mr. X's taxable incomes for the past three years are as follows:

<u>Year</u>	<u>Taxable</u>
1981	\$50,000
1980	26,000
1979	16,000

- 5) in each of the above three years Mr. X's income includes dividends, grossed-up amount \$1,000
- 6) Mr. X received dividends of \$36,000 in 1982 (grossed-up amount \$54,000, dividend tax credit \$12,240)
- 7) Mr. X can elect to forward average on up to \$54,000 in 1982.

Discussion:

The 1982 taxable income in excess of \$53,376 will be taxed federally at 34 per cent. If a portion of this excess can be taxed in a prior year at less than 34 per cent, Mr. X will benefit.

Determining Amount to be Elected on:

Amount Elected On	Adjusted Taxable Income				Marginal Tax Rate % on Adjusted Taxable Income				
	1979	1980	1981	1982	1979	1980	1981	Avg.	1982
N11	\$16,000	\$26,000	\$50,000	\$100,000	25	32	36	31	34
\$ 3,000	17,000	27,000	51,000	97,000	25	32	36	31	34
15,000	21,000	31,000	55,000	85,000	28	32	36	32	34
30,000	26,000	36,000	60,000	70,000	32	32	36	33-1/3	34
45,000	31,000	41,000	65,000	55,000	32	32	36	33-1/3	34
46,623	31,541	41,541	65,541	53,377	32	32	36	33-1/3	34*

* Reducing 1982 taxable income any further would reduce the marginal tax rate to 30% which is below the 1979-1981 average.

Conclusion:

Mr. X should therefore elect to forward average on \$46,623

Tax Calculation for Various Elected Amounts:

	(A)	(B)	(C)	(D)
Elected Amount	N11	\$ 30,000	\$ 46,623	\$ 51,000
Adjusted Taxable Income				
1982	\$100,000	\$ 70,000	\$ 53,377	\$ 49,000
1981	50,000	60,000	65,541	67,000
1980	26,000	36,000	41,541	43,000
1979	<u>16,000</u>	<u>26,000</u>	<u>31,541</u>	<u>33,000</u>
	<u>\$192,000</u>	<u>\$192,000</u>	<u>\$192,000</u>	<u>\$192,000</u>
Federal Taxes Payable				
	(A)	(B)	(C)	(D)
On 1982 taxable income	\$ 29,085	\$ 18,885	\$ 13,233	\$ 11,920
Dividend tax credit	(12,240)	(12,240)	(12,240)	(12,240)
Federal tax reduction	<u>(200)</u>	<u>(200)</u>	<u>(200)</u>	<u>(200)</u>
	16,645	6,445	793	N11
Tax on elected averaging amount	N/A	10,200	15,852	17,340
Tax on adjusted taxable incomes				
- 1981	N/A	16,881	18,876	19,401
- 1980	N/A	8,955	10,728	11,195
- 1979	N/A	5,965	7,738	8,205
Tax otherwise payable				
- 1981	N/A	(13,281)	(13,281)	(13,281)
- 1980	N/A	(5,755)	(5,755)	(5,755)
- 1979	N/A	(3,122)	(3,122)	(3,122)
Credit for Accumulated Averaging Amount	N/A	(10,200)	(15,852)	(17,340)
Total federal tax for 1982	<u>\$ 16,645</u>	<u>\$ 16,088</u>	<u>\$ 15,977</u>	<u>\$ 16,643</u>

Option C results in the least amount of tax for 1982.

It should be noted that a taxpayer resident in Canada who dies having an unclaimed accumulated averaging balance, is forced to bring that amount into income either in the year of death or notionally over the three prior years. This is the only situation where a taxpayer is forced to bring his accumulated averaging amount into income. This is also the only situation where the application of F.A. requires no speculation as to uncertain future variables.

Examples of Forward averaging Consideration

1. Components of Income - Utilization of the Dividend Tax Credit

An individual must carefully analyze the components of the income reported before electing to forward average for the year. This is extremely important when the individual is in receipt of dividends from taxable Canadian Corporations which are subject to the 50% gross-up mechanism and a dividend tax credit is allowed as part of the tax integration concept. Assume the following information for 1982:

Taxable income	<u>\$250,582</u>
Net income	\$260,444
1982 Accumulated averaging income	<u>73,179</u>
Excess	<u>\$187,265</u>

Included in net income was a taxable dividend from a taxable Canadian Corporation in the amount of \$200,616. The future income flow was expected to be considerably lower such that it would attract a very much reduced federal rate of tax.

If the taxpayer was to claim the total excess of \$187,265 and forward average this amount, there would be no 1982 tax to pay other than the forward average tax of \$94,232. However, as a result of this decision, the taxpayer would suffer a permanent loss of the unused dividend tax credit of \$28,860 which represents \$57,353 of taxable income at his marginal tax rate.

In order to maximize the dividend tax credit, the taxpayer should elect to forward average only \$102,798 which would result in forward average tax of \$51,728 and full utilization of the dividend tax credit.

2. Hindsight Application

In 1982, the taxpayer reported the following:

Taxable income	<u>\$ 8,134</u>
Net income	\$22,655
1982 Accumulated Averaging Income	<u>15,628</u>
Excess	<u>\$ 7,027</u>
Total Forward Average Tax On Excess	\$ 3,535

Hindsight was applied in this instance as the taxpayer died in early 1983 and the 1983 final return was prepared simultaneously with the 1982 tax return. The final decision was to forward average in 1982 on the maximum of \$7,027 which result in taxable income of \$1,107. The tax payable was \$3,535 being the forward average tax only.

In finalization of the 1983 return, the income elected upon was indexed by 1.115%, the 1983 indexing factor, resulting in \$7,835 being reported as income. Due to the relatively short taxation year for other sources of income, and full personal exemptions allowed in the year of death, there was no tax liability for 1983.

The 1982 tax relating to forward averaging was also indexed by 1.115% which resulted in a tax refund of \$3,942.

Evaluation and Conclusion

The numerical analysis shows that the former system of general averaging and IAAC is slightly more favourable to the taxpayer than the forward averaging. Unfortunately, forward averaging requires the estimation of future variables, which by nature are uncertain. Once applied, it becomes necessary to constantly monitor and update the averaged amounts subject to tax in some future periods. Forward averaging is, therefore, administratively cumbersome to both the taxpayer and the tax collector alike. Moreover, its elective requirement tends to discriminate against those who can least afford professional assistance and goes counter to the self-assessing requirement which is the central feature of our tax system. It is not surprising that, in practice, tax advisers are finding few occasions in which the forward averaging provision can be advantageously applied to their clients with a tolerable degree of certainty in determining their ultimate tax liability. The replacement of the old averaging system appears inconsistent with one of the recommendations by the Carter Commission (1967, pp. 151-152) that the hardship due to the interaction of progressive tax rates and fluxuating income flows over time should be substantially relieved by generous income-averaging provisions. The purpose for replacing the old averaging system with a provision of marginal utility is not clear although increased tax revenue may be one of the motives.

Admittedly, the forward averaging can be advantageous in some special situations, such as in the year of death and in the years preceding and after retirement. Is the limited application worth the cost of complicating the tax law due to the inclusion of forward averaging?

Example 1 — Five-Year Planning Period

Taxation of Capital Gains Realized by a Farmer at Retirement

Comparison of Pre- and Post-Budget Systems

Basic Assumptions: Farm sold for \$250,000 cash in 1982; capital gain is \$200,000; farmer and wife both turn 65 in the following year and receive OAS and full CPP pension; average provincial tax rate 47%; 10% inflation; 12% yield on investment in income averaging annuity contract (IAAC).

	Year of sale	Year 1	Year 2	Year 3	Year 4	Year 5
PRE-BUDGET: BUY FIVE-YEAR IAAC						
Proceeds from sale of farm	250,000	0	0	0	0	0
IAAC premium (deductible)	78,199	0	0	0	0	0
IAAC income (to be included in income)	0	21,801	21,801	21,801	21,801	21,801
Cash flow from sale (after IAAC purchase)	171,801	21,801	21,801	21,801	21,801	21,801
Taxable portion of this cash flow	20,801	20,801	20,801	20,801	20,801	20,801
Other income (farm net income, OAS, CPP)	20,000	10,073	11,080	12,188	13,407	14,747
Personal exemptions	6,670	12,331	13,564	14,921	16,413	18,054
Taxable income	34,131	18,543	18,317	18,068	17,795	17,494
Federal plus provincial tax	11,417	5,012	4,825	4,665	4,490	4,309
Cash Available	180,384	26,861	28,055	29,323	30,718	32,240
POST-BUDGET: USE NEW FORWARD AVERAGING						
Proceeds from sale of farm	250,000	0	0	0	0	0
Taxable capital gain—all forward averaged	99,000	0	0	0	0	0
Taxable amount included from forward averaging	0	21,780	23,958	26,354	28,989	31,888
Other income (farm net income, OAS, CPP)	20,000	10,073	11,080	12,188	13,407	14,747
Personal exemptions	6,670	12,331	13,564	14,921	16,413	18,054
Taxable income	13,330	19,522	21,474	23,621	25,983	28,582
Regular federal plus provincial tax	3,397	5,272	5,799	6,379	7,017	7,719
Refundable tax prepayment	49,500	0	0	0	0	0
Refundable tax credits	0	10,890	11,979	13,177	14,495	15,944
Cash available	217,103	15,691	17,260	18,986	20,884	22,973
Net difference in cash available between pre- and post-budget systems:						
Current dollars	36,718	-10,155	-8,922	-7,767	-6,717	-5,754
Constant dollars	36,718	-11,171	-10,796	-10,338	-9,834	-9,267
Present discounted value of cash available over six years:						
Pre-Budget	\$284,885					
Post-Budget	284,336					
Difference	-0.2%					

Examples 2 and 3 released by the Department of Finance have been omitted as they indicate the same marginal difference.

The election of the forward averaging provision will be beneficial if the present value of future benefits (B) to be obtained is greater than the present cost (C) of forward averaging. That is, if $B - C > 0$, the forward averaging provision should be elected.

$$B = D \times (AAA \times .34 \times P - AAA \times F \times P) \quad (1)$$

$$C = FAA \times (.34 - F_C) \times P_C \quad (2)$$

Where

FAA = forward averaging amount

I = index factor used for accumulated averaging amount

AAA = FAA x I

D = discount factor

P = one plus provincial rate of tax in effect at time forward averaging amount brought back into income.

.34 = rate of credit when FAA brought back into income

F = federal marginal rate when FAA brought back into income

P_C = one plus provincial rate of tax in effect at time amount forward averaged

.34 = rate of tax that had to be paid on forward averaged amount

F_C = federal marginal rate that would have applied to forward averaged amount

$$\text{Since } AAA = FAA \times I, \quad (3)$$

$$B - C = FAA \times (I \times D \times P \times (.34 - F) - P_C \times (.34 - F_C)) \quad (4)$$

COMMENTS ON FORMULA

- (1) If the taxpayer's current federal marginal rate is 34 per cent and we can assume the federal marginal rates do not increase then $(.34 - F_c)$ becomes zero and the formula will never produce a negative number.

However, in deciding to forward average or not, estimates of future tax rates etc. must be made. Reasonable estimates can only be made for the near future.

- (2) If the taxpayer's federal marginal rate and his provincial rate remain constant, the formula will produce a positive number if $I \times D$ is greater than or equal to 1. That is, the indexing rate is greater than or equal to the net after-tax rate of return the taxpayer could earn. It is beneficial for the taxpayer to elect in this situation.
- (3) If the taxpayer's federal marginal rate and his provincial rate remain constant, the formula will produce a negative number if $I \times D$ is less than 1. Taxpayer would not elect in this situation.
- (4) If the taxpayer's federal marginal rate remains constant, but his provincial rate varies, it would be beneficial to elect if $I \times D \times P$ is greater than his current provincial rate plus one (i.e. P_c). If $I \times D \times P$ is less than P_c it would be disadvantageous to elect. Moving to a province with a higher rate is more beneficial for forward averaging than moving to a province with a lower rate.

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CAAA EDUCATION COMMITTEE

COMITÉ D'ENSEIGNEMENT

The Education Committee of the Association is pleased to provide a collection of papers and comments that were presented during the workshops it organized for the 1984 annual conference.

The Committee continues to believe that there are major curriculum issues at an individual institutional level and at a national level in financial accounting, auditing, accounting for the non-profit sector, income tax, and management accounting. The issues affecting given courses may have different implications when taught for undergraduate, graduate and professional after-degree programs. Also, there is little information on a national level concerning what should be taught in given topical areas. The workshops, the resulting papers, and the discussion that may be generated are steps toward improving our understanding of the accounting curriculum on a nation-wide basis. Last year we provided a collection of papers on intermediate financial accounting and on a first course in auditing.

The 1984 workshops focused on course material in the non-profit sector and on integrating computers into the accounting curriculum. We believe the following papers provide many ideas that are valuable for those interested in the accounting education scene in Canada. These ideas and the bibliographies are reproduced here with the overall hope that they may improve our understanding of the issues in accounting for the non-profit sector and in integrating the computer into accounting courses. We hope that in time these ideas will lead to improvements in course content and teaching quality in these areas.

CAAA Education Committee (1983-84)

Ross A. Denham (Chairman)
Morley Lemon
Daniel McDonald
Daniel Zeghal

ACCOUNTING AND PERFORMANCE MEASUREMENT IN THE NON-PROFIT SECTORSOME THOUGHTS ON A TEACHING AGENDA

I. Introduction:

My little effort here today reflects the challenges and frustrations of attempting to pull together a teaching agenda in accounting and performance measurement in non-profit organizations for Masters and Diploma students in Public Administration at the University of Victoria over the last six years. Eligible students must have taken at least a basic introductory course or its equivalent in accounting, although sometimes the effects of this prerequisite are not obvious!

My experience has been that the professional associations and the academic community -- with some occasional honourable exceptions -- regard the subject of the non-profit sector with at best tolerant indifference -- so that a token lecture or chapter or whatever is devoted to the subject, usually at the end of the course or book -- and at worst derision -- so that the subject is seen as a politicized, and therefore hopelessly corrupted, derivative of the standard accounting model. The available books are increasing in both quantity and quality, but still -- without exception as best I can ascertain -- are deficient in one of three ways:

- a) They assume a basic background in the nature and scope of non-profit organizations and the mechanics of translating the standard profit-oriented accounting model for use by non-profit organizations, and proceed directly to an interesting dissertation -- without, I am arguing, a good foundation -- on management control in non-profit organizations.

- b) They retain the emphasis on management control questions, but precede this treatment by a brief introduction to the nature and scope of non-profit organizations, and usually an even briefer introduction -- which is inadequate to the point of being deceptive -- to the translation of the standard accounting model for use by non-profit organizations.
- c) They emphasize accounting rather than management control in non-profit organizations, but tend to leap right into the details of the accounting model in non-profit organizations -- usually focussed on governments and indeed mainly on local governments -- and overwhelm the reader with detail and complexity without clarifying the basic concepts and the nature of the bridge from the standard model to the model used in or required by non-profit organizations.

In short, there is an excellent literature on management control, and no shortage of references on detailed accounting procedures in non-profit organizations, especially local governments, but there is, in my view, no systematic, basic treatment of the bridge between the standard accounting model and the non-profit accounting model. The first half of the course which I propose to discuss briefly here today therefore focuses on an attempt to construct such a bridge.

II. A Teaching Agenda: Two Alternatives:

- a) Initial Assumption: The subject of accounting and performance measurement in the non-profit sector is sufficiently important in itself, and sufficiently different from accounting and performance measurement in the

profit-oriented sector, that it requires separate -- but, of course, related -- treatment. My argument is that it would not suffice to attempt to incorporate reference to the non-profit sector in existing courses. In principle, existing courses could be widened and deepened to include reference to the non-profit sector, but the evidence of the existing literature suggests that the non-profit sector would tend to be treated as a minor variation on a general theme, and the fundamental conceptual and procedural distinctions blurred or perhaps lost altogether. My point here is a practical one rather than a substantive one. There is no question that the non-profit sector and its accounting and performance measurement could be incorporated in existing courses; but I doubt that a sector which accounts for nearly 45% of gross national product in Canada would receive the seriousness of treatment I believe it deserves in such an approach.

- b) Two Approaches to a Teaching Agenda: Given the assumption that the non-profit sector would be inadequately treated if simply incorporated in existing courses in accounting and performance measurement, there remain two distinct routes to the incorporation of the subject into teaching curricula, and obviously all the shades of grey along the spectrum between the two routes. The first route requires a set of courses similar to that presently in place for the profit-oriented sector, and would then build a set of specialized and advanced courses onto the basic set of core courses. The second route acknowledges the reality of scarce resources and the inevitability of incrementalism, and requires only one course -- a general overview of accounting and performance measurement in

the non-profit sector. Nothing if not pragmatic, this paper concentrates on the second route after a brief look at what a complete curriculum might look like.

c) Camelot: One View of a Complete Curriculum:

CORE: Four basic courses required of all students: each course requiring one semester:

1. Introductory Course: General Principles of Accounting and Performance Measurement in the Non-Profit Sector. (This course would be a rather less ambitious form of the one-course route set out below).
2. Accounting and Performance Measurement in the Non-Profit Sector: I
Public and Private Organizations (other than Governments).
3. Accounting and Performance Measurement in the Non-Profit Sector: II
Governments.
4. Management Accounting and Control in Public and Private Non-Profit Organizations.

SPECIALIZED AND ADVANCED COURSES: Two categories:

1. Intermediate and Advanced Theory Courses on Non-Profit Accounting, covering, e.g. in-depth treatment of Fund Accounting, and comparative treatment of different kinds of non-profit organization.
2. Specialized treatment of selected non-profit organizations, e.g. hospitals, colleges and universities, voluntary organizations.

d) Reality: The Single-Course Option:

My argument is that a one-semester course should provide introductory coverage of the following subjects:

1. The Nature and Scope of the Non-Profit Sector, including Governments.
2. The Nature of Accountability. Its Measurement in the Profit-Oriented Sector, including the Public Profit-Oriented Sector.
3. Accountability in the Non-Profit Sector:

(a) Financial Reporting:

Principles, Concepts, Financial Statements.

Illustrative Financial Statements for a hypothetical private non-profit organization and a public non-profit institution such as a college.

Financial Reporting in Governments -- a Variation on the General Theme.

(b) Performance Measurement and Reporting:

Alternative organizational classifications.

Cost and Output Measurement.

Analytical methods in support of performance measurement.

4. The Management Cycle in the Non-Profit Sector;

(a) Planning and Budgeting for Revenue and Expenditure.

Governments as a special case.

The role of a Budgetary Central Agency.

(b) Implementation and Control of Revenue and Expenditure Flows.

Governments as a special case.

The role of a Controlling Central Agency.

Internal Audit in the Non-Profit Sector.

(c) Retrospective Evaluation and External Auditing of Revenue and Expenditure Flows.

5. Case Studies:

- (a) A Private Non-Profit Organization.
- (b) A Public Non-Profit Institution, e.g. a Hospital or University.
- (c) A Government or Government Department.

The balance of this note explores the single-course option in more detail.

III. A Detailed Course Outline for the Single-Course Option:

The course outline described in this section contains thirteen topic areas. The scheduling of these topic areas over, say, a thirteen week course is discussed at the end of the section. The thirteen topic areas are each set out in syllabus form, and then commented on briefly.

a) Introduction: The Organizational Universe:

	Private	Public
Profit	Enterprises	Enterprises
Non-Profit	Service Organizations	Institutions Departments

Comment: It is important in this section, I believe, to emphasize to the students that the fundamental distinction is between the profit-oriented and the non-profit sectors and not between the public and private sectors. Students are frequently surprised to be informed that there is a public profit-seeking sector -- although the performance of Canadian crown corporations at the federal and provincial level would typically justify this innocence -- and are often equally surprised to

discover that there is a private non-profit sector. A reminder that their neighbourhood bridge club or nudist colony fits into this category is often timely..

- b) The Scope of the Non-Profit Sector in Canada and the United States -- by share of GNP and Employment.

Comment: I have found it useful to supplement the discussion of the institutions in the various components of the organizational universe with some statistical material on the scope of the non-profit sector in Canada -- perhaps also with some comparative material on the United States and other European countries -- by share of GNP and by employment. This I have discovered for Canada is more easily said than done, since the statistics exist in a variety of places and are subject to various forms of interpretation.

- c) Characteristics of Non-Profit Organizations:

Objectives and Output Measurement

Funding

Constraints

Ownership

Comment: The various text books typically handle this section of the material fairly well, although they frequently provide a discussion which is lengthy and detailed to the point where the key differences are blurred. My preference is to stress four major differences: first, objectives and output measurement, where the difference between the service and profit objectives has to be stressed; second, funding, where it is important to stress that revenue is unrelated to the value of output in the non-profit

sector; third, constraints, where I stress the constraints imposed by fund accounting and the different forms of appropriation control; and, finally, the question of ownership, where it has to be stressed that non-profit organizations have no ownership shares that can be sold or traded, and that the equity in a non-profit organization is not owned by, or disposable by, individuals in a private capacity.

d) Accountability, Financial Reporting, and Performance Measurement in Non-Profit Organizations: Overview

The Management Cycle

The Nature of Accountability

Level 1 -- Propriety and Compliance

Level 2 -- Performance Measurement: range of non-dollar output measures.

Political Accountability in Public non-profit organizations.

Comment: In this section I attempt to sketch the context of accounting and performance measurement in non-profit organizations by introducing the management cycle and the nature of accountability in non-profit organizations. Under the first head I stress the sequence of planning and budgeting, followed by implementation and management control, and in turn by retrospective evaluation and external audit. Later in the course I come back to the institutions which are charged with these functions in the non-profit sector, particularly its public part. It is worth, I think, spending a bit of time on the question of accountability. I try to point out that procedural accountability, for propriety and compliance, is very similar to that for profit-oriented organizations, with two caveats -- first, the fact that the organization frequently has to report as a series of accounting entities under the constraints of fund accounting; and,

second, and more important, that the non-profit sector lacks a set of generally accepted accounting principles. One can point to the glacial progress in this area, but also stress that procedural accountability is often very much an ad hoc affair in the non-profit sector. The second level of accountability raises the question of performance measurement, and it is helpful here to stress two points: first, that financial reporting in the non-profit sector is purely procedural, and that non-financial information on outputs must be included if performance is to be reflected; and, second, that performance measurement in the public non-profit sector is complicated by the fact that public sector decision-makers operate in a political culture where accountability and rationality are defined in terms of re-election rather than profit or cost-benefit analysis. This crucial contextual difference is frequently omitted or blurred in the text books on the subject.

I have had a bit of a debate with my colleagues and students at this point in the design of the course as to whether one should go directly from the material on the management cycle and accountability to topic areas (f) and (g) listed below on the users of accountability information and concepts and principles, etc. The obvious reason for this suggestion is that topics (f) and (g) continue the broad introduction to the subject. However, I persist in believing that students tend to get a bit bored by a long introductory section, and in the interests both of enrolment preservation and what I consider to be a superior logic (!) I think it is useful to drop students right into an example early in the course. So I leap next into the material dealt with under topic (e).

e) Financial Reporting in Non-Profit Organizations:

Begin with illustrative example: e.g. Smalltown Museum

The Set of Financial Statements:

The Statement of Financial Position:

Fund Balance and the revised accounting equation.

The limited role of the Statement of Financial Position.

The Statement of Revenue and Expenditures:

Comparison with the Statement of Operations in the profit-seeking sector.

The components of revenue and expenditures -- the absence of matching.

The Statement of Changes in Fund Balance

Other Statements:

Statement of Fixed Assets and Statement of Long-Term Debt.

The Relevance of the Statement of Changes in Financial Position.

An Illustrative Set of Transactions for the Year.

Recording Rules in the Non-Profit Sector

$$A_1 + E = L_1 + FB_0 + R$$

Journalizing and Posting.

The Trial Balance

The End-of-Year Financial Statements.

Comment: The illustrative example deals with a hypothetical Smalltown Museum financed mainly by government grants and other donations, but also using some user fees. The example starts with a set of financial statements for Smalltown Museum at the end of a year of operation, and

examines each of these statements briefly. Under the Statement of Financial Position, I stress that most non-profit organizations show in their Statement of Financial Position only current assets and liabilities, and must therefore supplement this statement by associated account statements of fixed assets and long-term debts. Clearly also, the distinction between the fund balance and owner's equity must be stressed, and it is useful to point out that non-profit organizations must frequently present a separate Statement of Financial Position for each of its various funds. In general, it is clear that the Statement of Financial Position is much less important in the non-profit sector than in the profit-oriented sector. The Statement of Revenue and Expenditures is very different from the profit-oriented Statement of Operations. Revenues include all sources of funds, and only those revenues obtained from user-pay operations reflect the value of output. Expenditures include all dollar outlays, with no distinction being made between capital and operating transactions. In short, there is no matching, and the Statement of Revenue and Expenditures is really simply a Sources and Uses of Funds Statement. I go on to point out that the Statement of Fund Balance is very much like a Retained Earnings Statement in the profit-oriented sector, although I have to emphasize here again the distinction between Owner's Equity and Fund Balance. This first simple example is set up on a cash accounting basis, and I demonstrate to the students here that the Statement of Revenue and Expenditures serves double duty, serving also as a Statement of Changes in Financial Position. Having described the initial set of statements, I then take the students through about twenty-five transactions, and duly

record these and generate a new end-of-year set of financial statements. Now all this is very basic indeed, but if anyone is still reading this, and has remained awake, let me stress that it has been my experience that this very basic bridging example is the component which is typically least well done in the literature and which students most need to appreciate the distinction between financial reporting in the profit-oriented and the non-profit sector.

f) Accountability to Whom? The Users of Accountability Information:

Comment: This is pretty standard stuff, but I emphasize the distinction between internal and external users of accountability information, and within the external group, specify the various providers and users of resources.

g) Financial Reporting in Non-Profit Organizations: Concepts, Principles, Objectives and Constraints:

Introduction

Concepts (Conventions)

Going Concern

Matching

Allocation of Transaction to Reporting Periods -- Cash and Accrual accounting.

The Accounting Entity.

The Nominal or Stable Dollar Concept.

Principles or Qualitative Characteristics:

Relevance and Reliability and their various components.

Objectives: Material from F.A.S.B. and G.F.O.A. in U.S. and C.I.C.A. in Canada.

Constraints:

Budgetary Control:

outside accounting system

appropriation accounting

Separate Entities:

Fund Accounting:

Types of Funds:

Expendable/Non Expendable

Restricted and Unrestricted

Hybrid (Fiduciary) Funds

Comment: Although this section sometimes seems a little dry to the students, I try to persuade them that there is very little point in talking about financial reporting and performance measurement unless one knows why one is doing that, i.e., what the objectives of the various information assembling and reporting exercises are! There is some debate here as to what one calls various things, and what order they should be treated in, but, for better or worse, my preference has been to deal with concepts, principles, objectives, and constraints, in that order. Under each of these heads, important distinctions can be drawn between the non-profit sector and the profit-oriented sector. For instance, most students do not realize that there is no legal basis for the going concern concept in public non-profit sector, where annual parliamentary authorization is required. They also usually need reminding that the financial reports of non-profit organizations do not reflect the matching concept, that cash accounting and its variants are much more common in the non-profit than in the profit-oriented sector, that organizational and accounting entities are frequently not coincident in the non-profit sector, and that, perhaps not surprisingly in the light of the absence of a financial statement of performance, the non-profit

sector has demonstrated comprehensive lack of interest in price level adjustment. The broad principles of reliability and relevance and their various components are as relevant to the non-profit sector as to the profit-oriented, but do need a little elaboration and rather careful tailoring.

Until recently there was very little material on the objectives of financial reporting in non-profit organizations, but the Financial Accounting Standards Board and the Government Finance Officers Association in the United States and the Canadian Institute of Chartered Accountants in Canada have come some distance in the last two or three years to provide provisional statements of such objectives. It is worth going over these with the students in a critical way.

Budgetary control outside the system of financial reporting is, of course, very common in the profit-oriented sector -- indeed is one of the pillars of management accounting. It is useful, however, to illustrate such a system for a non-profit organizations and then go on to the quite distinct system of appropriation accounting or budgetary control actually built in to the financial reporting system. This reflects, in the non-profit sector, the traditional concern of funders for a detailed and on-going reporting on the use of funds.

Quite a few of my colleagues, and rather a large number of students (!) tend to be a little weary of my next constraint -- the careful sorting out of the various types of funds in a fund accounting system. While I sympathize with their weariness, this really is an important topic, and is frequently treated with conspicuous lack of clarity in the literature. I find it useful to sort out the key distinction between the expendable funds and non-expendable funds, go on to stress that the expendable fund

is the "classic" fund for a non-profit organization, as illustrated in the Smalltown Museum example, list the various categories of expendable funds, and point out that they are associated with non-fund accounts for general fixed assets and long-term debt, and then go on to point out the various proprietary and enterprise funds under the non-expendable head. I would concede to my colleagues and students perhaps the one point that the treatment of hybrid or fiduciary funds can be somewhat brief!

h) Extension of the Financial Reporting Example in Three Stages

1. Accrual Accounting: revised examples including payables and receivables; the recording of transactions and the generation of a new set of financial statements.
2. Appropriation Accounting: The creation of appropriation and Anticipated Revenue Accounts. Recording Transactions and generating financial statements. The extended accounting equation.
3. Fund Accounting: Illustration of Smalltown Museum using a General (Expendable) Fund, a Specific Purpose (Expendable) Fund, and an Enterprise (Non-Expendable) Fund. Inter-fund transactions. Recording transactions and generating financial statements.
4. The Revised Accounting Equation (reflecting appropriation and Fund Accounting:

$$\begin{array}{lcl}
 \text{Assets} + \text{Expenditures} + \text{Estimated Revenue} = & \text{Liabilities} + \text{Fund Balance} + & \\
 + \text{Encumbrances} + \text{Transfers } \underline{\text{TO}} \text{ other Funds} & \text{Revenues} + \text{Authorized Expend-} & \\
 (\text{Uses}) & \text{iture} + \text{Reserve for Encumbrances} & \\
 & + \text{Transfers } \underline{\text{FROM}} \text{ other Funds} & \\
 & (\text{Sources}) &
 \end{array}$$

Comment: The basic example is made more complex in three stages, by introducing, first, accrual accounting, second, appropriation accounting, and, finally, fund accounting. I have found that if the example is built up in a series of steps, using the same basic data, the students comprehend each step in turn and, perhaps most important, comprehend the final big picture -- which, although not more complex than the big picture in the profit-oriented sector, is rather different in some important ways, as the revised accounting equation illustrated above demonstrates.

i) The Special Case of Governments:

Introduction to governmental financial statements: history and constraints.

Users of Governmental Financial Statements.

The Objectives of Financial Reporting in Governments.

Comparative Financial Reporting by Governments in Canada: evolution and improvement.

Generally Accepted Reporting Practice: a Recommended Set of Statements.

Consolidation: the Extent of Inclusion of Financial Reports by Government Enterprises.

Case Study:

From a given initial position and set of transactions, go through the exercise of recording transactions and generating financial statements for a hypothetical government or government department.

Comment: In this section I attempt to apply the general model which has been developed to this point to the particular case of governments, trying to break away from the local government focus of many of the text books in this area. The material made available to this point by the Canadian

Institute of Chartered Accountants is very useful, but operates at rather a high level of aggregation, and needs the interpretation offered by a very specific example. I try to do this by introducing an example similar to that developed for Smalltown Museum for a hypothetical government or government department. My geographic isolation on a rocky outcropping off the West Coast makes the choice of a provincial department most feasible.

- j) Performance Measurement and Reporting in the Non-Profit Sector -- oriented to accountability for performance in the use of scarce resources.

Alternative functionally-oriented classifications.

Concepts of cost.

Output Measures: efficiency; effectiveness; absolute value.

The juxtaposition of dollar cost and non-dollar output measures as cost-efficiency and cost-effectiveness performance measures. The imputed dollar value of output and the cost-benefit performance measure.

Comment: This is, of course, a critical area, but, blessedly, tends to be quite well done in the literature. My only reservation with the substantial literature in this area is that it makes very little attempt to apply cost concepts and the procedures of management accounting to the non-profit sector. There is a huge literature on output measurement, oddly enough, but a surprisingly thin literature which relates that measurement specifically to a well-developed discussion on cost concepts.

- k) The Management Cycle in the Non-Profit Sector:

1. Introduction:

The management cycle as an integrated and sequential set of activities.

Long-term planning and operational planning and programming of revenues and expenditures. The implementation of budgetary decisions and

management monitoring and control of these decisions. The retrospective evaluation and auditing of performance. The players in the cycle. The special case of governments -- the role of central agencies and political decision-makers. The role of analytical support in providing substantive information which gives content to the form of the management cycle, the nature of that analytical support determined by the accountability regime (what information? how displayed and substantiated?) to which the non-profit organization is subject.

2. Planning and Budgeting for Revenue and Expenditure:

Long-term revenue planning. Revenue forecasting. The preparation of the revenue budget. The integration of the revenue and the expenditure budgets. Revenue budgeting in the various kinds of non-profit organizations, including governments.

Long-term expenditure planning. The planning framework of objectives, priorities and strategies (policy options) as the context of non-profit budgeting. Capital and operating budgets. The evolution of alternative approaches to expenditure budgeting in the non-profit sector, through traditional line-item budgeting to the various forms of performance budgeting.

3. Implementation and Control of Revenue and Expenditure Flows:

The analysis of implementation and factors affecting implementation. The monitoring of implementation -- internal audit and management control. Implementation and monitoring of the revenue budget. The evolution of internal audit into a more complex framework of management control, reflecting the evolution of more stringent, value-for-money,

performance accountability regimes. The integration of budgeting and control, and the role of central agencies.

4. Retrospective Evaluation and External Auditing of Revenue and Expenditure Flows:

Retrospective evaluation of revenue budget decisions and their implementation. Retrospective evaluation of expenditure budget decisions and their implementation within non-profit organizations, including governments, and externally through mandatory external audit. The evolution of external audit into a "comprehensive audit" framework, reflecting like internal audit the evolution of more stringent accountability regimes. The theory and practice of comprehensive auditing in the non-profit sector.

Comment: Having built the basic bridge from financial reporting in the profit-oriented to the non-profit sector, and having pointed out that performance measurement in the non-profit sector requires not only financial reporting but also the matching of financial information with non-financial output information, I then go on to attempt to deal in more detail with the management cycle in the non-profit sector. This is, of course, a huge area, and, depending on the preferences of students, I give a fair bit of time to the various modes of budgeting, the developing literature on internal audit and management control in the non-profit sector, and the new and glamorous area of comprehensive auditing in the non-profit sector.

1) Case Studies

1. A Private Non-Profit Organization:

The options here would depend on the availability of data, but might include various community organizations, cultural organizations,

foundations, independent schools, labour unions, performing arts organizations, religious organizations, social and country clubs, and voluntary health and welfare organizations. The focus of the case study could be comprehensive, or could be limited to one part of the material developed in the course, e.g. budgeting practice.

2. A Public Non-Profit Institution:

Hospitals and universities or colleges are the obvious choice here, the more so because of their "arms-length" relationship to governments and the resulting complexity of their accountability relationships.. Again the focus could be general or specific.

3. A Government or Government Department:

Provided that the problems associated with dealing with governments as a whole -- particularly consolidation -- have been dealt with earlier, it might be most useful here to concentrate on a government department of some size and complexity, such as a health or education ministry. On the other hand, tackling a small municipality as a whole would be very challenging. Again, the focus could be general or specific.

Comment: The last section of the course involves an examination of three case studies: a private non-profit organization, a public non-profit institution, and a government or government department. About half-way through the course I enlist the cooperation of research organizations to make some data available to students, and members of the class pool this information together and report back on the three case studies at the end of the course.

IV. Scheduling the Single-Course Option:

Let me concede right away that the list of suggested topics is very ambitious, perhaps absurdly ambitious, for a one-semester course. Let me also try to explain how I have squeezed the material into a 13-week graduate course, with one three-hour session each week.

I cover topics (a), (b), (c) and (d) in the first week; this is a bit of a rush, but students can supplement the material quite easily. Topic (e) is the cornerstone of the course, or rather the part which distinguishes the course from others I have seen, and I allocate three full weeks to it -- leaving indeed the option of borrowing part of a further week, if necessary. Topics (f) and (g) I try to squeeze into weeks five and six. Weeks seven and eight are devoted to topic (h), week nine to topic (i), week ten to topic (j), and the balance of the time to the management cycle elaboration and the case studies. If I have to make a choice, I drop the elaboration of the management cycle material, and make it available in a subsequent course.

V. A Last Word on Course Emphasis:

I suppose I have always been a little troubled by seeming to dodge the primary issue of performance measurement in this course. Indeed students and colleagues have often made the point that the really important part of the course is the performance measurement part, and that the other material could be treated less thoroughly. I concede the point in substance, but still believe that students ultimately make more sense of the performance measurement material if they have been guided across the bridge from the profit-oriented accounting model to the non-profit accounting model in its financial manifestation. My second argument for the emphasis of the course is frankly that there is no shortage of literature on performance measurement, but that there is a dearth of introductory material on the bridge between the two accounting models.

Available Text-Books:

A brief review would be provided of the following books:

1. C.I.C.A., Financial Reporting for Non-Profit Organizations,
(C.I.C.A.: Toronto, 1981).
2. C.I.C.A., Financial Reporting by Governments, (C.I.C.A. Toronto,
1980).
3. E.O. Henke, Introduction to Nonprofit Organization Accounting,
(Wadsworth, San Francisco, 1980).
4. L.E. Hay, Accounting for Governmental and Nonprofit Entities,
sixth edition (Irwin: Homewood, Illinois, 1980)
5. E.S. Lynn and R.J. Freeman, Fund Accounting: Theory and Practice,
(Prentice-Hall: Englewood Cliffs, 1974).
6. R.N. Anthony and R.E. Herzlinger, Management Control in Non-Profit
Organizations, revised edition, (Irwin: Homewood, Illinois, 1980).
7. K.V. Ramanathan, Management Control in Nonprofit Organizations:
Text and Cases, (John Wiley: New York, 1982).
8. K.V. Ramanathan and L.P. Hegstad, Readings in Management Control
in Nonprofit Organizations, (John Wiley: New York, 1982).

Comment: To this point I have used a combination of the Anthony and Herzlinger book and the Henke book, supplemented by notes of the sort to which you, the reader, have just been subjected!

LA COMPTABILITÉ DES ORGANISMES À BUT NON LUCRATIF

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**Texte présenté à la conférence de l'Association canadienne
des professeurs de comptabilité**

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Guelph (Ontario)

Je vous remercie, Monsieur le président, de votre aimable présentation. J'ai accepté avec plaisir votre invitation de m'adresser aux participants à cette conférence de l'Association canadienne des professeurs de comptabilité. J'avoue toutefois m'être demandé ce que je pouvais apprendre à des professeurs?

Définir ce qui doit être la comptabilité des organismes à but non lucratif n'est pas une mince tâche. J'essaierai de donner un aperçu à la fois théorique et pratique des concepts et des tâches multiples et complexes liés à la comptabilité des entités de ce genre. J'aborderai, en premier lieu, l'aspect pratique de cette réalité en m'appuyant sur des exemples. Ma présentation comporte quatre parties:

- (1) Un examen de l'évolution de la comptabilité et de la situation actuelle.
- (2) Les problèmes liés à la comptabilité des organismes à but non lucratif.
- (3) Les solutions liées à la comptabilité des organismes à but non lucratif:
 - a) l'obligation de posséder des principes comptables généralement reconnus;
 - b) la nécessité d'un contrôle de la gestion financière;
 - c) l'obligation de rendre compte;
 - d) l'utilité du concept de l'optimisation des ressources

- (4) Le schéma d'un cours sur la comptabilité des organismes à but non lucratif.

1. Un examen de l'évolution de la comptabilité et de la situation actuelle

Le système de comptabilisation systématique des opérations a été créé il y a plus de 100 ans dans le but d'établir les résultats ou l'incidence nette d'une opération ou d'un groupe d'opérations. Les entreprises et les échanges commerciaux se sont multipliés, et les organismes et instituts comptables professionnels ont été créés dans le but d'établir des principes, des lignes directrices et des concepts qui régiraient la science de la comptabilité. Il faut se rappeler que l'on a poursuivi longtemps un seul et même objectif: la réalisation de profits à la fin de l'exercice. Toutefois, aujourd'hui, c'est-à-dire en 1984, cet objectif n'est plus le seul qui prévale. Bien que le monde des affaires demeure important, un large secteur de notre économie est constitué d'organismes à but non lucratif qui, au plan professionnel, exigent notre attention et nous demandent d'explorer des avenues nouvelles.

Ces organismes on les retrouve aux niveaux fédéral, provincial et municipal, qu'il s'agisse de commissions scolaires, d'hôpitaux, de fabriques paroissiales, d'organismes de charité ou de sociétés chargées de recueillir des fonds. Aux organismes susmentionnés, on peut ajouter une foule de sociétés de la Couronne qu'a créées le gouvernement fédéral. À quelques exceptions près, l'on y retrouve un dénominateur commun: la réalisation d'un profit n'est pas l'objectif premier de ces organismes. Il n'existe donc pas de résultat net que l'on peut utiliser pour évaluer l'efficacité d'un organisme ou pour le comparer à des entités

semblables. Songeons un instant au grand nombre d'organismes de ce genre et à leur taille. L'organisme à but non lucratif le plus considérable est le gouvernement fédéral. Dans ce dernier cas, il n'est pas question de mesurer le bénéfice net des opérations, les profits réalisés. Cet organisme, toutefois, annonçait au 31 mars 1983, un déficit de 25 milliards de dollars, déficit qui, est sous-évalué. À ce gouvernement vient s'ajouter un ensemble paragouvernemental: les sociétés de la Couronne. Il existe, si l'on compte les filiales, plus de 300 sociétés de ce genre, lesquelles emploient quelque 263 000 canadiens. Leurs recettes et leurs dépenses, pour l'exercice clos le 31 mars 1983, s'établissaient respectivement à 31,9 milliards de dollars et à 33,6 milliards de dollars. Outre le secteur fédéral, il faut citer l'Ontario qui possède quelque 295 sociétés de la Couronne, le Québec qui en possède quelque 130 et la Colombie britannique où l'on retrouve 51 sociétés de ce genre, pour ne citer que quelques chiffres. Les contribuables, bien souvent, ne connaissent pas la plupart de ces sociétés. Comme l'indiquait le vérificateur général, M. Kenneth Dye, "L'ensemble de ces sociétés, toutefois, exigent des contribuables un investissement qui souvent constitue un placement à perte."

À ces sociétés, il faut ajouter quelque 45 000 institutions enregistrées, au Canada, comme organismes de charité. Au plan international, l'on peut citer les Nations unies, l'Organisation du traité de l'Atlantique nord et plusieurs autres organismes de services, organismes également à but non lucratif. Il nous faut donc conclure que ces organismes à but non lucratif contribuent de manière importante au PNB. Il ne s'agit pas là d'un phénomène passager, mais d'un phénomène durable. On peut donc se demander ce qu'il faut faire pour corriger les problèmes et les "malaises" suscités par ces organismes. Avant de répondre à

cette question, de fournir des solutions ou, à tout le moins, d'essayer d'en fournir, tentons de préciser quels sont ces problèmes.

2. Les problèmes liés à la comptabilité des organismes à but non lucratif

À ce titre, les problèmes de comptabilité sont nombreux. Je les ai regroupés en trois grands ensembles.

En premier lieu, il y a l'absence complète de principes comptables généralement reconnus. Ce premier problème suscite des controverses et est complexe et difficile à résoudre à cause de la grande variété des entités et des objectifs différents qu'elles poursuivent. Le débat vient de ce que plusieurs comptables professionnels estiment que dans plusieurs organisations les conventions comptables utilisées ne sont pas satisfaisantes ou sont incomplètes. Par exemple, le fait que les principes comptables du gouvernement du Canada ne soient pas complets, c'est-à-dire qu'ils ne tiennent pas compte de tiers ou d'autres entités liées étroitement au gouvernement et dépendant financièrement de ce dernier, constitue une lacune qui a amené le Bureau du vérificateur général à formuler une réserve dans son opinion sur les états financiers du Canada. À cause de cette lacune, certaines sociétés de la Couronne et d'autres entités externes au gouvernement, par exemple le Compte d'assurance-chômage, le Compte du régime de pensions du Canada et le Compte du fonds des changes, etc. n'apparaissent pas dans les états financiers du Canada. Le déficit total de ces entités atteint environ 5 milliards de dollars, ce chiffre, toutefois, n'est pas définitif; par conséquent, son incidence totale sur le déficit du gouvernement canadien, lequel, nous l'avons déjà indiqué, est de 25 milliards de dollars, n'est pas connue. À cette

lacune, s'ajoutent d'autres problèmes, par exemple, la comptabilisation des immobilisations, la question du choix de la comptabilité de caisse ou de la comptabilité d'exercice, le choix d'une méthode appropriée de répartition des coûts, etc.

Le second problème vient du fait qu'il n'existe pas de systèmes obligeant réellement les conseils d'administration, les conseils institutionnels, la haute direction et les particuliers eux-mêmes à rendre compte des responsabilités qui leur ont été confiées. Plusieurs facteurs expliquent cette lacune. Tout d'abord, l'évolution de ces entités et de ces institutions, l'accroissement rapide de leur importance, et la nécessité de vaincre la crise économique, ont empêché ces groupes et ces personnes d'assumer pleinement leurs rôles en ce qui a trait à la gestion et au contrôle financiers.

Par exemple, en 1977, le précédent vérificateur général, le regretté Jim Macdonell, déclarait:

"L'étude des systèmes utilisés par les ministères, organismes et sociétés de la Couronne vérifiés par l'Auditeur général démontre que la gestion et le contrôle financiers au sein du gouvernement canadien sont foncièrement inadéquats. De plus, cette situation continuera d'exister à moins que le gouvernement ne prenne des mesures fermes, appropriées et efficaces en vue de corriger cette situation vraiment très sérieuse."

Bien que certains correctifs aient été apportés, il reste encore certains points à améliorer. En deuxième lieu, la définition des rôles et fonctions des directeurs, des administrateurs et, en certains cas, de la haute direction comportait des ambiguïtés et n'était pas définie avec toute la rigueur voulue. Dans plusieurs cas, ces rôles et fonctions n'étaient pas établis en fonction des

responsabilités octroyées. En outre, on n'a pas accordé à l'obligation de rendre compte toute l'importance qu'elle devait avoir.

Le troisième problème porte sur l'utilisation de contrôles meilleurs et plus efficaces. Les organismes à but non lucratif ne se sont pas souciés outre mesure du concept de l'optimisation des ressources, ou en d'autres termes, des questions d'économie, d'efficience et d'efficacité. Nous avons souvent entendu dire, ou nous avons souvent constaté, que la modification du conseil d'administration d'un hôpital ou d'une commission scolaire avait apporté un changement d'attitude ou un changement d'approche qui avait permis d'améliorer la gestion. Cela m'amène à formuler les propositions suivantes en ce qui a trait aux problèmes susmentionnés.

3. Les solutions liées à la comptabilité des organismes à but non lucratif

a) L'obligation de posséder des principes comptables généralement reconnus

Il nous faut, au départ, souligner les efforts faits par les associations comptables canadiennes, "AICPA" et le gouvernement fédéral dans le but de formuler et de déterminer des principes comptables généralement reconnus dans le cas des organismes à but non lucratif. L'unanimité n'a pas encore été faite sur ce sujet, mais nous y travaillons. Je crois qu'il ne faut plus hésiter et qu'il faut mettre en pratique ces principes; ils ne sont peut-être pas parfaits ou complets, mais il s'agit là d'instruments avec lesquels on pourra travailler et que l'on pourra améliorer.

b) La nécessité d'un contrôle de la gestion financière

Mon expérience m'a appris que les concepts de gestion financière, bien qu'ils soient connus d'à peu près tout le monde, ne sont pas toujours appliqués. Ces concepts visent les questions de planification, de réalisation, de contrôle, de surveillance et de communication des renseignements à toutes les étapes du processus de gestion. Toutes ces phases sont importantes et doivent être partie intégrante du processus journalier de gestion. Parmi ces concepts, il y en a trois à mon avis, qui sont essentiels pour gérer les organismes à but non lucratif de la même manière que l'on gère les fonds du secteur privé. Ces trois concepts auxquels je fais allusion sont la planification, le contrôle et la surveillance, et la présentation de rapports.

Le premier et le plus important de ces concepts est le processus de planification, lequel est essentiel pour la survie de toute organisation. Il doit permettre de préciser la mission de l'organisation, laquelle comporte des buts sociaux ou institutionnels et des objectifs d'organisation. La planification d'une mission exige la production d'énoncés clairs, précis, et fouillés afin de décrire ce que l'on veut réaliser ainsi que la manière d'y arriver et les moyens à utiliser à cette fin. La planification exige la participation du conseil d'administration qui est en quelque sorte l'organe politique de toute entité ou institution. Ces conseils sont dans certains cas constitués de représentants élus du peuple et ont pour mission de faire connaître les vues et les désirs de ce dernier. La mise au point de plans stratégiques, de plans à long terme, de plans à moyen terme et de plans d'opération est étroitement liée à la mission, à la raison d'être de l'organisation. Chacun de ces plans représente une phase différente du processus; ils sont tous reliés entre eux.

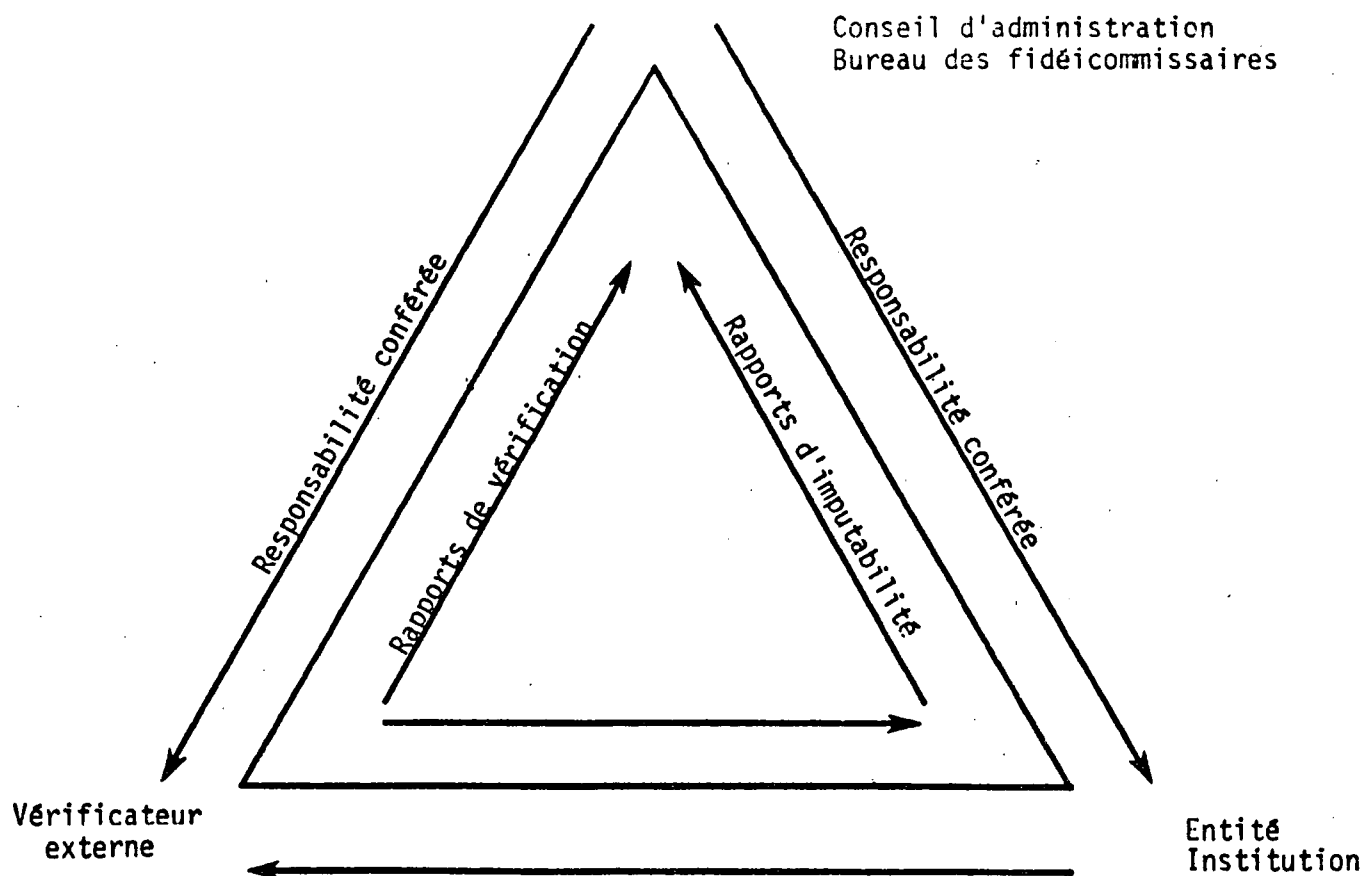
En second lieu, vient la question du contrôle et de la surveillance des opérations. Cette phase met à contribution le système financier et les contrôles comptables de l'organisation, lesquels permettent de fournir à la direction les renseignements nécessaires à la prise de décisions et au contrôle des opérations. Certains ont déclaré qu'il n'était pas toujours possible de doter les organismes à but non lucratif des mêmes mécanismes de contrôle que les entreprises à but lucratif à cause de la nature des buts sociaux visés et des services à fournir à la population. Je ne suis pas de cet avis. J'admets que les contrôles financiers ne peuvent s'appliquer de la même manière, mais ils peuvent être utilisés une fois qu'on aura apporté à leur égard certaines modifications. Permettez-moi de vous poser une question. Pourquoi les contrôles exercés sur les recettes perçues aux guichets du Centre national des Arts seraient-ils différents de ceux exercés au Centre O'Keefe, à Toronto? Ils ne devraient pas l'être. Le CNA est un organisme à but non lucratif, que subventionne en partie le gouvernement fédéral. Par conséquent, le contrôle financier et le contrôle interne devraient avoir la même importance ou la même rigueur que ceux exercés au sein d'une entreprise privée. Cette remarque vaut également en ce qui a trait aux contrôles des éléments d'actif et des dépenses. On peut citer comme exemple récent le déficit de la banque Ambrosiano, régie par l'Église catholique romaine, déficit qui a atteint quelque 10 millions de dollars. Plus près de nous, on peut parler des paiements en trop du Compte d'assurance-chômage qui se sont chiffrés en 1978 à 295 millions de dollars et en 1981 à 150 millions de dollars. On pourrait également citer la découverte en 1980 de 500 000 dollars de paiements en trop qu'avait effectué aux commissions scolaires le ministère de l'Éducation du gouvernement du Québec. Ces exemples, ainsi que d'autres que vous connaissez bien, et le fait que les gouvernements, de tous les niveaux, croissent en taille et deviennent plus

complexes, prouvent irrémédiablement qu'il faut instaurer de meilleurs contrôles et de meilleurs systèmes de gestion.

Le troisième point évoqué est celui de la présentation de rapports, de la communication des renseignements. Puisque cette question est liée de près à celle de l'obligation de rendre compte, je traiterai simultanément de ces deux questions.

c) L'obligation de rendre compte

Contrôle et communication des renseignements sont intimement liés au principe de l'obligation de rendre compte. Cette notion désigne l'obligation de répondre des responsabilités qui ont été conférées. Il s'agit d'une mesure en vertu de laquelle les entités, les institutions et les particuliers rendent compte de leur rendement. Le schéma suivant illustre ce concept et son processus de réalisation.



À Ottawa, en 1976-1977, la Commission royale sur la gestion financière et l'imputabilité a souligné l'importance du principe de l'obligation de rendre compte. Les ministères, les sociétés de la Couronne et d'autres entités associent cette obligation à la phase de la planification. Il s'agit en quelque sorte d'un contrat de gestion conclu entre le conseil d'administration et son directeur général ou entre un sous-chef de son équipe de gestion. Ce contrat prévoit la présentation d'une description du milieu d'intervention et de la stratégie globale, d'une liste des objectifs opérationnels comportant obligatoirement une liste des mesures qu'entend prendre la société, une liste des indicateurs principaux, indicateurs qui doivent pouvoir être mesurés, ainsi qu'une liste des principaux indicateurs de rendement et des mesures des résultats. Ainsi donc, les contrôles et les grands comptes de gestion financière, de même que le principe de l'obligation de rendre compte, devraient être utilisés par les organismes à but non lucratif. Ces derniers y trouveraient les moyens, les procédés, les contrôles et les mécanismes de communication des données qui leur permettraient de rendre compte de leurs opérations.

d) L'utilité du concept d'optimisation des ressources

Le concept d'optimisation des ressources, c'est-à-dire les questions d'économie, d'efficience et d'efficacité, qui est l'élément central des vérifications intégrées, est également essentiel dans le cas des organismes à but non lucratif. Certains prétendent que ce concept n'est utilisable que dans le cadre des vérifications. Toutefois, je crois que les gestionnaires doivent comprendre à fond ce concept et qu'ils doivent s'en prévaloir.

Un système moderne de gestion financière, qu'utilisent un gouvernement, une université ou un hôpital, doit être très flexible tout comme il est nécessaire pour une multinationale de posséder des systèmes offrant une grande souplesse. Les contraintes administratives et budgétaires que la situation imposait à la fin des années 70 et au début des années 80, ainsi qu'une demande de plus en plus forte d'un accroissement de la productivité, nous ont amenés à effectuer des vérifications de valeur reçue en contrepartie de l'argent dépensé. Dans plusieurs pays autres que le Canada (les États-Unis, la Grande-Bretagne, la France et la Suède), la vérification de valeur reçue en contrepartie de l'argent dépensé a constitué l'une des réponses à la préoccupation croissante des législateurs et des fonctionnaires supérieurs à la suite des études ou de l'examen plus approfondi des dépenses publiques, pour les questions d'économie, d'efficience et d'efficacité. Il s'agit là d'une méthode de vérification plus poussée, qui va au-delà des préoccupations certes importantes mais restreintes de la comptabilité financière traditionnelle.

Les exigences administratives peuvent varier d'une organisation à l'autre. Pour chaque situation donnée, il existe plus d'une façon d'assurer une gestion efficace. La délégation des responsabilités est plus grande dans les organismes à but non lucratif de forte taille. De manière générale, la responsabilité de l'engagement des dépenses est répartie entre plusieurs personnes au sein de ces organisations, alors que l'obligation de rendre compte des résultats et de la répartition des ressources incombe à la haute direction. Ces organismes doivent donc disposer de meilleurs contrôles de gestion. Les gestionnaires doivent s'efforcer d'utiliser sagement les ressources afin d'en tirer des avantages maximums. L'application des concepts d'économie, d'efficience et d'efficacité permet d'atteindre cet objectif. Bien que ce ne soit pas le moment de vous faire

un exposé sur ces concepts, je puis affirmer que leur application présente plusieurs avantages. En résumé, le principe d'économie exige que l'on s'efforce d'acquérir des services ou des ressources matérielles et humaines qui soient de la plus haute qualité au coût le moins élevé; l'efficience désigne le rapport qui existe entre l'atteinte des buts ou la prestation des services et les ressources utilisées pour les atteindre ou les produits. En d'autres mots, il s'agit de la relation intrant/extrant relativement à la réalisation d'une certaine tâche. Ces concepts, étroitement liés entre eux, requièrent tous deux la mise au point de critères de base à l'aide desquels l'on pourra évaluer une structure, un programme ou un système de gestion. Ces concepts peuvent s'appliquer, par exemple, à la gestion de la trésorerie, à la répartition des ressources dans le cas des programmes de santé, à la détermination des périodes optimales d'hospitalisation des patients, à l'acquisition des immobilisations, au coût des cours de formation, aux programmes de création d'emplois et à plusieurs autres situations.

La mesure de l'efficacité des programmes, ou l'évaluation des programmes, par contre, est l'évaluation de l'entité ou des programmes afin de vérifier que les objectifs ont été atteints ou, en d'autres mots, afin de vérifier que la population, en fin de compte, retire un avantage comme cela était prévu. L'évaluation de l'efficacité des programmes des secteurs public et para-public est l'élément central du concept de l'optimisation des ressources et est essentielle à la survie des organismes de ces secteurs. Chaque organisation établit de nouveaux programmes pour lesquels il faut souvent trouver des fonds. On a souvent tendance, dans ce cas, à s'approprier des fonds de programmes déjà en vigueur, mais moins importants, ou à puiser aux fonds de programmes dont les objectifs peuvent être réalisés par des moyens plus modestes. Les programmes d'utilité

publique ont tendance à s'éterniser. Une fois mis en place, leur existence se poursuit sans grandes modifications, exception faite de l'accroissement annuel du budget et des modifications occasionnelles apportées aux règlements. Cette façon de faire doit être corrigée si l'on veut optimiser l'utilisation des ressources. L'économie et l'efficience sont sans doute des questions fondamentales de gestion, mais l'atteinte des objectifs de programme désirés a une importance encore plus grande. Bien qu'il puisse y avoir un certain mérite à faire maladroitement ce qui doit être fait, on ne pourra jamais justifier le fait de bien faire ce qui ne doit pas être fait.

L'évaluation des programmes est une tâche beaucoup plus difficile. Il faut y tenir compte des comportements sociaux et d'autres facteurs étrangers à l'organisation. Certains pays, par exemple les États-Unis, ont consacré beaucoup plus d'efforts que le Canada à la mesure de l'efficacité des programmes. Toutefois, il faut dire que l'importance que le gouvernement canadien a accordée récemment à l'évaluation des programmes fait de ce dernier un des leaders en ce domaine. L'évaluation des programmes, malgré ses difficultés, est essentielle au bon fonctionnement des organismes à but non lucratif.

4. Schéma d'un cours

Vous trouverez à l'annexe I du texte de ma présentation, le schéma d'un cours de 45 heures que j'ai préparé. Ce cours exige, comme conditions préalables, d'avoir suivi auparavant un cours de base ou un cours de niveau intermédiaire en comptabilité. L'objectif de ce cours est de fournir aux étudiants une connaissance des problèmes que pose la comptabilité des organismes à but non

lucratif et des moyens qu'il est possible d'utiliser pour assurer cette comptabilisation. Chaque leçon du cours comporte un exposé théorique et des études de cas portant sur des organisations de genres différents et dont le niveau de complexité varie. Idéalement, un travail sur place, au sein de l'une des organisations, portant sur l'optimisation des ressources permettrait de fournir aux étudiants l'expérience concrète de ce genre de réalité et l'organisation elle-même en tirerait avantage sans qu'il lui en coûte quelque chose.

Conclusion

Je crois pouvoir affirmer que le succès des entreprises privées ainsi que des organismes à but non lucratif dépend non seulement de l'application des contrôles de gestion et du concept de l'optimisation des ressources mais également de leur capacité à improviser et à faire preuve de créativité dans un contexte donné. Je tiens à signaler le cas du projet de loi C-24 sur les sociétés de la Couronne qui exige de ces dernières, de manière très précise, un compte rendu plus strict de la manière dont elles ont assumé les responsabilités qui leur ont été confiées et la présentation d'un plan général et d'un budget, et qui les assujettit à un examen spécial de leur processus interne de gestion une fois tous les cinq ans. À mon avis, la survie des organismes à but non lucratif est fortement liée à l'application des concepts susmentionnés.

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LA COMPTABILITÉ DES ORGANISMES À BUT NON LUCRATIF**SCHÉMA DU COURS**

- | | |
|-----------------------------|---|
| 1^{re} leçon | Introduction <ul style="list-style-type: none">- Évolution de la comptabilité- Définition des organismes à but non lucratif- Problèmes particuliers |
| 2^e leçon | Structure d'organisation <ul style="list-style-type: none">- Responsabilité et obligation de rendre compte- Renseignements - Prise de décisions |
| 3^e leçon | Comptabilité financière |
| (6 heures) | <ul style="list-style-type: none">- Diverses méthodes comptables- Principes comptables généralement reconnus- Normes qui s'appliquent aux organismes à but non lucratif- Systèmes financiers |
| 4^e leçon | Comptabilité de gestion <ul style="list-style-type: none">- Comportement de la direction- Analyse financière- Solutions de rechange- Prise de décisions |
| 5^e leçon | Planification <ul style="list-style-type: none">- Aperçu général- Planification stratégique- Planification d'opération |

- 6^e leçon** **Établissement du budget**
- **Objectifs de l'établissement du budget**
 - **Établissement du budget: méthodes et conceptions générales**
 - **Préparation du budget**
- 7^e leçon** **Contrôles comptables**
- **Dépenses**
 - **Recettes**
- 8^e leçon** **Contrôles législatifs**
- **Pouvoirs octroyés**
 - **Direction supérieure**
- 9^e leçon** **Application du concept d'économie**
- **Définition**
 - **Établissement des critères**
- 10^e leçon** **Application du concept d'efficience**
- (6 heures)**
- **Définition**
 - **Objectifs**
 - **Normes relatives à l'efficience**
 - **Établissement des critères**
- 11^e leçon** **Communication des renseignements et évaluation des programmes**
- (6 heures)** - **Communication des renseignements financiers et des résultats**
- **Évaluation des programmes ou des activités**
 - **Analyse des états financiers**

INTEGRATING COMPUTERS INTO THE ACCOUNTING CURRICULUM

by

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ABSTRACT

Despite consistent coverage in the literature given to the subject of computers in education, the use of computers in accounting courses in Canada and the United States remains at a very low level. A review of the contemporary literature indicates that business and industry have adopted computers and innovative computer applications more readily than have universities; that accounting students are not well prepared to deal with computer applications in accounting; that computers have been largely ignored in most accounting programs; and, that the primary use of computers in most institutions has been oriented to programming concepts.

Based on the experience at the University of Waterloo, a six-point framework for integrating computers into the accounting program is presented. First, the question of what is to be achieved when the computer is introduced or upgraded in the accounting curriculum is resolved. This statement of teaching/learning objectives is critical in developing a coherent strategy to guide future choice and implementation issues.

Second, evidence concerning the 'current state-of-the-art' is gathered from faculty, students and other accounting and business departments. Existing hardware and software components are documented and faculty are interviewed to determine the nature and extent of their present demands on the system. From students comes estimated usage time and the specific computer components that are utilized. Faculty are then asked to provide a description of what general features they would like to see in a new or upgraded computer system. This requirements analysis provides a 'logical' view of what the computer system should accomplish to meet the needs of both faculty and students.

Third, the combination of teaching objectives and computer requirements is used to identify an 'ideal' system. The result of such analysis leads to several possible computing approaches. Included among these approaches is the setting up of specific courses to teach computer literacy and such basic skills as word processing, spread sheet analysis, data management and automated accounting. This has the advantage of exposing students to general computer applications while not requiring each faculty member to become involved in learning new computer technologies. If, however, accounting faculty do not become involved in the computerization process, there is less likelihood that upper level accounting courses will benefit from more specialized accounting applications. Alternatively, computerized materials can be

integrated into each accounting course. This allows students to be exposed to a wide variety of general and accounting related software. On the other hand, it involves a considerable investment in time from faculty who in many cases are hesitant to retrain themselves in computerized approaches. A third option is to combine features of each approach. The system specification developed at Waterloo involves specifying computer requirements at three different levels - basic conceptual knowledge, broad skills and specialized skills. The first two levels are taught by non-accountants while the specialized levels in financial, auditing, managerial and tax are taught by accounting faculty.

Fourth, the 'ideal' system specification is matched to the strengths and limitations of the university and department. The purpose here is to define those attributes within the control of the department which can help shape the eventual computing plan.

Fifth, a plan is adopted and carried out. In the implementation phase, consideration is given to such issues as: the type of individual(s) responsible for overall computing strategy and operation; motivational devices to encourage faculty to develop and introduce computer skills in class; selection of software and hardware; stand alone vs. networked microcomputers; and, documentation procedures.

Sixth, the system is monitored. In an area where obsolescence occurs with increasing rapidity, the importance of maintaining an effective system cannot be overestimated.

Consideration is also given to the future of computing in accounting. In time, computers will be integrated into courses wherever it makes sense. Basic skills courses will be unnecessary and programming will only be offered to those students who request it as an option. Future accounting programs will: include a greater emphasis on computer-based assignments, cases and problems; incorporate computer-assisted lecture techniques, computer managed text and graphic aids; employ large scale data bases to simulate the accountant's role in computerized transaction processing, model generation, internal control and decision support; and, integrate developments from other disciplines such as CAD/CAM, artificial intelligence, data modelling, and expert systems.

A complete version of this paper can be obtained free of charge from:

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