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

# COMPTE RENDU

## CONGRÈS ANNUEL DE 1982

Juin 1982

Université d'Ottawa

Ottawa

# PROCEEDINGS

## 1982 ANNUAL CONFERENCE

June 1982

University of Ottawa

Ottawa

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

## COMPTE RENDU

## PROCEEDINGS

CONGRÈS ANNUEL DE 1982

1982 ANNUAL CONFERENCE

Juin 1982

June 1982

Université d'Ottawa

University of Ottawa

Ottawa

Ottawa

Carleton University
Ottawa, Canada K1S 5B6

September 28, 1982

The Members
The Canadian Academic Accounting Association

The 1982 Annual Conference of The Canadian Academic Accounting Association was held in Ottawa at the University of Ottawa. The program and papers presented at this meeting are enclosed in this volume for your information.

The local arrangements chairman was Reynald Maheu of the University of Ottawa. His assistance and that of other members who reviewed papers are gratefully acknowledged.

The conference program and the table of contents follow. Papers which are not included in this volume have been deleted at the request of the author.

Publication of the Proceedings is made possible, once again, by the generosity of Peat, Marwick, Mitchell & Co., Chartered Accountants. Their assistance is most appreciated.

Derek Acland
1982 Program Chairman



School of Business □ Arts Tower □ (613) 231-4373

Carleton University
Ottawa, Canada K1S 5B6

le 28 septembre 1982

Aux membres de
L'Association Canadienne des Professeurs de Comptabilité

Le congrès annuel de 1982 de l'Association Canadienne des Professeurs de Comptabilité a eu lieu à l'Université d'Ottawa à Ottawa. Le programme du congrès et les mémoires presentés à ce congrès sont inclus dans ce compte rendu pour votre information.

Le responsable des arrangements locaux était Reynald Maheu de l'Université d'Ottawa. Son aide et l'assistance des autre membres qui ont examiné les mémoires sont grandement appréciées.

Le programme du congrès et la table des matières sont inclus dans les pages suivantes. Les mémoires présentés au congrès qui n'ont pas été inclus dans ce compte rendu ont été exclus à la demande des auteurs.

Ce compte rendu a été publié grâce à la générosité du cabinet de comptables agrées Peat, Marwick, Mitchell & Cie, et nous les en remercions.

Derek Acland
1982 Président du Programme du Congrès



School of Business □ Arts Tower □ (613) 231-4373

TABLE OF CONTENTS


| | Page |
|---|---|
| Conference Program | v |
| Plenary Session - Approaches to the First Course in Accounting: Graduate and Undergraduate | |
| Introductory Accounting: Some Thoughts of an Instructor<br>V. Bruce Irvine<br>University of Saskatchewan | 1 |
| Introductory Accounting: An Experiment<br>Daniel B. Thornton<br>University of Toronto | 20 |
| CAAA Education Committee Session - Computer Usage in Accounting Education | |
| The Use of Computers in Teaching Accounting<br>Len Fertuck<br>University of Toronto | 41 |
| McMaster's System for Computer-Aided Learning in Accounting<br>Paul V. Dunmore<br>McMaster University | 49 |
| Concurrent Research Papers | |
| La réaction boursière à l'uniformité en matière comptable: Cas de la Conversion des Etats financiers en devises étrangéres<br>A. Naciri<br>Université d'Ottawa | 59 |
| Are Accounting Concepts Assumptions, Propositions or Objectives?<br>John Macintosh<br>McMaster University | 73 |
| Economic Models of the Labour Market: Their Implications for Pension Accounting<br>James Pesando<br>Carol Clarke<br>University of Toronto | 85 |

Responsibility Centres: A Reconsideration 91
Murray J. Bryant
Daniel B. Thornton
University of Toronto

Control in Organizations: A Framework for Analysis 101
Robert L. Simons
McGill University

Independence of Auditors: An Empirical Study of The Adams Report 114
Daryl Lindsay
George Murphy
Harold Silvester
University of Saskatchewan
Morina Rennie
Peat, Marwick, Mitchell & Co.

Industrial Concentration And The Informational Content of Financial Statements 124
Daniel Zeghal
University of Ottawa

A Structured Approach to Choosing A Computer System for an Accounting Faculty 140
Howard M. Armitage
Anthony K. P. Wensley
University of Waterloo

Computers and Auditing: A Canadian Survey 150
Francine Schlessinger
Alfred L. Kahl
University of Ottawa

The Information Content of U.K. Annual Reports 159
Michael Maingot
University of Ottawa

A Departmental Overhead Algorithm Consistent With Opportunity Costs 171
James T. Mackay
University of Wisconsin

A Reconsideration of Human Resource Accounting 180
Chris Robinson
University of Toronto

FASB Statement 52 And Its Implications For The Canadian Accounting Profession 190
Roger Y.W. Tang
University of Calgary
C. Alan Holt

CANADIAN ACADEMIC ACCOUNTING ASSOCIATION

1982 CONFERENCE

June 1-3, 1982

University of Ottawa
Ottawa, Ontario

TUESDAY, JUNE 1

| | |
|---|---|
| 2:00 - 10:00 p.m. | Registration<br>(University Centre) |
| 8:00 p.m. - 10:00 p.m. | Welcoming Reception<br>hosted by the Institute of Chartered Accountants of Ontario<br>(Blue Room) |

WEDNESDAY, JUNE 2

| | |
|---|---|
| 8:00 a.m. - 10:00 p.m. | Registration<br>(University Centre) |
| 9:00 am - 10:30 am | * Plenary Session<br>(Lamoureux Hall-Room 122)<br><br>"Approaches to the First Course in Accounting: Graduate and Undergraduate"<br>CAAA Education Committee<br>Chairman:<br>Yvon Houle<br>University of Quebec at Three Rivers<br><br>Presenters:<br>Daniel Thornton<br>University of Toronto<br><br>Bruce Irvine<br>University of Saskatchewan<br><br>Discussant:<br><br>Pierre Vezina<br>Laval University |
| 10:30 a.m. - 10:45 a.m. | Break |

*Simultaneous translation available for this session

WEDNESDAY, JUNE 2 - (Cont'd.)

10:45 a.m. - 12:00 Noon

Concurrent Sessions:

*Session A
(Lamoureux Hall - Room 122)

Education Committee Plenary Session:
Follow-up

Session B
(Lamoureux Hall - Room 219)

"Computer Usage in Accounting Education"

Chairman:

Paul Dunmore
McMaster University

"The Use of Computers in Teaching Accounting"

Len Fertuck
University of Toronto

"McMaster's System for Computer-Aided Learning in Accounting"

Paul Dunmore
McMaster University

12:00 - 2:00 p.m.

Luncheon
Sponsored by the Canadian Certifed General Accountants' Association
(Blue Room)

Address:

"Information for Managerial Decision Making - Revisited"

Guest Speaker:

Hector Anton
Vincent C. Ross Institute of Accounting Research, New York University

Chairman:

Alister Mason
President
Canadian Academic Accounting Association

*Simultaneous translation available for this session

WEDNESDAY, JUNE 2 - (Cont'd.)

2:00 - 3:25 p.m.

Concurrent Sessions:

*Session C
(University Centre - Odeon)

Chairman:

Gilles Chevalier
Touche Ross & Co.

"La réaction boursière à l'uniformité en matière comptable: Cas de la Conversion des Etats financiers en devises étrangères"

A. Naciri
University of Ottawa

"Are Accounting Concepts Assumptions, Propositions or Objectives?"

John Macintosh
McMaster University

2:00 - 3:25 p.m.

Concurrent Sessions:

Session D
(Lamoureux Hall - Room 219)

Chairman:
William Scott
Queen's University

"Economic Models of the Labour Market: Their Implications for Pension Accounting"

James Pesando
University of Toronto
Carol Clarke
University of Toronto - Erindale

"Convertible Bonds: Debt and Equity Values"

Raymond King
University of British Columbia

3:25 - 3:45 p.m.

Break

*Simultaneous translation available for this session

WEDNESDAY, JUNE 2 - (Cont'd.)

3:45 - 5:15 p.m.

*Plenary Session
(University Centre - Odeon)

Chairman:

Len Eckel
University of Waterloo

"Historical Cost Accounting and its Rationality"

Yuji Ijiri
Carnegie-Mellon University

5:30 - 7:00 p.m.

Reception
(Blue Room)
Sponsored by Prentice-Hall of Canada Ltd.

THURSDAY, JUNE 3

8:00 - 2:00 p.m.

Registration
(University Centre)

9:00 a.m. - 10:30 a.m.

*Plenary Session
(University Centre - Odeon)
Annual Meeting of the Canadian Academic Accounting Association
(Reports of Committee activities and plans. Report on American Accounting Association).

Chairman:

Alister Mason
President
Canadian Academic Accounting Association

Guest:

Dr. Yuji Ijiri
President - Elect
American Accounting Association

10:30 a.m. - 10:45 a.m.

Break

10:45 a.m. - 12:00 noon

Concurrent Sessions:

Session E:
(University Centre - Odeon)

*Simultaneous translation available for this session

THURSDAY, JUNE 3 - (Cont'd.)

10:45 a.m. - 12:00 noon

Session E: (Cont'd.)

Chairman:

Robert Beshara
Carleton University

"Responsibility Centres: A Reconsideration"

Murray Bryant and Daniel Thornton
University of Toronto

"Control in Organizations: A Framework for Analysis"

Robert Simons
McGill University

10:45 a.m. - 12:00 noon

Concurrent Sessions:

Session F
(Lamoureux Hall - Room 242)

Chairman:

Derek Acland
Carleton University

"Independence of Auditors: An Empirical Study of the Adams Report"

Daryl Lindsay
Morina Pritchard
George Murphy
Harold Silvester
all of University of Saskatchewan

"Industrial Concentration and the Informational Value of Financial Statements"

Daniel Zeghal
University of Ottawa

12:00 - 1:30 p.m.

Informal Buffet Lunch
(Blue Room)
Sponsored by the Society of Management Accountants of Canada

1:30 - 3:30 p.m.

Concurrent Sessions:

Session G
(Lamoureux Hall - Room 242)

Chairman:

James Waugh
Carleton University

1:30 - 3:30 p.m.

Session G (Cont'd.)

"A Structured Approach to Choosing A Computer System for an Accounting Faculty"

Howard Armitage and
Anthony Wensley
University of Waterloo

"Computers and Auditing: A Canadian Survey"

Francine Schlessinger
Thorne Riddell
Alfred Kahl
University of Ottawa

"Multi-Media Instruction in Accounting: A Decade Later"

Turgut Var
University of Hawaii
Irene Gordon
Simon Fraser University

1:30 - 3:30 p.m.

Concurrent Sessions:

Session H
(Lamoureux Hall - Room 221)

Chairman:

Harvey Mann
Concordia University

"The Information Content of UK Annual Reports"

Michael Maingot
University of Ottawa

"A Departmental Overhead Allocation Algorithm Consistent With Opportunity Costs"

James Mackey
University of Wisconsin

"A Reconsideration of Human Resource Accounting"

Chris Robinson
University of Toronto

THURSDAY, JUNE 3, - (Cont'd.)

1:30 - 3:30 p.m.

Concurrent Sessions:

Session I
(Lamoureux Hall - Room 243)

Chairman:

Tom Beechy
York University

"FASB Statement 52 and Its Implications for the Canadian Accounting Profession"

Roger Tang
University of Calgary
Alan Holt

"Investment Considerations In a Depreciation Based Tax Shelter: A Comparative Approach"

Lawrence Gould
McMaster University
Stanley Laiken
University of Waterloo

"Predictibility and Simplicity - How Does The Income Tax Act Measure Up?"

C.T. Lau
University of Windsor

3:30 - 5:30

Closing Reception
(University Centre - Room 109)
Sponsored by John Wiley & Co.

L'ASSOCIATION CANADIENNE DES PROFESSEURS
DE COMPTABILITÉ

CONGRÈS ANNUEL 1982

Le 1-3 juin 1982

Université d'Ottawa
Ottawa, Ontario

LE MARDI 1er JUIN

| | |
|---|---|
| 14 h - 22 h | Inscription<br>(Centre Universitaire) |
| 20 h - 22 h | Réception d'Accueil<br>Parrainée par: Institute of Chartered Accountants of Ontario<br>(Salon Bleu) |

LE MERCREDI 2 JUIN

| | |
|---|---|
| 8h - 22h | Inscription<br>(Centre Universitaire) |
| 9h - 10h30 | * Séance plénière<br>(Pavillon Lamoureux - Salle 122)<br><br>"Enseignement d'un cours d'introduction en comptabilité: diverses approches"<br>Comité d'enseignement de l'ACPC.<br><br>Président:<br><br>Yvon Houle<br>Université du Québec à Trois-Rivières<br><br>Orateurs:<br><br>Bruce Irvine<br>Université de Saskatchewan<br><br>Daniel Thornton<br>Université de Toronto<br><br>Commentateur:<br><br>Pierre Vezina<br>Université Laval |
| 10h30 - 10h45 | Pause Café |

* La traduction simultanée est disponible pour cette séance

LE MERCREDI 2 JUIN (Suite)

10h45 - midi

Séances parallèles

* Séance A:
(Pavillon Lamoureux - Salle 122)

Discussions sur la séance plénière du Comité d'enseignement

10h45 - midi

Séance B:
(Pavillon Lamoureux - Salle 219)

"Computer Usage in Accounting Education"

Président:

Paul Dunmore
Université McMaster

"The Use of Computers in Teaching Accounting"

Len Fertuck
Université de Toronto

"McMaster's System for Computer-Aided Learning in Accounting"

Paul Dunmore
Université McMaster

midi - 14h

Déjeuner
Parrainé par l'Association des comptables généraux licenciés du Canada
(Salon bleu)

Sujet de l'allocution

"Information for Managerial Decision Making Revisited"

Conférencier invité:

Hector Anton
Université de New York

Président:

Alister Mason
Président
L'Association canadienne des professeurs de comptabilité

* La traduction simultanée est disponible pour cette séance

LE MERCREDI 2 JUIN (Suite)

14h - 15h25

Séances parallèles

* Séance C:
(Centre Universitaire - Odéon)

Président:

Gilles Chevalier
Touche Ross & Cie

"La réaction boursière à l'uniformité en matière comptable: Cas de la Conversion des Etats financiers en devises étrangères"

A. Naciri
Université d'Ottawa

"Are Accounting Concepts Assumptions, Propositions or Objectives?"

John Macintosh
Université McMaster

14h - 15h25

Séance D:
(Pavillon Lamoureux - Salle 219)

Président:

William Scott
Université Queens

"Economic Models of the Labour Market: Their Implications for Pension Accounting"

James Pesando
Université de Toronto
Carol Clarke
Université de Toronto-Erindale

"Convertible Bonds: Debt and Equity Values"

Raymond King
Université de la Colombie-Britannique

15h25 - 15h45

Pause café

* La traduction simultanée est disponible pour cette séance

LE MERCREDI 2 JUIN (Suite)

15h45 - 17h15

* Séance plénière
(Centre Universitaire - Odeon)

Président:

Len Eckel
Université de Waterloo

"Historical Cost Accounting and Its Rationality"

Yuji Ijiri
Université Carnegie-Mellon

17h30 - 19h

Réception
(Salon Bleu)
Parrainée par Prentice-Hall Canada Inc.

LE JEUDI 3 JUIN

8h - 14h

Inscription
(Centre Universitaire)

9h - 10h30

* Séance plénière
(Centre universitaire - Odéon)
Assemblée annuelle de L'Association Canadienne des professeurs de comptabilité (Rapports sur les activités et les projets des comités. Rapport sur les activités de l'AAA)

Président:

Alister Mason
Président
L'Association canadienne des professeurs de comptabilité

Invité:

Yuji Ijiri
Président
American Accounting Association

10h30 - 10h45

Pause café

* La traduction simultanée est disponible pour cette séance

LE JEUDI 3 JUIN (Suite)

10h45 - 12h

Séances parallèles:

Séance E:
(Centre Universitaire - Odéon)

Président:

Robert Beshara
Université Carleton

"Responsibility Centres: A Reconsideration"

Murray Bryant et
Daniel Thornton
Université de Toronto

"Control in Organizations: A Framework for Analysis"

Robert Simons
Université McGill

10h45 - 12h

Séance F:
(Pavillon Lamoureux - Salle 242)

Président:

Derek Acland
Université Carleton

"Independence of Auditors: An Empirical Study of the Adams Report"

Daryl Lindsay
Morina Pritchard
George Murphy
Harold Silvester
Université de la Saskatchewan

"Industrial Concentration and the Informational Value of Financial Statements"

Daniel Zeghal
Université d'Ottawa

12h-13h30

Déjeuner
(Salon Bleu)
Parrainé par La Société des comptables en management du Canada

LE JEUDI 3 JUIN (Suite)

13h30 - 15h30

Séances parallèles:

Séance G:
(Pavillon Lamoureux - Salle 242)

Président:

James Waugh
Université Carleton

"A Structured Approach to Choosing A Computer System for an Accounting Faculty"

Howard Armitage et
Anthony Wensley
Université de Waterloo

"Computers and Auditing: A Canadian Survey"

Francine Schlessinger
Thorne Riddell
Alfred Kahl
Université d'Ottawa

"Multi-Media Instruction in Accounting: A Decade Later"

Turgut Var
Université d'Hawaii
Irene Gordon
Université Simon Fraser

13h30 - 15h30

Séances parallèles:

Séance H:
(Pavillon Lamoureux - Salle 221)

Président:

Harvey Mann
Université Concordia

"The Information Content of UK Annual Reports"

Michael Maingot
Université d'Ottawa

LE JEUDI 3 JUIN (Suite)

Séance H: (Continué)

"A Departmental Overhead Allocation Algorithm Consistent With Opportunity Costs"

James Mackey
Université du Wisconsin

"A Reconsideration of Human Resource Accounting"

Chris Robinson
Université de Toronto

13h30 - 15h30

Séances parallèles:

Séance I:
(Pavillon Lamoureux - Salle 243)

Président:

Tom Beechy
Université York

"FASB Statement 52 and Its Implications for the Canadian Accounting Profession"

Roger Tang
Université de Calgary
Alan Holt

"Investment Considerations in a Depreciation Based Tax Shelter: A Comparative Approach"

Lawrence Gould
Université McMaster
Stanley Laiken
Université de Waterloo

"Predictibility and Simplicity - How Does The Income Tax Act Measure Up?"

C.T. Lau
Université de Windsor

15h30 - 17h30

Réception
(Centre Universitaire - Salle 109)
Parrainée par John Wiley & Co.

CAAA 1982 Conference
University of Ottawa

V. Bruce Irvine
College of Commerce
University of Saskatchewan

# INTRODUCTORY ACCOUNTING: SOME THOUGHTS OF AN INSTRUCTOR

Initial communication regarding the nature of material to be presented and discussed at this session resulted in identification of the topic "Instructing An Introductory Accounting Course." "Super," I thought, "certainly interesting and there is likely to be a wide diversity of opinion." Discussion of the topic and participation therein would be a learning experience for me. The general nature of the topic offered a wide degree of latitude and I asked the question "What could I contribute?" My first reaction was to reflect on the guidance given me when initially assigned to teach an introductory accounting class to first year undergraduates. My recollection was that I was simply given a course outline, text and solution manual and told to "do the best I could." Further reflection suggested that I had not explicitly taken a great deal of time to examine issues associated with instructing such a course. At this point I become terrified - had I agreed to present a paper for discussion about which I knew nothing? What do I know that people would possibly want to hear about?

Faced with this problem, as any reasonable decision maker would do, I searched for information to reduce my uncertainty. The "solution" reached was to draw on my personal experience to identify issues and relate to you some conclusions regarding instructing introductory accounting. The experience includes:

- 14 years in the classroom with such classes,
- class sizes from 30-160 students,
- first year undergraduate. M.B.A. and professional courses,
- full academic year, half year and summer school classes,
- a limited number of different institutions,
- use of different texts,
- a student body of different levels of academic performance history (primarily due to imposition of quotas on entries to the business school in recent years).

Since the first experience with introductory accounting, I have "developed" the course intuitively and through explicit actions regarding how I thought things should be. One of the first things I discovered was that things can never be as they should be. Limitations are always present, not the least of which are the instructor's capacity for creativity and the presence of environmental constraints (class sizes, type of students, texts available, other instructors and their thoughts, where the course fits into the entire curriculum, what instructors in other disciplines think, etc.). Perhaps recognition and, to a degree, acceptance of these limitations and their consequences is one of the most important aspects to be learned in trying to understand the unique and common features of such a course across different Canadian institutions.

The purpose of this paper is not to present the nitty-gritty details of the introductory financial accounting course at the University of Saskatchewan (a course outline, sample term exam given after four weeks of the course and description of a new grading system to be used are included in Appendices for those interested). Nor is the purpose to convince people that there are certain "right" or "wrong" things to do in such courses. The purpose is to identify some general issues related to teaching an introductory accounting course and to indicate some personal conclusions about these issues.

## Some Issues and Thoughts

There are many issues relevant to a discussion of instructing an introductory financial accounting course for freshman students. To provide a framework, I have categorized some of these under three main headings: Preparation Issues, Implementation Issues and Evaluation Issues.

## Preparation Issues

To prepare for instructing an introductory financial accounting course, adequate planning is an essential. Such planning culminates in the preparation of a course outline which should incorporate such things as course objective(s), text(s), grade contract, schedule of material covered and student assignments (Appendix I provides an example). Developing the outline, however, should be backed up by a fair amount of thought if an instructor is to fully comprehend what is expected to be and how it will be accomplished. Such thought is also important if one is to later assess how well what was intended was accomplished - an important aspect of the instructor learning about the course and improving in future offerings.

Unfortunately, if accounting departments in other universities are having experiences such as those recently incurred at Saskatchewan, many of the introductory classes are being staffed by sessional type appointments. Such individuals are interested in teaching but often have not devoted sufficient thought to this preparation stage. This frequently may lead to problems and frustrations during the class for both the instructor and department head. To assist in overcoming this, it is suggested that discussions take place between all instructors prior to the course which examine the following issues

### The Objective of the Course

A basic reason for thinking about and stating an objective is that it leads to more rational understanding and decision making about the operational aspects of the course. A statement of objectives establishes, in a general way, what students are expected to learn from the course. Some examples are:

- to provide students with an understanding of the basic accounting equation, the underlying concepts and how the accounting system works to generate financial statements.

- to introduce and provide a survey of financial accounting so that students will have a basic understanding of how to use financial statements and the process by which they are derived.

- to provide students with a perspective to intelligently understand and use accounting reports.

While each of these statements may be totally legitimate and, at first glance, appear repetitious, they have been structured (in the writer's opinion) to reflect what may be called the "preparer-orientation to user-orientation continuum." As such, they provide a basic rationale for decisions such as the choice of text, type of assignments, nature of instruction and type of examinations.

A question that is often useful to ask is "Why are the objectives of the course as they are?" Answers are often difficult to derive but attempting to do so is important to rationalizing that the present course objectives are appropriate or that they should be revised. I would suspect that objectives are as they are because of such things as departmental tradition, instructors' education and experience, time available for the course, its location in the total curriculum, the fact that the course usually is to serve all students in a business program (not just accounting majors), availability of instructors, and willingness and time to experiment.

## 2. Pedagogical Preparation

Establishment of the course objective(s) is necessary to determine what is to be accomplished in terms of type, breadth and depth of knowledge. Prior to delivering a course, it is also important to think about how the objective is

to be accomplished. This concerns issues which deal with what I will call "pedagogical preparation".

Pedagogical preparation requires an instructor to make decisions or, perhaps, accept decisions of others regarding such things as the text book, supplementary materials (annual reports, study guides, journal articles, problem sets), student assignments, office hours, number of exams and use of lab sessions or class time. Within this framework, however, I wish to comment on two particular issues: the procedural versus the conceptual approach and the resource allocation problem within a class.

Recent years have witnessed some debate regarding the "appropriate" approach to teaching an introductory financial accounting course. The opposing viewpoints have been labeled the "procedural" and "conceptual." To be honest, I have never quite been sure how text publishers or academics clearly distinguished between the two approaches. It appears that the procedural approach has associated with it a stereotype of having students learn lots of rules and formats so that they are able to apply them to particular problems to generate particular answers. Descriptors such as "mechanical," "problem oriented", memorization", "bookkeeping", "routine" and "boring" appear to be associated with the procedural approach. The conceptual approach has associated with it more descriptive material which concentrates less on being able to do problems and more on having students understand issues associated with deriving and using accounting information. Descriptors associated with this approach are "ability to integrate", "theoretical", "being able to think" and "interesting".

To a large extent these two approaches appear to coincide with the "preparer versus user" distinction identified in the discussion of course objectives. Indeed, if one accepts that there is at least some degree of

correlation, the debate between a procedural versus conceptual approach may really be one of what the course objective should be. Is the underlying assumption that one can not have both perspectives incorporated into a course? Many would say this assumption is correct - texts emphasize one approach or the other, instructors are not capable of handling both, students would not be able to cope, important material would have to be omitted, it would take too much work. To an extent, these things are true. To an extent, they simply represent an underlying resistance to change. If change is felt to be appropriate it can occur, albeit slowly and not without cost.

My viewpoint on the issue is this: the "preparer-user" or "procedural-conceptual" categorizations are not seen as uniquely separable positions. Rather, they are end points on a continuum and one may choose to be somewhere between.

Personally, I see myself moving the perspective of courses I have taught from a highly procedural orientation closer to the middle of the continuum. This has had a cost in terms of the depth and number of topics covered not to mention a degree of frustration by both the students and instructor. The benefit of such movement has been a more "commfortable" perception that, while students may be less expert in being able to do a wide variety of specific problems, they are better able to attack problems with an improved understanding of what they are doing and why. When exams are marked, however, it is clear that my efforts have not been totally successful

What I have done may best be discussed in the framework of the resource allocation problem within a class. Various resources are available to assist in accomplishing a course objective. These resources are class time, out-of-class time, textbook(s), problems for assignment, study guide, and other supplementary information an instructor may wish to use (annual reports,

journal articles, cases, practice sets for example). The instructor's problem is which of these are to be used and how are they to be used. My suspicion is that if one chose the strictly procedural route the resources chosen and how they are used would be mutually reinforcing (ie.: text chosen, problems assigned based on text reading and class time devoted primarily to problem solving would be a matched set). A similar matching of resource identification and use may be expected for a strictly conceptual approach. An integrated (to whatever degree) approach would result in some mix of these resources and their use.

Ideally, an appropriate text with related problem assignments would significantly assist this integrative approach. Unfortunately, it is unlikely that such an ideal book for each instructor will be found and one must select what is seen as most suitable.

Given the text, the use of class time provides a basic variable controlled by the instructor. Class time would not simply be used as a vehicle for repeating what students have (or should have) read. Rather, it can be used to expand on a topic, think out loud about a topic, put the topic in perspective relative to the course objective and illustrate points by selective problem solving. In essence, the lecture time provides the instructor with an opportunity to arouse student interest by making the material more interesting.

Selection of appropriate supplementary material can also assist. Use and discussion of actual annual reports (particularly at the beginning and end of a course) have been particularly helpful to me. One of the reasons for attempting to move from a procedural perspective has been the concern that students are not acquiring the ability to integrate material on various topics into unfamiliar situations. Cases, both written and discussed, provide an

avenue for overcoming this problem. I have just begun to experiment with case usage.

The approach an instructor takes is basically an individual decision. My basic point is that instructors should recognize this and that they do try some experimentation if they feel it is warranted. To me, the basic merit of the procedural-conceptual debate has been that it raised questions in my mind about what I had been doing in the introductory class. Although I have not been able to come to definitive conclusions, the search for answers has been interesting and has been one of the rewarding aspects of teaching introductory accounting.

## Implementation Issues

While addressing the preparation issues provides a basis for planning what to do and how to do it, one still has to carry out the instruction. Instructors will vary considerably in how they perform this function. While there are a multitude of factors that enter at this stage of instructional responsibility, I would like to present some thoughts on three issues: the fist class meeting, humour and experimentation, and the instructor's attitude.

### 1. The First Class Meeting

The initial meeting of a class is one of the most important sessions of the entire term. Some instructors may simply go into the class room, hand out the course outline, go over it and leave. While this is necessary, to me, the first class meeting also presents an opportunity for the instructor to establish him or herself as a human being, to set the tone of the class and to relieve the coldness and uncertainty (fear?) of freshman students entering a business program.

One technique I have used to accomplish this is to go into the first class and announce, dead seriously, that the students will now be given a verbal examination. Faces turn white, some slouch down in their chairs and a "silent groan" permeates the classroom. The questions are then given:

1. What lives on a farm, has four legs, eats hay and can see equally well from both ends?
2. What is this? (Show clenched fist)
3. What has two humps and can be found in Alaska?

.
.
.

n. What is accounting?

In addition, I have also found it beneficial to inform students about myself (experience, interests, likes), the course itself and where it fits into the College's total curriculum, as well as discuss with them what they think an instructor's responsibilities are.

For some reason, the approach appears to "turn-on" students initially. Maintaining such an attitude requires substantial effort and creativity and, by no means, does it always work.

## 2. Humour and Experimentation

Generally (and probably legitimately) most texts may be thought of as fairly "dry", presenting facts and giving examples. Such reading combined with typical problem assignments and examinations, while necessary ingredients for the course, are not likely to "excite" students - how often have we heard accounting is boring? Some instructors will simply accept this. To me, however, creating and maintaining interest of students is an important part of an instructor's responsibility.

One mechanism is to be humorous at the appropriate times. The occasional joke or story does not take much time but it does introduce a change of pace from the regular routine. Typically, stories I have used relate to topics being covered. By no means, however, am I suggesting that we become comedians rather than instructors. I think that a student's opinion of and interest in accounting can be affected by an instructor just as much as, if not moreso than, by texts and problems. We, by example, should show that we are reasonable and decent human beings rather than people that are "... a human petrification with a heart of feldspar and without charm of the friendly germ, minus bowels, passion, or a sense of humour." (quote of Elbert Hubbard, philosopher, found in Charles T. Horgren, Cost Accounting: A Managerial Emphasis, 5th edition, Prentice-Hall, Inc., 1982, p. 350)

An important characteristic of freshman students taking an introductory accounting class is their general naivety about business (ie.: "Does issuing a cheque mean they spent cash?", "What is an issued and outstanding share?") A lack of understanding about business activity and terminology makes it difficult to learn accounting. Consequently, I have, for some topics, experimented in creating and using examples to which students can relate when introducing and discussing a topic. For example, when teaching the concept of what an asset is and some of the limitations in accounting for assets, I will ask the class to consider whether or not Guy LaFleur is an asset to the Montreal Canadiens and, if so, why he is not reported as such in Molson's financial statements.

Another example is the presentation used to introduce business and related accounting activity associated with purchases and inventory. Rather than verbally discuss the purchase process, visual props are used to illustrate it.

Briefly this is how it goes.

Give Example

From this, the class has experienced a basic activity of business and the example can be used to lecture about such things as transaction anaylsis, measurement issues related to purchases, handling returns and allowances and inventory valuation.

Such things work in terms of creating interest, and, more importantly, having students better understand course material. The creation of such examples seems limited only by the instructor's creative capacity.

3. The Instructor's Attitude

From what I have read about effective teaching, three variables appear to be particularly important to perceived good instruction: ability to communicate, good knowledge of material and concern for students. While we all are no doubt continuously working on the first two, the third is often neglected. How do we view an assignment to instruct an introductory accounting class? Is it the lowest priority on a long list of things to do? Do we insist on only seeing students during our office hours between 8:30 and 9:30 a.m. on Tuesday and Thursday if we are around? If so, I doubt we would be truly successful at the task.

To me, teaching an introductory class is "fun". Students are committed to learning and it is exciting to see them progress.

My basic point is that the instructor's attitude toward the class is an important variable to effective instruction. It may be worthwhile to occasionally ask ourselves what our attitude is. The answer may provide us with a better understanding of why a particular class is progressing as it is and what could be done if a change is perceived to be desirable.

## Evaluation Issues

Having planned and delivered the course, the concluding aspects deal with issues of evaluation. Two aspects of evaluation will be considered: evaluation of students and evaluation of the course. Both aspects are rather ego-deflating but must be addressed by an instructor.

### 1. Why Don't Students Learn What I Teach Them?

This question reflects a basic, underlying dilemma of most instructors who are concerned about their students. To me, it was one of the major causes for experiencing a great deal of frustration with teaching early in my career. The reason for the frustration was that I blamed myself for students doing "poorly" based on their marks compared with my expectations. Such an attitude is catastrophic to anyone contemplating an academic career. Therefore, to survive, I found it necessary to develop a perspective (perhaps self rationalization) that would provide an answer to this question. While this perspective enabled me to maintain some degree of sanity, I realize it is not necessarily correct nor applicable generally. The basic point is that every instructor is likely to confront the question and develop his or her own answer. From the answer, I believe that a basic component of how a class will be taught is determined.

The perspective I have used is as follows:

Learning = f (individual's ability, motivation, attitude, learning environment)

The fundamental thrust of the model is the recognition of the fact that a student's performance (as determined by a grade for the course) is dependent upon many factors beyond the realm of an instructor's control and awareness.

The instructor has a great deal of influence on the nature of the learning environment and, consequently, any interaction effects it may have. The ultimate conclusion, however, is that what the student learns is primarily his or her responsibility. An instructor can not make students learn but can help them to learn if they want.

2. What Can An Instructor Learn From The Course?

Evaluating student performance is a necessity of the academic system. Evaluating the course after it has been taught, while not a requirement of an instructor, should be a responsibility assumed. Such an activity represents an effort by the instructor to learn from experience.

The course evaluation process would be much like a variance analysis taught in managerial accounting courses although certainly more subjective. Questions such as the following could be the basis:

- How did actual results match up with the course objective?
- How successful were the various pedagogic techniques relative to what was expected?
- What was done well?
- What wasn't done well?
- Why were actual results better or worse than expected?
- What can be done to improve in the future?

The critical ingredients in such an analysis are (1) a fairly clear determination (plan) of what was expected to be accomplished by the course and techniques used and (2) a fairly clear determination of what was actually accomplished. The former is necessary if any course evaluation is to occur and has been discussed previously. Determination of what actually was accomplished is extremely subjective. Two basic sources of such information are student

evaluations (verbal and written) and the instructor's self evaluation.

To me, the primary usefulness of student evaluations is to help assess my progress in improving the course instruction. This is accomplished by examining frequency counts and trends therein of student responses to questions for a given class and for classes over time. In particular, I will spot some weaknesses from an evaluation, work hard to correct them in the next class and hope improved performance is reflected. I have also found that written responses on student evaluations are very useful (ie.: statements made by students in response to the request "What were the major weaknesses of the class, the instructor?" or "What were the major strengths of the class, the instructor?")

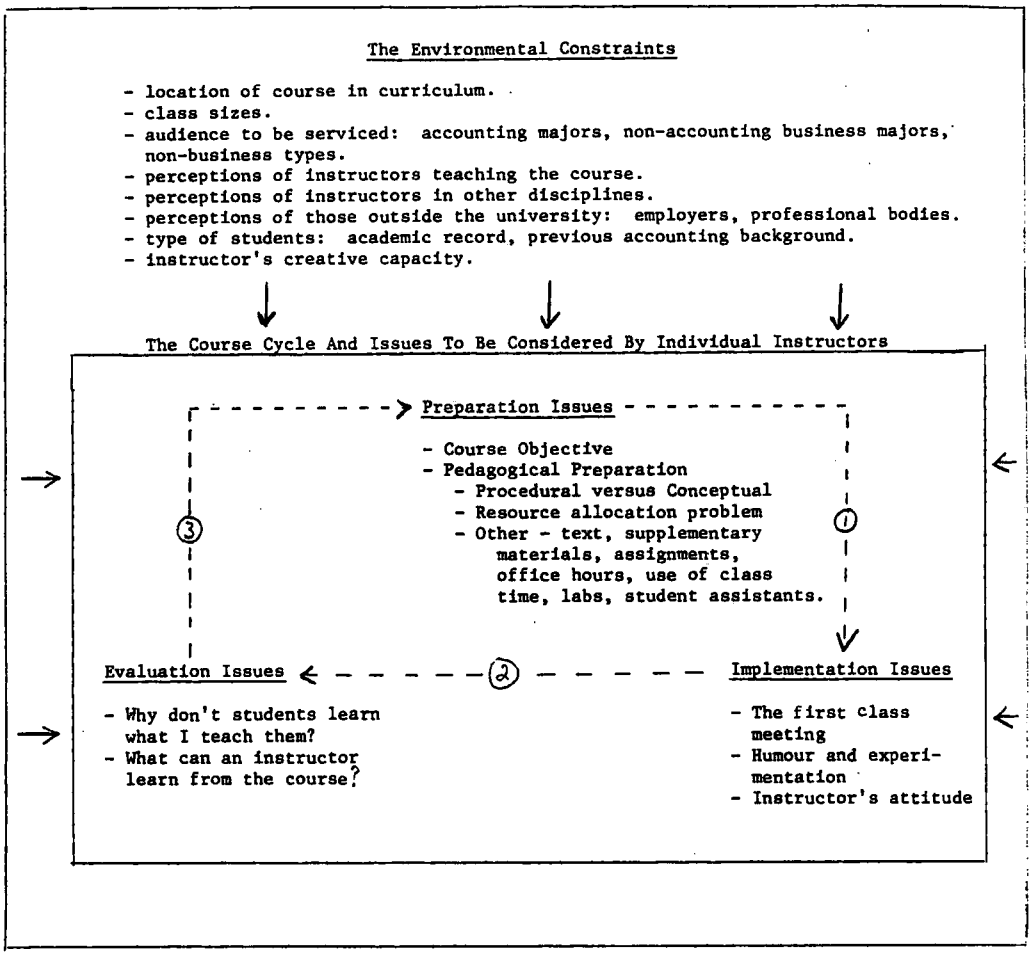
An instructor's self assessment of the course and his or her teaching is primarily subjective and often difficult. Such assessment essentially initiates the preparation stage for the next offering of the course. As such it would represent the final link in the continuing cycle related to the evolutionary development associated with instructing an introductory financial course to freshman undergraduate students. (See Figure 1)

## Conclusion

In this paper, I have presented some personal thoughts on issues related to instructing introductory accounting. On reflection, the level of these thoughts may be more appropriately perceived as representing a general philosophical approach to teaching any class with some minor deviations to account for peculiarities of the introductory nature of the course (ie.: objective statements, student background, breadth and depth of material coverage, class size).

If this approach has missed the intent of the session and the expectations of the audience, I trust that Professor Thornton's presentation will fill the gap. Being the initial speaker on the program always leaves one with the great advantage of being able to "pass the buck". You may recall that one of the questions I had initially asked myself was whether or not I had agreed to present a paper for discussion about which I knew nothing. The conclusion is yours to reach.

Figure 1. A Course Cycle



# Appendix 1

UNIVERSITY OF SASKATCHEWAN
COLLEGE OF COMMERCE

Accounting 120B, 1982

COURSE OUTLINE

Section 05: MWF, 12:30-1:30 (46 Commerce); Lab F 8:30-9:30 (46 Commerce)

Instructor: V. Bruce Irvine, B. Comm. (Sask.), M.B.A. (Chicago), Ph.D. (Minn.), R.I.A.
Office: 285 Commerce
Phone: 343-3495
Office Hours: M 1:30-4:00; Th 1:30-2:30

Objective of the Course:

This course is an introduction to and survey of the accounting process with emphasis given to the basic concepts and mechanics underlying the preparation of periodic financial statements. Issues relating to the identification, measurement and communication aspects of financial statement information will be presented along with an examination of the means of deriving information from financial statements. Although the traditional accounting model is emphasized, some discussion of alternative models of information measurement will be considered.

Some of you may have taken bookkeeping courses, seen reports and their masses of numbers, or heard accountants referred to as "number crunchers". It may surprise you to learn that the major challenges and problems of accounting are much broader than generating numbers and that accounting is a highly judgmental discipline without clear answers to many issues. Accountants must cope with and provide solutions for many ambiguous situations. Those who use accounting information must recognize the judgmental aspects going into the numbers presented. You will be introduced to some of the judgments that are necessary and to some of the tools that can be used to assess the quality of the potential solutions.

The College of Commerce has two core classes in accounting (classes that all Commerce students take regardless of major). Accounting 120 focuses on the fundamental concepts, mechanics, objectives and judgments involved in the preparation of financial reports for people outside an organization - shareholders (owners), creditors, bankers, etc. Members of management are responsible for the content of such reports which are prepared by the company's own accountants. Auditors provide an independent opinion on the adequacy of these reports. Accounting 230 focuses on the provision of accounting information for internal management purposes (planning, control, special decisions, etc.). As core classes, the basic objective is to provide you with a general understanding of the issues and procedures involved. For those who choose a major in accounting, these two classes provide the building blocks for an in depth examination of issues dealing with financial statement preparation, auditing, taxation, managerial decision making, systems and theory. For those not majoring in accounting the classes are designed to provide a general appreciation for the nature of accounting information, its usefulness and limitations.

Text:

Davidson, Stickney, Weil, Mitchell. *Financial Accounting: An Introduction to Concepts, Methods, and Uses.* First Canadian Edition, Toronto, Holt, Rinehart and Winston of Canada, Limited, 1979.

Notes: (1) Although not required a *Student Study Guide* for this text may be available in the Bookstore. Those who may be having some difficulty with the course material or pace may wish to use this study guide to supplement their studying.

(2) Many accounting terms are used in the course. The text provides a Glossary (pp. 635-688) which may be used for quick reference to definitions.

Student Responsibilities:

1. Text reading

2. Mid-term examinations. There will be three such exams, each lasting 50 minutes. The dates of these exams are indicated below. Students who are absent without justifiable cause will be given a 0 for that exam.

3. Final examination. The final exam will cover the entire course material. It will be scheduled for a three hour period sometime between April 10 and 30. It is intended that all students in Accounting 120B will write this exam at the same time. More details on the type of questions (multiple choice, problems, essay) and weighting of material will be provided at a later date.

.../2

Determination of Final Course Grade:

| | |
|---|---|
| Final Exam | 50% |
| Term Exams | 40% |
| Discretionary | 10% |
| | 100% |

Term Exams: There are three term exams. The 40% will be distributed as follows:

- The exam on which you score the lowest mark will count 10%.
- Each of the other two exams will count 15%.

For example, Miss X got 60, 70 and 75 on her three exams. The mark out of 40 for these exams would be 27.75:

((.10 x 60) + (.15 x 70) + (.15 x 75))

Discretionary: The discretionary 10% is based on your performance with respect to homework assignments, classroom participation, general brilliance and other contributions to the class. The determination of your mark is based on a formula which relates your performance on the above areas to average performance on the term examinations.

Homework:

Your instructors are firm believers that doing (or not doing) assigned homework problems will be of significant consequence in the level of performance you exhibit in the course. You will probably come to the same conclusion through your own experience in the course. Your efforts in regard to homework and class assignments will likely be justly rewarded in terms of the marks you receive on your exams.

The homework shown on the course material outline is set up in two classifications:

1. Those problems not underlined will likely be taken up in class in conjunction with discussion of the material in the chapter. It is recommended that you try these problems before the class period to which they relate. This will be of tremendous help in following the class discussion and clarifying areas where you went wrong so that you can raise questions during discussion of the material rather than facing difficulty after the material has been covered in class. These problems will not be handed in.

2. Underlined problems will be handed in for assessment of your understanding of the problem. This will be graded and returned to you as soon as possible. The idea here (and the basis on which any grade for homework will be made) is that you do these problems so you can assess whether or not you understand the concepts involved. All underlined problems will be handed in on the day following the class in which the chapter is finished. If you wait until the last day to do them all, time to finish could be very limited. Therefore, it is recommended that you do the problems during the time in which the chapter is taken up.

If you have any difficulty with the problems, feel free to see your instructor when you are doing them as help may be given.

Some key figures for the solution to the hand-in problems will be posted outside Commerce 285 before they are due to be handed in.

Except for unusual circumstances, late assignments will not be accepted.

Lab Sessions:

Lab sessions are given to provide you with the opportunity to ask questions and discuss problem areas on a casual and individual basis. Consequently, they are a place where you can do homework problems and receive direct assistance, ask questions about past assignments or returned homework or review any other matters of concern to you. The instructor or teaching assistant will be present at these sessions.

Course Material:

| Date* | Topic | Reading | Class Assignments and Homework |
|---|---|---|---|
| Jan. 4 (1) | Introduction to course | — | — |
| Jan. 6-11 (3) | Accounting information and decisions. Balance sheet and income statement - an overview | Ch. 1 | 11, 13, 16, 10, 12, 15 |
| Jan. 13-20 (3.5) | Measuring financial position - valuation principles and accounting procedures. The accounting cycle introduced | Ch. 2 | 6, 13, 25, 7, 12, 21, 23, 28 |

| Date* | Topic | Reading | Class Assignments and Homework |
|---|---|---|---|
| Jan. 20-25 (2.5) | Income statement measurement principles. Revenues and expenses. | Ch. 3 | 29, 14, 24, 15, 17, 22, 27, 30 |
| Jan. 27-Feb. 3 (3.5) | Income statement accounting procedures. The accounting cycle extended | Ch. 4 | 9, 30, 17, 10, 16, 18, 23, 31 |
| Feb. 5 (Friday) | EXAMINATION 1 | Chapters 1-4 will be covered. | |
| Feb. 8-12 (3) | Cash, marketable securities and receivables | Ch. 7 | 19, 30, 25, 16, 17, 18, 21, 33, 26 |
| Feb. 15-20 | Mid-term Break | | |
| Feb. 22-26 (3) | Inventories and cost of goods sold | Ch. 8 | 13, 17, 9, 26 (without formulas), 14, 18 (a, b, c only), 20, 23 |
| Mar. 1-5 (3) | Long lived assets and depreciation expense | Ch. 9 | 20, 8, 9, 27, 10, 13, 15, 22, 23 |
| Mar. 10-12 (2) | Liabilities | Ch. 10 | 3, 4, 5, 8, 17, 18, 19 |
| March 8 (Monday) | EXAMINATION 2 | Chapters 7 - 9 will be covered. | |
| Mar. 15-19 (3) | Owners' equity | Ch. 11 | 23, 13, 15, 30, 12, 17, 24, 31 |
| Mar. 22-26 (3) | Flow of funds and statement of changes in financial position | Ch. 5 | 5, 6, 13, 14, 15, Handout Pr., 12, 16, 17, 21. |
| Mar. 29-31 (2) | Financial statement analysis | Ch. 6 | 26, 22, 9, 11, 21, 23, 24 |
| April 2 | EXAMINATION 3 | Chapters 10, 11, 5, 6 will be covered. | |
| April 5-7 | Alternative models, an assessment. General and specific price changes. | Ch. 14 | 15, 16, 17 |

* Approximate number of classroom hours on each chapter in parenthesis.

Chapters Omitted - 12 and 13

Miscellaneous Notes:

1. This outline is tentative in that changes (such as number of problems, adding or deleting homework problems, timing of chapter coverage) may be introduced by the instructor as the course progresses.

2. The reading and homework assignments are set up with the intention that roughly two hours of study per hour of classroom time is required to be spent on the class (ie: about 6-8 hours of work per week outside of class time). This is an average assessment. However, if many of you find that it is taking more time than is designated by this rule of thumb, let your instructor know so that changes may be considered. Other comments you have (good or bad) about the course would be appreciated by the instructor.

3. For examination purposes, you are responsible for all the material covered in the text and class sessions (except where otherwise specified by your instructor). Because of limited class time, all aspects of the material in a chapter can not be covered in class. This does not mean you are not responsible for that which is not covered in class.

4. If you find that the assigned problems are not sufficient to give you confidence in your ability to handle the material covered in a chapter you may want to try some of the problems that were not assigned. Your instructor will be happy to give you solutions to these problems and help you in any other way possible.

VBI/vjm

CAAA 1982 Conference
University of Ottawa

# INTRODUCTORY ACCOUNTING: AN EXPERIMENT

DANIEL B. THORNTON*

This paper is a report on a test of a pedagogical hypothesis concerning the impact of a particular approach to teaching introductory accounting at the University of Toronto. I shall not try to convince anyone that the approach tested here is superior to other, competing methods: Nor did I attack the execution of the pedagogy with missionary zeal. I took on the assignment largely out of curiosity. Last summer, over lunch, two other CAAA members tried to convince me to assist in organizing a symposium for Canadian accounting teachers who were allegedly not current in their reading of some parts of the accounting literature. Playing devil's advocate I said, "Are you sure they will want to attend the seminar? In some universities, their teaching ratings from students could actually deteriorate if they introduced some of the material that we believe ought to be covered in introductory courses." Being well-trained academics, my friends pounced on me immediately: "That's a testable hypothesis!" they said. "If no one tries it, how will we ever know?"

The same day, I began designing a first year MBA course that would expose the students to some of the material in question. I secured the approval of my dean to offer an experimental section that would be run simultaneously with three other sections of the course taught in the

---

*University of Toronto and Queen's University. The author bears sole responsibility for all statements contained in this invited paper.

"conventional" way. In effect, there were three control groups and one experimental group. Whatever else may be said of the rigour with which I conducted my experiment, the presence of these control groups should have enabled me to detect significant differences in students' perceptions of the course that were due to my new approach.

Course Design

At the time I was preparing the course, I had not been involved with introductory accounting for five years: I had retreated to finance, managerial economics and "advanced" accounting theory largely because I did not like teaching the introductory accounting courses as they were currently being taught. It is probably fair to say that introductory accounting at the University of Toronto, in both the B. Com. and MBA programs, can be placed very near the "preparer-orientation" end of the continuum proposed by Professor Irvine. Realizing that the right way to teach is a matter of opinion, I simply voted with my feet.

The course outline that I settled upon is reproduced in Exhibit 1. Its essential elements were as follows:

1. Lecture material on the history of accounting thought taken largely from the AAA monograph, Accounting Theory and Theory Acceptance: to give students an idea of where accounting has been.
2. Beaver's Financial Reporting: An Accounting Revolution: to give students a view of some directions in which the social science of accounting may by heading.
3. Case presentations from Anthony and Reece: to give them some feeling for

managerial discretion in the selection of reporting policies and for the concept of an accounting cycle.

4. A major term paper in which they were to critique financial statements in terms of what they had learned, and to critique the CICA requirements for such disclosures and measurements. This was due at the end of the course, and could be done in groups of 2 or 3 or solo.
5. Some supplementary reading on accounting theory that might help them with their term papers. I put on reserve some copies of Ijiri's readable defence, Historic Cost Accounting and Its Rationality, and the first draft of my own monograph in the same series, Financial Reporting of Uncertainty: Theory and Practice.
6. The opening chapters of Foster's Financial Statement Analysis, which served as a basis for a lecture on empirical properties of financial accounting numbers - both cross sectional and time series.
7. A term test requiring preparation and interpretation of financial statements (Exhibit 2).
8. A final exam covering all of the material in the course (Exhibit 3).

In the introductory lecture, I proposed the rather complex framework for thinking about financial accounting that is reproduced in figure 1. I emphasized that as future users or preparers of financial accounting data, with some influence on standard-setting, they should be aware that:

1. Contemporary accounting thought has veered away from the pursuit of a "correct" income figure. In fact it is now acknowledged that income is

---

Note: Exhibits 2 & 3 are not reproduced due to space limitations. They are available on request from the author.

an ambiguous economic concept under uncertainty or incomplete markets. Instead, accounting data are being viewed more as instruments for disclosure or for contracting.

2. Accounting rule makers appear to assume that users are sophisticated, both in their understanding of accounting procedures and in their interpretation of accounting data. Consequently, much of financial accounting data is likely to be impounded in security prices or interest rates in a multi-person competitive setting.[1]
3. The profession is only beginning to grope for ways of disclosing uncertainties, which are the essence of most economic enterprises. As MBA's with training in statistical decision theory, information economics, and related areas, they will have to assume a leadership role in guiding the profession in the future, and not just accept the profession's rules at face value. Moreover, as several of our forthcoming case studies demonstrated, managers of business firms and other enterprises do have the ability to change accounting standards.
4. The profession is searching for ways of conveying levels of credibility commensurate with audit procedures and standards. Students who plan to enter the profession or to consume its attestation services should begin thinking about this linkage now.

At this point, approximately 10 students left, never to return. I should have collected some demographic data on them prior to their departure,

---

[1]That is, "efficient markets" plays the role of an assumption rather than a hypothesis in contemporary accounting theory: an assumption that may be appropriate in some instances but not in others.

because the ones who remained were probably the ones most sympathetic to my approach: The results below probably reflect self-selection bias in my favour. Of those who stayed, several students asked, "why do we have to learn all this extra stuff?" "You don't," I said. "There are three other sections of this course." Several others said, "I've already had accounting, and I was afraid this was going to be a bore. It looks like it might be an interesting course, after all." Off we went!

As the course progressed, questions inevitably arose during case discussions as to the right way to account for transactions. The only types of answers I gave were as follows:

1. Who are the users? What information do they want in this instance?
2. Well, U.S. accountants seem to like to compute earnings per share giving effect to expected dilution, whereas Canadian accountants prefer to show contingent e.p.s. numbers, letting the reader decide how to evaluate possible dilution.
3. What are the potential economic consequences of the 2 alternatives?
4. I don't know.

Some students expressed frustration at this approach. Others appeared to be interested considerably by it. One part-time student apparently enjoyed bating his controller into arguments over arbitrary accounting principles, both internal and external to the firm. "This course is dispelling a lot of myths about accounting," he said. All students said Beaver's book was very hard to read. (Of course Beaver didn't intend it to be used in a first course, so this is probably more a reflection of my

judgment than his writing ability). Needless to say, I enjoyed the course immensely: I learned at least as much from the students as they learned from me, I'm sure. My day of reckoning, however, came at the second last meeting, just after I had lectured for two hours on "empirical properties of accounting numbers."

Course Evaluation

Our course evaluations are done on a 7 point semantic differential scale. Statistics are computed scrupulously and sent to the Dean's office. Of the 30 students who remained in my course, 7 decided they had more important things to do, and left without filling out the form. Again, this may introduce non-response bias in my results, but I don't know whether the bias would be for or against me.

Exhibit 4 contains a sample evaluation form. Results of the student opinion poll are tabulated in Exhibit 5. The responses are divided into two groups: one in which the ratings for me and my course were above the faculty averages, and another in which they were below the faculty averages. The first observation that struck me was that, for the first time in my teaching career, I had scored below average in students' assessment of my "overall effectiveness as a teacher": nearly a whole standard deviation below the faculty average. I was astonished. Everything had seemed to be going so well. On further scrutiny, I noted that the variance in most of the below-average rating scores was higher than the variance in the above-average rating scores. I suspected a bimodal distribution for these scores. For instance, my "over-all effectiveness" scores were distributed as follows:

| Rating | Frequency |
|---|---|
| 1 | 0 |
| 2 | 4 |
| 3 | 2 |
| 4 | 4 |
| 5 | 1 |
| 6 | 11 |
| 7 | 0 |
| | 22 |

Evidently, the class was divided in their assessment. I decided to probe for the reasons for this. First, I checked the qualitative comments made by students who gave me low and high scores. Here are some typical comments (verbatim) from students who thought I was effective as a teacher:

1. The course turned out to be a lot more interesting than I had feared, largely due to the method of instruction, which kept you involved by maintaining a high level of discussion. A lecture course would have been overwhelmingly boring.
2. ....I like the approach that Professor Thornton takes...Instead of paying too much attention to the bookkeeping aspect of accounting, he focuses more on the "whys".....this helps me in my day-to-day work.....
3. Professor Thornton avoided as much as possible pronouncing on subjects of disagreement in class discussions. This was good, in that he did not impose his <u>opinion</u> on matters which are questions of opinion.....However, the class had no prior experience or knowledge of accounting principles. It would have been useful for him to tell straight out when approaches were not in accordance with GAAP.

Some comments by students who thought I was not effective:

1. I would have benefitted from LECTURES rater than case discussions.
2. I like the instructor to brief me more on each chapter or lesson. (Evidently not an English graduate).
3. Although the case study is an excellent method of tackling and promoting understanding of topics, I feel that it would have been useful to discuss topics in a general manner.....i.e. highlights of the particular chapter in the text in order to increase generalizability of information. (Apparently an inductivist).

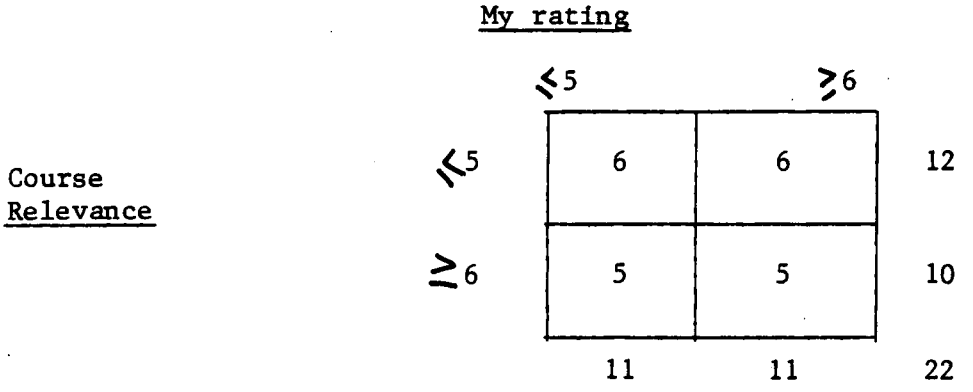
I think these six comments imply a lot about the characteristics of students that liked and did not like my approach. No wonder the distribution was bimodal.

The course did, however, receive an excellent average rating as being "relevant to my career." I wondered whether there was any relationship between the rating of the course and of the instructor. Why not try a chi-square analysis? My null hypothesis was that there was no relationship. If I refuted the hypothesis, some possible reasons could be as follows:

a) Those who thought the course was relevant hated me because I was frustrating them in their quest to learn GAAP and become public accountants (negative correlation).

b) Those who liked the course also like me because I was arming them with a good background on which to draw later (positive correlation).

Unfortunately, the chi-square test does not test for the form or sign of a relationship - only for statistical dependence or independence, so refutation of the null hypothesis cannot be interpreted further. Results were as follows:




Only this scaling gave enough observations per cell to justify a chi-square test. Apparently, the ratings given to me are statistically independent of the ratings given my course on the basis of this scaling.

Because of the small data base, I abandoned plans to try further tests of relationships among answers to questions. None the less, the "average" responses indicated that the following generalizations might be made, at least tentatively:

1. Students thought the course was challenging and relevant, and the tests and assignments were fair. However, supplementary readings (especially Beaver) were very poorly received and the workload was considered too heavy.
2. I was well-informed, enthusiastic and open to discussion, but hard to contact outside class, not very well organized and not very effective overall in relation to other instructors in the faculty.
3. Beaver's book should be dropped, and I should do <u>much</u> more lecturing. (These findings arose from "optional instructor statements" 1 and 2 in exhibit 4).

4. The conventional text, used both in my section and in the others, received rave reviews.

The inference that I was forced to draw was that overall my students would have been happier if they had been in one of the other sections.

Accomplishment of Pedagogical Objectives

Whatever may be said of the students' perceptions of the course, I was satisfied that most of them gained some understanding of the material. Most answers to the questions on the final examination (exhibit 3) and the test (exhibit 2) revealed a reasonably good appreciation of the course material: awareness of how accounting data may affect the environment; sensitivity to how participants in that environment may affect financial accounting standards; awareness of the degrees of freedom open to management in choosing reporting strategies; understanding of likely characteristics of accounting numbers produced by firms in different industries and of relationships among accounting numbers disseminated by firms in different industries; awareness that not-for-profit accounting is generally different from accounting for business firms (through one reasonably good case discussion); and the ability to prepare financial statements from transaction data under stated assumptions. Furthermore, the term paper showed that approximately 70% of the students were able to read financial statements with fairly good comprehension and discrimination. They exhibited respect for GAAP. They appreared to share my view that the accounting rules are arbitrary and ultimately unenforceable by accounting bodies, but essential as instruments for facilitating interaction both within and among firms.

This awareness and voluntary acceptance of arbitrariness is central to the philosophy of individualism on which most, if not all of our social institutions are based. It is the voluntariness of their acceptance of those rules that makes individuals capable of reforming them, yet capable of using them wisely to achieve their purposes. Moreover, I submit that voluntary acceptance can be achieved only if the most critical individuals understand the rules and their conceptual underpinnings.

## Conclusion

It seems to me that it would not be inaccurate to say that the operation was a near failure, but the patient lived. I believe that I have significantly affected the view that a dozen intelligent individuals hold of financial accounting, primarily by introducing material that is seldom covered in introductory courses. I wonder how many potentially excellent professionals we lose in first courses by not covering this material. On the other hand, I also appreciate that my approach may have eliminated others who were looking for certainty that I refused to give them. Whether on balance we are better off is a value judgement that is extremely difficult to justify. However, I do urge instructors to consider introducing some of the material - if they are not already doing so - incrementally and experimentally. If the shoe fits, why not wear it?

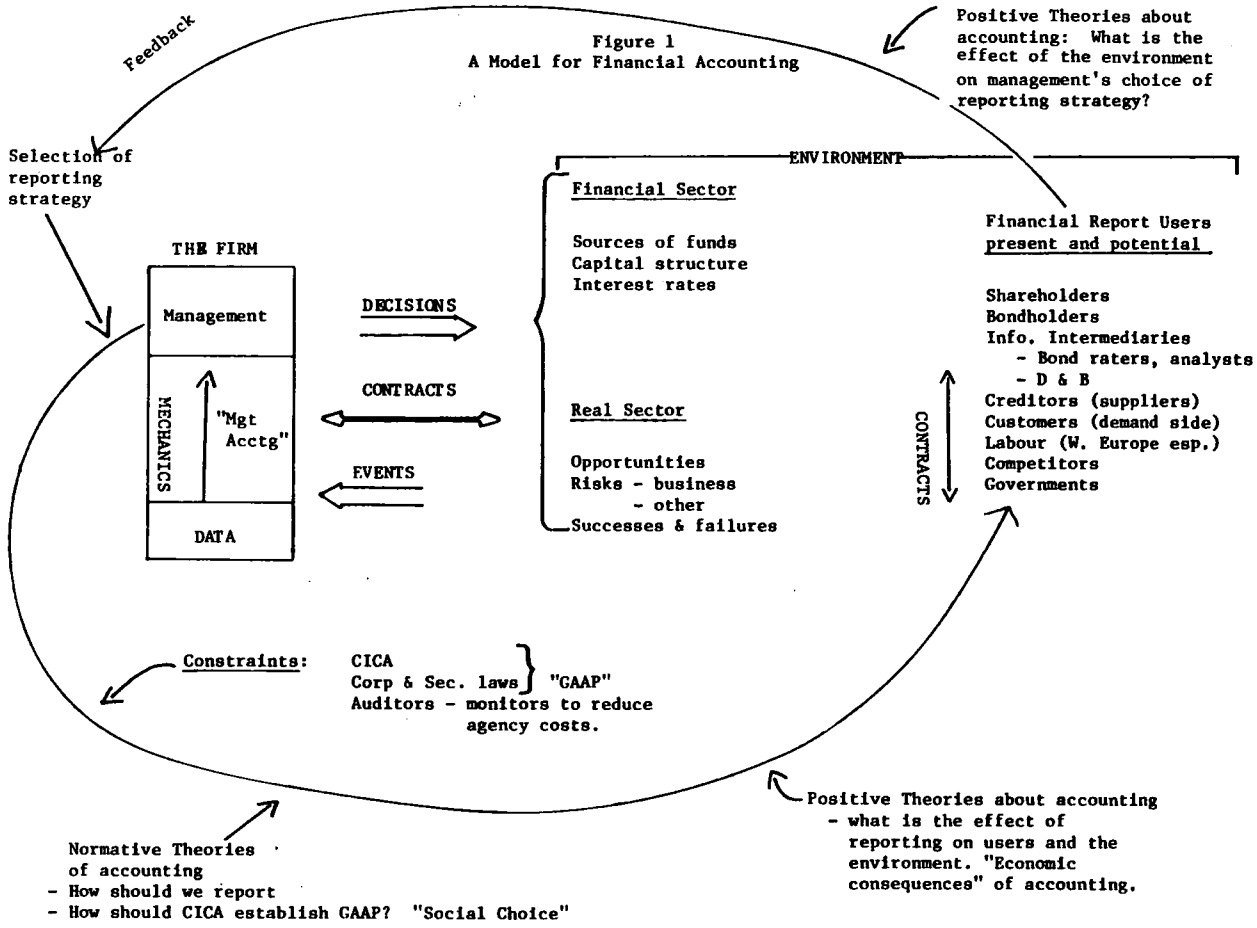

Feedback
Figure 1
A Model for Financial Accounting
Positive Theories about accounting: What is the effect of the environment on management's choice of reporting strategy?
Selection of reporting strategy
ENVIRONMENT
Financial Sector
Sources of funds
Capital structure
Interest rates
Real Sector
Opportunities
Risks - business
- other
Successes & failures
Financial Report Users present and potential
Shareholders
Bondholders
Info. Intermediaries
- Bond raters, analysts
- D & B
Creditors (suppliers)
Customers (demand side)
Labour (W. Europe esp.)
Competitors
Governments
CONTRACTS
THE FIRM
Management
MECHANICS
"Mgt Acctg"
DATA
DECISIONS
CONTRACTS
EVENTS
Constraints:
CICA
Corp & Sec. laws
"GAAP"
Auditors - monitors to reduce agency costs.
Positive Theories about accounting
- what is the effect of reporting on users and the environment. "Economic consequences" of accounting.
Normative Theories of accounting
- How should we report
- How should CICA establish GAAP? "Social Choice"

Figure 1

## Exhibit 1: Syllabus

Faculty of Management Studies
University of Toronto
BUS 1021
Introduction to Financial Accounting
Professor D. B. Thornton
September, 1981

Office hours: Thursday afternoons room 427. 978-5552
Other office - Sidney Smith Hall room 3006. 978-3336.

Books for the course

(a) Mandatory reading - examinable material

Anthony, R. N., and J. S. Reece (1979) Accounting: Text and Cases. Homewood, Ill.: Richard D. Irwin, Inc.

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

(b) Supplementary reading

Ijiri, Y. (1981) Historical Cost Accounting and Its Rationality. Vancouver, B. C.: Canadian Certified General Accountants' Research Foundation

Foster, G. A. (1978) Financial Statement Analysis. Englewood Cliffs, N. J.: Prentice-Hall, Inc.

Thornton, D. B. (1981) Financial Reporting of Uncertainty: Theory and Practice. Vancouver, B. C.: Canadian Certified General Accountants' Research Foundation.

Classes: Thursdays, 6:30 - 8:30, except for3 , which will be 6:30 - 9:30

Tutorials: Thursdays, 8:30 - 9:30 "on request"

Grades:

| Item | Contribution |
|---|---|
| Class participation (team) | 15% |
| Term project (solo or team) | 35 |
| Mid-term test | 15 |
| Final examination | 35 |
| | 100% |

INSTRUCTOR'S OBJECTIVES FOR THE COURSE:

My objectives for the course may be described under four broad headings:

1. Managerial choice of a financial reporting policy

How can managers best communicate the opportunities, uncertainties, successes and failures relevant to their firms to a varied audience of readers and potential readers of financial statements external to the firm? Twenty-two case studies will be considered, all of which concern this same basic issue in some form or other.

2. Accounting theories

Accounting can be a fascinating social science. I hope that you will gain some appreciation of the literature through reading Beaver's Financial Reporting: An Accounting Revolution, and from my brief lectures. If you enjoy this aspect of the course, I hope that you will consider taking my second year course, BUS 2201 "Accounting Theory". Two broad aspects of accounting theory will be surveyed in the present course:

(a) Positive theories ABOUT accounting - What is the effect (if any) of financial reporting on the firm's environment?: e.g., on stock market prices, interest rates, competition, etc. What is the effect, in turn, of the firm's environment on managers' selection of reporting policies? We shall sample a very large and rapidly growing empirical literature in endeavouring to answer these important questions.

(b) Normative theories OF accounting - How should the financial position and results of operations of a firm be measured and disclosed? To whom are firms accountable for what? Or, are the answers to these questions "in the eye of the beholder"? If so, is it possible to develop a good normative theory of accounting? Are normative accounting theories cultural

phenomena? Or, is there some universally "correct" theory that is independent of cultural biases, but which somehow has eluded us so far?

3. Mechanics

Every manager can benefit from knowing a few basic facts concerning how financial statements are prepared from a data base within a firm, and a few basic facts concerning how accounting institutions constrain firms' measurement and disclosure practices by imposing upon them reporting rules called "generally accepted accounting principles" (henceforth, GAAP, which rhymes with gap). Possibly, if each firm gives up a little freedom, all firms will gain a lot, because readers of financial statements will know that some uniformity exists in financial reporting practices. This, of course, is ultimately an empirical question. Without the basic knowledge referred to above, a manager will be unable to communicate effectively with either internal accountants (sometimes called, "management accountants") or with external accountants (public accountants, or auditors). The course should serve as a satisfactory introduction for students who may consider professional accounting careers, but it is directed primarily at managers and future managers of business firms and other reporting entities. My own opinion is that there should be no difference in the introductory course given to these two groups of students, but not everyone agrees with me.

My objectives here will be accomplished mostly through the case studies. It's up to you to learn some debits and credits from the text book. I may even ask you to make a few journal entries on your test or exam: but if so, they will be designed to test your understanding of accounting models, not your prowess as a bookkeeper.

4. User groups

How can financial accounting data be used by readers of financial statements for decision making? Examples: by a banker making a loan; by a government official who wants to regulate a monopoly "in the public interest"; by an investor buying a stock; by the Minister of Finance in assessing the incidence of income tax policies; by an "information intermediary" who wishes to interpret financial data for some group of individuals. To this end, we shall need to examine some empirical literature on the behaviour of accounting numbers over time and across firms. This is sometimes called, "financial statement analysis" or "ratio analysis". Coverage of this topic will be accomplished through:

(a) the assignment of a research project, and

(b) lecture and handout material on empirical studies of the behaviour of accounting numbers.

General note on objectives

Naturally, it is important to be able to work effectively with other people. You will note that the major project may be done either solo or in a team of 2 or 3. It's up to you. My own opinion, for what it's worth, is that you will learn far more from your fellow graduate students during your MBA programme than you will learn from the faculty, and this is an excellent opportunity to get together to solve some interesting problems. There will be absolutely no difference in the grade assigned to a project because of solo or team preparation, and everyone in the team will receive exactly the same grade.

CLASS PARTICIPATION

There are 23 case studies assigned. Subtracting the two covered the first night, there are 21 remaining. These will be presented by teams of 2 or 3 students, using whatever visual aids they wish. The procedure will be as follows:

| | |
|---|---|
| 1. Introduction to the topic by the instructor | 10 minutes |
| 2. Presentation by tonight's team | 15 |
| 3. Discussion by the class at large | 25 |
| | 50 minutes |

Please try not to go overtime.

Your grade for class participation will be based on your presentation, plus the contribution that you make over the term to the plenary discussions. I'll be looking for constructive criticism of the presentations and some innovative approaches to the cases that the presenting group has not considered.

THE PROJECT

This can be done either solo or in a team of 2 or 3. Select two firms in the same industry (or approximately - the precise definition of what constitutes an industry is a moot point). Prepare an analysis of the strengths and weaknesses of their financial reports, 2,000 to 3,000 words in length. You should consider all of the following factors:

1. Make a brief general assessment of the opportunities, risks, and industry structure relevant to the firms. Assess the efficacy with which management has portrayed the position of its firm in this economic environment. Can you identify any biases in the financial reporting of uncertainties?

2. Identify 3 groups of readers who, in your opinion, would have some reason to look at these financial statements.

(a) What do you feel these readers would want to know about the firm and its impact upon the environment, both economic and social?

(b) Assess how well or poorly their needs are being met by the financial policies adopted by management.

3. Assume the role of a manager of the firms. What changes would you make in each firm's reporting policies in order to remedy some of the weaknesses that you noted in the preceding two sections, while preserving the strengths of the old reporting policy? In your analysis, consider the following factors:

(a) What would be the costs of each proposed change - both implicit and explicit?

(b) What would be the potential benefits to each of the relevant user groups?

(c) How would you decide how to trade off the disclosures that might be relevant to one user group against those that might be relevant to another?

4. Would you expect any of your proposed changes in financial reporting policy to have any impact upon the firm's stock prices, interest rates, or other costs of doing business? Explain carefully, citing the relevant sections from Beaver's book and other literature that we have discussed in class.

5. Would you expect the new disclosures to change any of the opportunites or risks of doing business other than those in 4 above. Explain very carefully. For instance, Robertson Davies in <u>The Manticore</u> states that "a secret is a valuable adjunct of power. Business people have sometimes stated that extra disclosures could have unfavourable effects on their firms' competitive positions.

6. Can you identify any financial reporting rules laid down by the CICA

which, in your opinion, constrain management of the firm to make disclosures or measurements that could be improved upon in the absence of the reporting constraint? If so, what recommendations would you make to the CICA's accounting standard setting body with respect to this industry?

Note: Class assignment schedule is not reproduced here due to space limitations.

# Exhibit 4

UNIVERSITY OF TORONTO
FACULTY OF MANAGEMENT STUDIES

## COURSE EVALUATION QUESTIONNAIRE

CIRCLE APPROPRIATE RESPONSE

COURSE NUMBER: 1021F (3) INSTRUCTOR CODE: 53 (8)

STATUS:

1 FULL TIME (FMS)
(2) PART TIME (FMS)
3 PH.D (FMS)
4 OTHER FACULTY (SPECIFY _____) (10)

PLEASE USE THIS QUESTIONNAIRE TO ANONYMOUSLY EVALUATE THE INSTRUCTOR AND SUBJECT MATTER OF THIS COURSE. IGNORE ALL KEYPUNCH CODES IN PARENTHESES ( ).

IN THE REMAINING SECTION OF THE QUESTIONNAIRE YOU ARE ASKED TO INDICATE THE EXTENT TO WHICH YOU AGREE OR DISAGREE WITH A NUMBER OF STATEMENTS. AFTER READING EACH STATEMENT CAREFULLY, CIRCLE THE NUMBER WHICH BEST REPRESENTS HOW YOU FEEL ABOUT THE STATEMENT. THE MEANINGS OF THE NUMBERS ARE AT THE TOP OF EACH COLUMN.

IF YOU HAVE NO BASIS FOR A CHOICE DO NOT CIRCLE ANY NUMBERS.

| | | Strongly Disagree | Disagree | Slightly Disagree | Neither Agree nor Disagree | Slightly Agree | Agree | Strongly Agree | |
|---|---|---|---|---|---|---|---|---|---|
| A. | ABOUT THE INSTRUCTOR: | | | | | | | | |
| 1. | THE INSTRUCTOR ORGANIZED AND INTEGRATED THE TOPICS IN THE COURSE VERY WELL. | 1 | 2 | 3 | (4) | 5 | 6 | 7 | (31) |
| 2. | THE INSTRUCTOR SEEMED WELL INFORMED ABOUT THE SUBJECT MATTER OF THE COURSE. | 1 | 2 | 3 | 4 | 5 | (6) | 7 | (32) |
| 3. | THE INSTRUCTOR WAS GENERALLY EASY TO CONTACT FOR CONSULTATION OUTSIDE OF CLASS. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | (33) |
| 4. | THE INSTRUCTOR SHOWED ENTHUSIASM FOR THE SUBJECT MATTER OF THIS COURSE. | 1 | 2 | 3 | 4 | 5 | (6) | 7 | (34) |
| 5. | THE INSTRUCTOR PROVIDED SUFFICIENT OPPORTUNITY TO DISCUSS AND QUESTION POINTS RAISED IN CLASS. | 1 | 2 | 3 | 4 | 5 | (6) | 7 | (35) |
| 6. | OVERALL, THE INSTRUCTOR PERFORMED EFFECTIVELY AS A TEACHER IN THIS COURSE. | 1 | 2 | 3 | (4) | 5 | 6 | 7 | (36) |
| B. | ABOUT THE COURSE: | | | | | | | | |
| 7. | THIS COURSE WAS SUFFICIENTLY CHALLENGING THAT IT STRETCHED ME TO MY FULL POTENTIAL. | 1 | 2 | 3 | (4) | 5 | 6 | 7 | (38) |
| 8. | THE ANNOUNCED OBJECTIVES OF THE COURSE AGREED WITH WHAT WAS ACTUALLY TAUGHT. | 1 | 2 | 3 | (4) | 5 | 6 | 7 | (39) |
| 9. | THE SUBJECT MATTER OF THIS COURSE WAS HIGHLY RELEVANT TO MY CAREER INTERESTS AND OBJECTIVES. | 1 | 2 | 3 | (4) | 5 | 6 | 7 | (40) |
| 10. | THE TEXTBOOK PROVIDED A SUBSTANTIAL CONTRIBUTION TO WHAT I LEARNED FROM THIS COURSE. | 1 | 2 | 3 | 4 | 5 | (6) | 7 | (41) |
| 11. | THE OTHER REQUIRED READINGS WERE OF CONSIDERABLE VALUE TO ME IN THIS COURSE. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | (42) |
| 12. | THE ASSIGNMENTS AND EXAMINATIONS PROVIDED A FAIR EVALUATION OF MY KNOWLEDGE IN THE COURSE. | 1 | 2 | (3) | 4 | 5 | 6 | 7 | (43) |
| 13. | THE LIBRARY COLLECTION AND SERVICES WERE SATISFACTORY FOR THE REQUIREMENTS OF THE COURSE. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | (44) |
| 14. | IN COMPARISON TO OTHER COURSES AT THE SAME LEVEL, THE WORK LOAD IN THIS COURSE WAS NOT EXCESSIVE. | 1 | (2) | 3 | 4 | 5 | 6 | 7 | (45) |
| 15. | OPTIONAL INSTRUCTOR STATEMENT #1 | 1 | 2 | 3 | 4 | 5 | (6) | 7 | (46) |
| 16. | OPTIONAL INSTRUCTOR STATEMENT #2 | 1 | 2 | 3 | (4) | 5 | 6 | 7 | (47) |
| 17. | OPTIONAL INSTRUCTOR STATEMENT #3 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | (48) |
| 18. | OPTIONAL INSTRUCTOR STATEMENT #4 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | (49) |

PUT OTHER SPECIFIC OR GENERAL COMMENTS ON COURSE OR INSTRUCTOR OVERLEAF. IN PARTICULAR, INDICATE FEATURES LIKED MOST OR LEAST.

## Exhibit 5: Evaluation by Students

| | No. of Respondents | Mean Score | Standard Dev. | No. of Stand. Devs away from Faculty Mean |
|---|---|---|---|---|
| **Positive Comments:** | | | | |
| Instructor - | | | | |
| Well informed | 23 | 6.6 | 0.5 | +0.3 |
| Enthusiastic | 23 | 6.0 | 0.7 | +0.1 |
| Open to discussion | 23 | 6.2 | 0.9 | +0.3 |
| Course - | | | | |
| Challenging | 23 | 5.6 | 1.2 | +0.5 |
| Relevant to my career | 23 | 5.4 | 1.0 | +0.5 |
| Textbook (Anthony & Reece) | 23 | 6.1 | 0.9 | +1.3 |
| Assignments & exams | 23 | 5.2 | 1.0 | +0.4 |
| **Negative Comments:** | | | | |
| Instructor - | | | | |
| Organized | 23 | 5.1 | 1.5 | -0.3 |
| Easy to contact | 16 | 4.0 | 1.2 | -1.2 |
| Effective overall | 22 | 4.6 | 1.6 | -0.9 |
| Course - | | | | |
| Taught announced objectives | 22 | 5.4 | 1.1 | -0.2 |
| Supplementary readings | 20 | 3.3 | 1.9 | -1.3 |
| Library services | 14 | 3.9 | 1.1 | -0.7 |
| Workload not excessive | 19 | 3.8 | 1.6 | -0.8 |
| Other - | | | | |
| Beaver's book should be dropped | 23 | 5.2 (1=no, 7=yes) | | |
| Thornton lectured too much | 23 | 2.2 (1=disagree, 7=agree) | | |

Canadian Academic Accounting Association
Annual Conference 1982 - University of Ottawa

Len Fertuck
University of Toronto

# The Use of Computers in Teaching Accounting

## Introduction

There are two basic approaches to using computers in accounting courses. In this paper they will be referred to as Computer Aided Instruction (CAI) and Decision Support Systems (DSS). The methods are suited to different pedagogical purposes. CAI is suitable for the fact acquisition and embedding stages of learning. DSS is more suitable when the objective is to integrate material and learn to deal with unstructured problems.

## Computer Aided Instruction

CAI systems generally present a paragraph of new material to the student, then present a series of questions which help the student to embed the knowledge just presented or test the student to see how well the material has been learned. Depending on the sophistication of the programs, the student may be provided with hints when he is having trouble or with varying amounts of drill and practices of varying difficulty based on responses to previous questions. The advantages claimed for such programs are that they can be infinitely patient with the student while he is learning, can tailor the material to the learning needs of individual students, and can monitor the student's progress to provide diagnostic information for the instructor. Detractors of such systems point out that much of the available material is very similar to that found in Programmed Instruction books and thus is nothing more than a very expensive form of electronic page-turning. Nievergelt [19] provides a good introduction to such systems and the benefits and problems of developing and using them.

In the accounting area at least 3 such systems have been developed. The best known is the course developed by McKeown at the University of Illinois using the PLATO System [16]. In Canada, the University of Alberta has installed PLATO but has not yet used this particular course. The course covers the entire introductory accounting course.

Unfortunately, it tends to be quite expensive. Special terminals costing about $5000 are needed and the courseware costs about $7.50 per student contact hour. McKeown reports some improvement in learning by students who used this course as compared to students who were taught in the conventional manner, but it is not clear that the high cost is justified.

The University of Delaware is also using the PLATO based Illinois course.

Another course has been developed at the Ontario Institute for Studies in Education. This also requires an expensive graphics terminal and so has had very limited use.

Scientific Time Sharing Corporation has contracted with two faculty members at the University of Pennsylvania to develop an accounting instruction package in the APL language for the education of their own staff. The student needs to know APL to use it, but can easily use APL to aid in calculations. There are apparently no plans to make the package commercially available.

We thus have a picture of accounting CAI packages which are expensive and relatively unused. The expense is related in part to the use of special terminals and in part to the very high cost of development. It has been estimated that it takes about 10-100 man-hours to develop one hour of finished courseware with beginning instructors being very near to the high end of that scale. Such high costs can be amortized only if the system is used by a large number of students at many schools.

The advent of microcomputers promises to provide such a potential market since many schools are installing such machines. Unfortunately, different microcomputers generally require different software and there are currently no standard languages for authoring courseware on microcomputers. Furthermore, there is very poor copyright protection on courseware to insure that an author will be paid for the courseware when it is used. These factors mitigate against early development of suitable material. The main positive factor is that a large number of introductory accounting courses are offered and instructors are very expensive and in short supply.

CAI programs must be considered in the context of other materials which are available for the same purpose. A number of programmed instruction manuals are available which have a similar purpose [4, 21] but cost much less and have the further advantage that they can be used at any location instead of at a computer terminal. The best of these may rival the typical CAI program developed by an instructor who has no previous experience with CAI.

Several packages have been developed which combine workbooks with cassette tapes and/or filmstrips [3, 6, 12]. The use of multiple media is designed to reinforce the presentation and aid embedding of knowledge. However, there is some question about whether films and cassettes are an appropriate medium for presenting accounting material. To be a successful alternative to books, a medium must exploit some capability not available in books such as color, motion or sound. None of these is inherently an important part of accounting which uses simple tables and diagrams to convey information. Thus, films, tapes and movies really are not able to do much for accounting that is not already accomplished in books.

The essence of accounting is the selection, manipulation, and presentation of data. The best technology for this is the computer and the best examples are found in software which is frequently referred to under the heading of DSS.

## Decision Support Systems

A DSS is not desinged to teach something to someone who does not already understand the principles involved. Instead, it is intended to permit the knowledgeable user to explore the consequences of something he knows. This is done by providing a variety of computational tools which will perform standard calculations, solve frequently used models, or simulate complex environments. Examples of such systems are statistical packages like BMDP, SAS, and SPSS; financial modeling languages like EMPIRE, EPS, IFPS, and SIMPLAN; simulation languages like DYNAMO, GPSS, and SIMSCRIPT; or mathematical packages like IMSL and MPSX.

These systems are primarily useful when the course objective is to learn how to integrate material and to deal with complex unstructured problems. They serve somewhat the same function as homework assignments in that they provide an environment in which the student can attempt to put into practice the concepts which have been learned in the fact acquisition and embedding stages of learning. The difference is that they permit the student to explore more alternatives or test himself on more complex problems because the computer relieves him of the manual calculations which frequently take up such a large fraction of the time spent on homework.

A corollary of this is that more complex problems must be provided if the student is to gain anything from the use of such packages. Such problems are seldom available in textbooks or case books since these have usually been develpoed with the constraints of manual solutions in mind. Effective use of DSS often implies some significant effort in developing new case material which will exploit the available computer power.

This lack of good case material may explain the relatively indifferent results which have been demonstrated in laboratory tests of the use of such tools [10, 4]. These tests usually compare students who are given access to computers with students who do manual assignments. The students are usually given the same problems to solve and the same examinations for evaluation. However, one should not expect to gain much by using a computer to solve a problem which is simple enough to solve manually. The real benefit comes from solving problems too complex to be solved by hand. If such problems are assigned, a control group is no longer possible and so we have no literature on the benefits of such material.

There appears to be a large amount of suitable software available. Indeed, one sometimes gets the feeling that every instructor with access to

a terminal or microcomputer is developing such software for use in the classroom. Unfortunately, there is a vast difference between developing a program to illustrate or solve a specific problem in one course at one school and developing software which can be used in a variety of courses in a number of schools having different hardware. Software developed for specific problems usually is not flexible enough to be adapted when the problem changes either due to changes in texts or changes in instructor preferences. Furthermore, it usually conveys the implicit message that computer programs are too rigid and inflexible to be of much use in a rapidly changing managerial environment.

A large collection of programs from different sources will typically have differing rules on how to enter data and commands, how to access files, and how to invoke standard procedures for such things as statistics and graphics. The result is that an inordinate amount of time will be spent in learning how to perform these functions leaving a relatively small amount of time for the basic material of the course. The result is often a great deal of pain for very little gain. Thus inflexibility and lack of standardization often reinforce a bias against the use of computers.

## Accounting Software

The available software can be divided into bookkeeping packages, financial and spreadsheet calculators, audit software, statistical packages, and games or simulations. The following list will not be exhaustive but will give some examples of what is available.

A number of bookkeeping packages have been developed [2, 5, 11, 17, 18, 20, 23]. All of these are card-oriented batch programs and tend to be tedious to use and often inflexible. Some schools have used commercial bookkeeping software packages on microcomputers. These are very flexible and interactive but tend to be tedious to use because of all of the options and all of the documentation which the student must wade through to solve even a simple problem. Many of the features which make them useful in a commercial environment are a distraction in the simpler classroom situation.

Spreadsheets, financial modeling, and other financial calculations such as yields, interest, and depreciation are available on a variety of commercial financial modelling languages such as EMPIRE, EPS, IFPS, SIMPLAN and several dozen less known ones. Many of these are available to business schools at nominal costs. They run on a variety of machines and are well-documented and well-maintained. However, they tend to place a heavy load on the computer and typically require two full days of instruction to learn. Much of the complexity comes from needing to understand associated file systems and input editors. Packages like VISICALC on microcomputers are becoming a simpler and more attractive alternative although they usually do not have the capability to model systems of simultaneous equations which are the norm in accounting models.

Audit software for sampling files and producing statistical descriptions can sometimes be obtained at nominal cost from the larger auditing firms. Like the modeling languages, these tend to consume computer resources since they are designed for large files. They also require a great deal of time to learn to use effectively. MARS [15] and ACL [24] have been designed for use in an academic environment.

A large number of statistical packages are available for many computers from many sources. They are usually quite good at doing the job for which they were designed. Unfortunately, few of them have been designed for use by accountants. They rarely include the ability to perform financial calculations such as depreciation and inventory and often are unable to produce even simple spread sheets. Such concepts as cost allocation are unheard of.

A large number of business games have been developed [13]. A number of these are designed to emphasize special areas such as finance and production. Anderson [1] has prepared a special version for use in accounting.

Art Thomas at Kansas University has undertaken a project to develop an accounting review program which is intended to combine some aspects of CAI and DSS on a microcomputer. This work is currently in the development stage.

The author has developed a package called the TREE System [7, 8] designed to overcome many of the problems inherent in the use of DSS in the classroom. TREE provides a wide variety of tools for performing calculations in accounting, economics, finance, forecasting, management science, marketing, matrix algebra, modeling, production, social sciences, and statistics. Most of these capabilities are built around a common database resembling a spread sheet. Thus the user can choose from a large menu of manipulations and apply them in any order which is appropriate for the problem.

The system is designed for ease of use by students. It prompts for and checks all input and provides an online index and online helps to guide the user. A comprehensive manual is also available [9]. It is designed for student problems which can be retained in the computer memory so that operating costs can be kept reasonable. Features, such as complex formats, that are not needed in an academic environment have been eliminated so that students can concentrate on the theory being illustrated by assignments. Students are able to learn how to use the system with 1 hour of instruction. It has been used for 5 years in over a dozen courses by over a dozen instructors at the University of Toronto. It is available for distribution from the author.

TREE has been used mainly as a tool to solve problems which would be too complex to solve manually. Assignments are drawn from a number of financial and marketing databases which have been placed on the system. Some

cases were specially written for use on the system. Others were chosen from among the most difficult ones available in texts. The instructors who use the system are generally convinced that it allows them to cover material in more depth by giving richer assignments.

Features which are particularly useful in accounting courses are a bookkeeping module; an overhead allocation routine; commands for financial calculations such as inventory, depreciation, and rates of return; matrix algebra; statistics; and financial modeling. Linear programming, PERT, decision trees, regression, and simultaneous equations have been used in managerial accounting courses.

## Conclusions

There appears to be great potential for using computers in teaching accounting. However, in the short term, this use is most likely to be in the form of Decision Support Systems of various kinds since the development of Computer Assisted Instruction courseware is a very difficult and expensive process. If such courseware is developed, it likely should incorporate many DSS features since these can be very useful in enhancing the learning experience.

## REFERENCES


1. Anderson, J., "Computer-Supported Instruction in Managerial Accounting", Accounting Review, July 1976, pp. 617-624.

2. Cruse, B.G. and J. Walker, GEAP: A Generalized Educational Accounting Package, Monograph 1978, School of Business Studies, Queensland Institute of Technology, Brisbane, Australia.

3. Curry, D. and Frame, R., Accounting Principles: A Multimedia Program, Merrill Publishing, 1973.

4. Dearden, J. Essentials of Cost Accounting, Addison-Wesley, 1969.

5. DeSautel, A. Krentle, W.R. Malschick, M.J. Walton, Accounting by Computer, Rinehart Press, 1974.

6. Dupree, D., Accounting: A Learning Experience Student Resource Materials Part I, Prentice-Hall, 1973.

7. Fertuck, L., "The TREE System as a Teaching Aid in Statistics, Modeling and Business Course," Computers and Education, Vol. 5 (1981), pp. 31-36.

8. Fertuck, L., "TREE: An Interactive Learning Support System," INFOR, Vol. 18, No. 2, May 1980, pp. 208-219.

9. Fertuck, L., The TREE System, University of Toronto, Faculty of Management Studies, 1981.

10. Friedman, M.E., "The Effect on Achievement of Using the Computer as a Problem Solving Tool in the Intermediate Accounting Curriculum," Accounting Review, January 1981, pp. 137-143.

11. Goosen, Kenneth R., Accounting and the Computer, General Learning Press, 1974.

12. Grant, C., Introductory Accounting, Merrill Publishing, 1977.

13. Horn, R.E. (Ed.), The Guide to Simulations/Games, 3rd ed., DIDACTIC Systems Inc. 1977, Vol. 2.

14. Jay, A.S., Comparison of Computer Assisted Instruction versus Conventional Instruction in a Beginning Accounting Course, Doctoral Thesis, University of California, Los Angeles, 1976.

15. Lampe, J., "A Practical EDP Audit/Retrieval System for Education," Accounting Review, October 1978, pp. 970-978.

16. McKeown, J.C., "Computer-Assisted Instruction for Elementary Accounting," Accounting Review, January 1976, pp. 123-130.

17. Meigs, Robert F., Computers and the Accounting Process, McGraw-Hill, 1973.

18. Neilson, Denis P., Interactive Computerized Accounting Problem Set, Irwin, 1972.

19. Nievergelt, J., "A Pragmatic Introduction to Courseware Design," Computer, Vol. 13, No. 9, (September 1980) pp. 7-21.

20. Pillsbury, Wilber F., Computer Augmented Accounting: Compuguide One, South-Western Publishing Co., 1970.

21. Sprouse, R. and Swieringa, R., Essentials of Financial Statement Analysis, Addison-Wesley, 1972.

22. Throckmorton, J., and Talbot, J., "Computer-Supported Instruction in Financial Statement Analysis," Accounting Review, January 1978, pp. 186-190.

23. Wilkinsen, J.W., Accounting with the Computer, Third edition, Richard D. Irwin, 1975.

24. Will, H., ACL Audit Command Language User Manual, ACL Services Ltd., Vancouver, 1981.

CAAA 1982 Conference
University of Ottawa

Paul V. Dunmore
McMaster University
Hamilton, Ontario

# McMASTER'S SYSTEM FOR COMPUTER-AIDED LEARNING IN ACCOUNTING

A new system for computer-assisted instruction in introductory financial accounting has been developed and used on a trial basis at McMaster University. This paper explains the philosophy behind the development and some of the characteristics of the system which reflect that philosophy. In an accompanying paper, Professor Fertuck has pointed out some of the hazards of computer-assisted instruction: my purpose is to suggest that those hazards are avoidable if they are considered in designing a system. Whether I have in fact avoided them is a question that can be answered only by experience.

## What Role Can Computer-Assisted Learning Play in a First Accounting Course?

Beechy (1980) has documented the extent to which problems are used in introductory financial accounting courses in Canada. Questions and problems were the only form of homework in 45% of programs, and represented 90% to 95% of homework assignments for another 11% of programs. Problem content in examinations ranged from 35% to 100%, with a median of 65%. McMaster University is typical in this respect: there is heavy reliance on the use of problems, both assigned for class discussion and for grading, to help the student learn and demonstrate a familiarity with both procedures and concepts. Many students ask for, and clearly need, many more practice problems than the instructors can provide. Class discussion of problems consumes large amounts of limited contact time, and shortage of faculty (and even of teaching assistants) makes it impossible to comment on extra problems attempted by individual students.

Some kinds of problems have a special characteristic: students are likely to produce only a few wrong answers, and the particular wrong answer makes it clear to the instructor what the student was thinking. In a face-to-face teaching situation, the instructor would be able to give appropriate remedial advice to the student based on no other information than the students' answer to the problem. (Of course, there are also many wrong answers which arise from punching the wrong button on a calculator. These answers call for no more elaborate advice than to do the problem again, carefully.) For problems with this characteristic, it is feasible for the instructor to anticipate all of the meaningful wrong answers and to prepare appropriate advice for each of them. The answers and advice can be stored in a computer and dispensed to the student by the computer, with the student having the opportunity to correct his mistakes in the light of the instructor's advice. In effect, the student is in a limited face-to-face situation with the instructor, and the computer is merely an intermediary. The dialogue in Figure 1 is a simple example of such a session.

The computer can thus play a clearly defined supplementary role in teaching introductory financial accounting. It can provide extra problem-solving practice for students, and it can reduce the need for problems to be solved in class time or to be graded as part of homework assignments. This may facilitate a redirection of class time towards conceptual issues or new accounting knowledge or the historical context of accounting, as advocated at the last CAAA conference by Professor Murphy (1981). The partially individualized learning which computers permit may also help to compensate for

the excessive class sizes which Beechy documented.

Two consequences flow from this view of the role of computers. First, there is no need, immediately or ever, to develop lesson materials in all topic areas of a course. Lesson development costs can be kept within bounds by selecting those topics in which students seem likely to gain the most benefits. At McMaster first attention was given to problems with adjusting entries, which our students find quite troublesome.

Second, the computer system must be able to deal with a reasonably broad group of accounting problems. The answer to a problem may be a number, a journal entry, a worksheet or section of a financial statement or other schedule of some kind, or even a discussion. However, it is not currently realistic to expect a computer to be able to recognize a right answer in all of these forms, much less to be able to identify the nature of an error in a wrong answer. The student's ability to perform a calculation or to prepare a journal entry is often regarded as being evidence of his understanding of the accounting for some situation. As a minimum objective, then, the computer system should be able to accept either a number or a journal entry as the answer to a problem.

Some Necessary Conditions for Success.

(i) Ease of Use by Instructors

Beechy expressed surprise that no university made any use of computers in teaching introductory financial accounting. This is likely to continue as long as the use of computers for accounting learning requires computer expertise of the instructor. Accounting faculty are experts in accounting and in teaching: it is unrealistic to expect the already overburdened accounting academic to develop expertise in the unrelated field of computer programming. But the active involvement of the instructor is a significant factor in getting the most benefit from computer-assisted instruction, as appears from many studies in other disciplines (Kulik et al., 1980). The computer is viewed here as a teaching tool, like an overhead projector: if use of the computer is so complex that most instructors are unable to prepare or modify computer-based problems, then the computer will not yield maximum benefits and will inevitably fall into disuse.

There are several requirements for the system to be easy to use by an instructor. First, the problems must be written in a language which is exactly tailored to the task at hand, so that the computer can accept instructions in the form that is meaningful to the instructor. Figure 2 shows a part of the instructions that generated the session in Figure 1. Without a formal explanation, it is nevertheless fairly clear what is meant by such instructions as

```
>CHOOSE THE OPENING-BALANCE BETWEEN $100.00 AND $300.00.
>POST JOURNAL ENTRY JE-1 WITH REFERENCE 1/1.
>SHOW T-ACCOUNTS FOR SUPP AND SUPP-X.
```

Second, the computer must handle all the incidental tasks required to manage the session, so that the instructor is freed to concentrate on the educational content. For example, when a student answers a question by typing a journal entry, he types it exactly as it would appear on a piece of paper. The computer decides which are the debit and credit lines, identifies the accounts used (ignoring minor mis-spellings, since students are not expert

typists), checks that the journal entry balances, and so forth. Examples of the computer dealing with such tasks are shown in Figure 1. The instructor does not concern himself with any of this activity: he needs only to consider what the student's answer indicates about his understanding of the accounting topic, and how to respond.

Third, the language design must minimize the risk that there will be undetected errors. A number of techniques of modern computer language design have been used in the McMaster system to help to ensure that the way that a session will work is obvious to the instructor.

With these features, it is possible for an instructor to design and draft a session at his desk, then translate it with little difficulty into the form needed by the computer. Indeed, it should be quite feasible to train a teaching assistant to translate the session and enter it into the computer.

(ii) Ease of Use by Students

Some computer-assisted instruction systems frustrate students using them by being fussy about the form of an answer, rejecting or misinterpreting answers that are clearly correct but that contain an extra blank or a minor spelling error. The McMaster system was designed with the idea that if the student's answer appears unambiguous to a human observer, then the computer should be able to understand it correctly. Some examples will illustrate the point: dollar amounts may but need not be prefixed with a $ sign; dates and explanatory comments are optional for a journal entry; dates may be typed in a wide variety of forms; minor spelling errors in account titles are ignored; alternative titles may be accepted for an account (e.g. "Temporary Investments" for "Marketable Securities") at the instructor's discretion; money amounts in a journal entry do not have to be lined up exactly, as long as the separation between debit and credit amounts is clear; and so forth.

Other features have been incorporated into the system to give the student some control over the session. Hints are available at the instructor's discretion, so that students who need more advice before attempting a problem can ask for it, while other students are not forced to wait for a lot of unnecessary advice. Also, a student who feels that he is making no headway with a problem can skip the problem and proceed to the next one.

It is also necessary to minimize the effects of computer system quirks. For example, only a limited amount of information can be fitted on a screen, and that information may arrive faster than the student can read it. Although the instructor must be primarily responsible for breaking up the lesson content into reasonable units, the computer system will automatically pause if necessary to ensure that the student has a chance to read everything before it scrolls off the top of the screen.

Some computer-assisted instructional systems have failed because they have been too difficult or frustrating for students to use. The features described here are intended to address the specific problems without giving the student or the instructor any new complications to deal with.

(iii) Reasonable Cost

McKeown (1976) developed a complete set of lessons for introductory financial accounting. These lessons are available through the PLATO service of Control Data Corporation, but the annual lease cost far exceeds McMaster's

total budget for teaching the first financial accounting course. The McMaster system uses ordinary terminals and is written in standard FORTRAN so that it can be fairly easily adapted to any medium-sized computer. The computer resources are thus not specialized, and the running cost is quite low. On McMaster's Cyber computer, the cost is about three dollars per contact hour (i.e., for hour of contact between a student and the computer).

The major cost of any computer-assisted learning is the cost of developing the lessons themselves. McKeown reported spending 8,000 man-hours, or abou[illegible] man-hours per contact hour to develop his PLATO-based lessons, and figures of 50 to 100 man-hours per contact hour are commonly reported. There are several ways in which this cost can be reduced. First, the strategy of preparing computer-assisted lessons only for selected topics rather than for a whole course reduces the total development cost. Second, using a language which is exactly tailored to the instructor's needs should reduce the cost of developing each lesson by simplifying the development process as much as possible. Very preliminary experience suggests that a figure of 20 man-hours per contact hour may be attainable. Third, the mechanical parts of the development can be performed by teaching assistants rather than by faculty members. Fourth, lessons developed on one computer can be run without change on another computer type (although the underlying system will require minor modifications), thus protecting the investment in lesson materials when equipment changes occur.

(iv) Feedback to Instructor

Perhaps the greatest advantage that computer-assisted learning has over such one-way instructional systems as programmed learning texts is the ability to provide information to the instructor on the performance of the students. This can be used in three ways: for grading students; for identifying topics on which student performance is consistently poor in time to provide extra instruction in class; and for improving the quality of the computer lessons themselves. For the latter use, the McMaster system reports to the instructor all answers that were not anticipated when the lesson was written, so that the instructor can identify any unforeseen difficulties that students are having and that should be specially dealt with by the computer. In the first student trial at McMaster, one student responded to the problem shown in Figure 1 with a debit to Cost of Goods Sold instead of to Supplies Expense. When the computer reported this to me, I recalled having seen other students make the same mistake, and I was able to improve the lesson by inserting a special discussion to deal with this particular misunderstanding.

Although feedback to the instructor is not by itself adequate to ensure high-quality lesson materials, it is a powerful tool in improving the quality of computer-assisted lessons.

Future Work

The system and the lessons based on it are still in a developmental stage. A full-scale student trial is planned for later in 1982, and lesson development by some of my fellow instructors is also planned. Only with much more experience can the preliminary cost estimates presented here be refined and the overall success of the approach be determined.

References

Beechy, Thomas H., University Accounting Programs in Canada: Inventory and Analysis. The Canadian Academic Accounting Association, 1980.

Kulik, James A., Chen-Lin C. Kulik. and Peter A. Cohen. "Effectiveness of Computer-Based College Teaching: A Meta-Analysis of Findings." Review of Educational Research, (Winter 1980), pp. 525-544.

McKeown, James C., "Computer-Assisted Instruction for Elementary Accounting." The Accounting Review, (January 1976), pp. 123-130.

Murphy, George J., "Accounting as an Academic Discipline." CAAA Annual conference Proceedings, 1981.

On 1 January, 1981, A.B.Chairperson & Co. had office supplies on hand of $139.62. During the year, purchases totalling $686.86 were debited to the Office Supplies on Hand account. On 31 Dec, 1981, a physical count shows the cost of supplies on hand to be $195.42. Make the adjusting entry.

```
? HINT
```

This is a classical adjustment example. What is the balance of Office Supplies on Hand before the adjusting entry is made? What should the balance be? How much should Office Supplies on Hand be debited or credited to make the balance correct?

```
? 31/12/1981  ACCOUNTS PAYABLE                    $195.42
?                 OFFICE SUPPLIES ON HAND                 $185.42
?
Total debits and credits are not equal. Please type the journal entry again.
? 31/12/1981    ACCOUNTS PAYABLE                  195.42
?                 OFFICE SUPPLIES ON HAND               195.42
?
```

I don't know why you would try to adjust those accounts. The balances that need adjustment are (1) the Office Supplies on Hand, which does not show the actual cost of supplies on hand at the end of the year, and (2) the Supplies Expense, which has a zero balance because no entry has yet involved Supplies Expense. The expense is a period expense because it cannot be matched to a specific revenue: that is, the expense should be recorded as the cost of supplies consumed during the year. Any supplies from the opening inventory of $139.62 or the purchases of $686.86 which are not included in the ending inventory of $195.42 must have been consumed and should be expensed.

So what should the adjusting entry be at 31 Dec, 1981?

```
? SUPPLIES EXPENSE                              195.42
?    OFFICE SUPLIES ON HAND                        195.42
?
```

You are debiting and crediting the proper accounts, but you have the wrong amount. In T-account form, the unadjusted accounts contain

```
   Supplies Inventory        Supplies Expense
 ---------------------    ---------------------
1/1   139.62|                 ======|======
pur   686.86|
      ------|
bal   826.48|
```

with 1/1 indicating the opening balance and PUR reflecting the purchases of supplies during the year. Since there are supplies costing $195.42 on hand, you should recalculate the amount of the credit to Office Supplies on Hand to bring the balance down to the right amount. What is the correct adjusting entry?

```
? DEC 31 1981    SUPPLIES EXPENSE              $631.06
?                    OFFICE SUPPLIES ON HADN              631.06
?                  TO RECOGNIZE SUPPLIES CONSUMED DURING 1981.
?
```

That is correct. After this entry is made, the inventory and expense accounts contain the following amounts (1/1 is the opening balance, PUR shows the purchases, ADJ is the adjusting entry):

```
   Supplies Inventory        Supplies Expense
 ---------------------    ---------------------
1/1   139.62|631.06 adj   adj   631.06|
pur   686.86|                     ------|
      ------|======        bal   631.06|
bal   195.42|
```

The inventory account then has the right balance (reflecting the amount actually on hand), and the expense account reflects the correct reduction in owners' equity from the consumption of supplies.

Figure 1.

```
>PROBLEM 3.
>NOTE.        Adjusting entry to recognize supplies expense.
>VARIABLE      OPENING-BALANCE        IS DOLLAR.
>VARIABLE      PURCHASES              IS DOLLAR.
>VARIABLE      SUPPLIES-BALANCE       IS DOLLAR.
>VARIABLE      SUPPLIES-X             IS DOLLAR.
>JOURNAL ENTRY    JE-1.
>DR  SUPP    OPENING-BALANCE.
>CR  R-E      PLUG.
>JOURNAL ENTRY    JE-2.
>DR  SUPP    PURCHASES.
>CR  A/P      PLUG.
 Entry to reflect purchases of supplies during the year. The credit would
be to Cash if purchases were paid for in cash, but in any case the debit
part of the entry is correct.
>JOURNAL ENTRY    ADJ.      LAST-YEAR-END.
>DR  SUPP-X  SUPPLIES-X.
>CR  SUPP     PLUG.
>JOURNAL ENTRY    DR/CR.      LAST-YEAR-END.
>DR  SUPP     SUPPLIES-X.
>CR  SUPP-X   PLUG.
>START.
>CHOOSE THE OPENING-BALANCE BETWEEN $100.00 AND $300.00.
>CHOOSE PURCHASES BETWEEN $600.00 AND $1,500.00.
>CHOOSE THE SUPPLIES-BALANCE BETWEEN $100.00 AND $300.00.
>LET SUPPLIES-X BE OPENING-BALANCE PLUS THE PURCHASES.
>LET THE SUPPLIES-X BE THE SUPPLIES-X LESS THE SUPPLIES-BALANCE.
>START A NEW LEDGER.
>POST JOURNAL ENTRY JE-1 WITH REFERENCE  1/1.
>POST JOURNAL ENTRY JE-2 WITH REFERENCE  PUR.
 On 1 January, #LAST-YEAR#, A.B.Chairperson & Co. had office supplies on
hand of #OPENING-BALANCE#. During the year, purchases totalling #PURCHASES#
were debited to the Office Supplies on Hand account. On #LAST-YEAR-END#,
a physical count shows the cost of supplies on hand to be #SUPPLIES-BALANCE#.
Make the adjusting entry.
>HINT.
 This is a classical adjustment example. What is the balance of Office
Supplies on Hand before the adjusting entry is made? What should the
balance be? How much should Office Supplies on Hand be debited or credited
to make the balance correct?
>HINT.
 For the other half of the entry, what happened to the missing supplies?
What account would be used to record this outflow of assets? Since the
amount for this second account must be chosen to make the entry balance,
you have the complete adjusting entry once you have answered all of
these questions. What is the entry?
>ANSWER  1  IS CORRECT;  JOURNAL ENTRY ADJ.
 That is correct. After this entry is made, the inventory and expense
accounts contain the following amounts (1/1 is the opening balance,
PUR shows the purchases, ADJ is the adjusting entry):
>POST JOURNAL ENTRY ADJ  WITH REFERENCE ADJ.
>SHOW T-ACCOUNTS FOR SUPP AND SUPP-X.
 The inventory account then has the right balance (reflecting the amount
actually on hand), and the expense account reflects the correct reduction
in owners' equity from the consumption of supplies.
>ANSWER  2  IS WRONG;  JOURNAL ENTRY  ADJ, BUT WITH THE WRONG AMOUNTS.
 You are debiting and crediting the proper accounts, but you have the
wrong amount. In T-account form, the unadjusted accounts contain
>SHOW T-ACCOUNTS FOR SUPP AND SUPP-X,
with 1/1 indicating the opening balance and PUR reflecting the purchases of
```

Figure 2 (start)

```
supplies during the year. Since there are supplies costing #SUPPLIES-BALANCE#
on hand, you should recalculate the amount of the credit to Office Supplies
Hand to bring the balance down to the right amount. What is the correct
adjusting entry?
>REPEAT THE QUESTION.
>ANSWER  3  IS WRONG;  JOURNAL ENTRY DR/CR.
 You had everything right except that you got the debit and credit the wron
way around. If your entry were posted, the result would be (1/1 shows the
opening balance, PUR shows the purchases during the year):
>POST THE JOURNAL ENTRY DR/CR.
>SHOW T-ACCOUNTS FOR SUPP AND SUPP-X.
 Since the expense is a reduction in owners' equity, it must have a DEBIT
balance, not a credit balance. The inventory balance is also wrong. The
correct adjusting entry is
>SHOW JOURNAL ENTRY ADJ;
>START A NEW LEDGER;
>POST JOURNAL ENTRY JE-1 WITH REFERENCE 1/1;
>POST JOURNAL ENTRY JE-2 WITH REFERENCE PUR; AND
>POST JOURNAL ENTRY ADJ WITH REFERENCE ADJ.
and as a result of this entry the ledger contains
>SHOW T-ACCOUNTS SUPP AND SUPP-X.
 The inventory balance then reflects the amount on hand, and the expense
account reflects the reduction in owners' equity from the consumption of
supplies.
>ANSWER  4  IS WRONG;  JOURNAL ENTRY DR/CR AND WITH THE WRONG AMOUNT.
 No. An expense is a reduction in owners' equity and is recorded with
a DEBIT, not a credit. The inventory balance must be brought down to the
correct amount, with a CREDIT. Even with the debit and credit interchanged,
your entry will still not be correct. The unadjusted accounts contain the
following amounts:
>SHOW T-ACCOUNTS FOR SUPP AND SUPP-X,
where 1/1 shows the opening balance and PUR the year's purchases. The journal
entry to record the purchases is shown here,as a summary of many entries
that would actually be made: the summary entry is
>SHOW JOURNAL ENTRY JE-2.
 On #LAST-YEAR-END# the supplies actually on hand cost #SUPPLIES-BALANCE#.
What entry will correctly adjust the inventory and expense accounts?
>REPEAT THE QUESTION.
>ANSWER  5  IS WRONG;  ANY OTHER.
 I don't know why you would try to adjust those accounts. The balances that
need adjustment are (1) the Office Supplies on Hand, which does not show
the actual cost of supplies on hand at the end of the year, and (2) the
Supplies Expense, which has a zero balance because no entry has yet
involved Supplies Expense. The expense is a period expense because it
cannot be matched to a specific revenue: that is, the expense should be
recorded as the cost of supplies consumed during the year. Any supplies
from the opening inventory of #OPENING-BALANCE# or the purchases of
#PURCHASES#  which are not included in the ending inventory of
#SUPPLIES-BALANCE# must have been consumed and should be expensed.
 So what should the adjusting entry be at #LAST-YEAR-END#?
>REPEAT THE QUESTION.
>AFTER  3 WRONG ANSWERS:
 This is a very straightforward adjusting entry, and you have not yet
succeeded in getting it right. Rather than allowing you to keep guessing,
I want you to refer to the material in Chapter 4 of the text, and in your
lecture notes. Try this lesson again after you have done that review.
See you another time!
>STOP
>END
```

Figure 2 (continued)

1982 Congres of the CAAA
University of Ottawa

A. Naciri
Faculty of Administration
University of Ottawa
Ottawa, Ontario

# THE MARKET REACTION TO THE ACCOUNTING STANDARDIZATION: THE CASE OF THE FAS #8

---

Abstract

---

In October 29, 1975, the Financial Accounting Standard Board (FASB) adopted Statement of Financial Accounting Standard No 8 (FAS #8) "Accounting For The Translation of Foreign Currency Transactions and Foreign Currency Financial Statement" which was conceived to standardize procedures for translating and reporting foreign currency positions of American Multinationals Firms (AMF).

The FAS #8 was criticized by many AMF which argued that its application would result in violent changes in their reported earnings not related to their economic conditions, thereby it would in their view, confuse stockholders and penalize their share prices by increasing their cost of rising funds. Alternatively the modern financial theory would argue that investors are sophisticated and can be expected to distinguish fluctuations attributable to the economic conditions of the firm. This is evident from the work of Fama (1970).

Because of such contradictory views regarding the probable effects of FAS #8 we think there is a place for more analysis of its probable market effects upon multinationals. Our study is based on a sample of 169 AMF, uses daily observations and cumulative average residual (CAR) methodology, i.e., the residuals $\tilde{U}_{it}$, surrounding the memorandum-discussion, the exposure-draft, the adoption and the reaffirmation of the FAS #8, are given by:

$$\tilde{U}_{it} = RO_{it} - [\alpha_i + \beta_{swi} R_{mt} + \tilde{\varepsilon}_{it}]$$

where $\tilde{U}_{it}$ = the residual of the security i at time t

$RO_{it}$ = the observed rate of return on security i at time t

$R_{mt}$ = the rate of return of the market portfolio at time t

$\alpha_i$ and $\beta_{swi}$ = the parameters to be estimated by OLS and Scholes and William's technic

$\tilde{\varepsilon}_{it}$ = the impact of random "outside disturbance" on the return of the security i at time t.

Given our results there nothing to suggest that Multinationals which did not affect their cash-flow by expending efforts to alter FAS #8 accounting impact, had suffered any market effect. And this is always the case whether the impact of the new standard on AMF reported earning is negative, neutral or positive.

Congrès 1982 de l'A.C.P.C.
Université d'Ottawa

A. Naciri
Faculté d'Administration
Université d'Ottawa
Ottawa, Ontario

# La réaction boursière à l'uniformité en matière comptable: Cas de la Conversion des Etats financiers en devises étrangères.

L'un des objectifs du "Financial Accounting statement No. 8" (FAS #8), emis par le "Financial Accounting Standard Board" (FASB) en octobre 1975, est d'amener les firmes multinationales américaines à exprimer en dollar leurs opérations conclues en devises étrangères, d'une manière qui garantirait que leurs états financiers consolidés soient préparés sur des bases uniformes. Devant un tel objectif on peut se poser la question suivante: Les investisseurs réagissent-ils automatiquement aux méthodes de conversion rapportées, ou, au contraire, nuancent-ils leur interprétation en fonction de ces dernières? Nous essayerons de répondre à cette question à l'aide d'un travail empirique.

Dans la section prochaine nous examinerons quelques hypothèses concernant l'utilité de l'uniformité en matière de méthodes comptables. Dans la deuxième, nous discuterons de l'échantillon et de la méthodologie. Nos résultats empiriques seront présentés à la section 3. Finalement notre conclusion, occupera l'essentiel de la section 4.

## I. Les conséquences éventuelles de l'uniformité

Les institutions comptables aux états Unis aussi bien qu'au Canada, si l'on juge par leurs exigences toujours croissantes en matière d'uniformité, semblent penser que devant la vaste gamme de méthodes comptables de conversion des états financiers consolidés[1] l'investisseur peut réagir mécaniquement aux mesures comptables rapportées. Il n'est, cependant, pas évident, de l'avis de beaucoup d'études, empiriques que cela soit le cas. Il semblerait plutôt d'après Archibald (1972), Ball (1972), Ball et Brown (1972), Kaplan et Roll (1972) et Sunder (1975), qu'il n'y a aucune réaction dans les prix des titres par suite d'un changement dans les méthodes comptables, excepté, peut-être, dans le cas d'un changement de méthode d'amortissement où des variations ont pu être remarquées. Sunder a expliqué ces dernières par le fait que le marché avait pu reconnaître les firmes qui allaient annoncer plus ou moins de bénéfice, selon la méthode d'amortissement employée. Le marché semble donc, aller plus loin dans la recherche de l'information, au-delà de ce que les méthodes comptables veuillent bien lui fournir.

---

(1) Avant Octobre 1975, quatre méthodes comptables de conversion étaient en utilisation: La méthode courante-non courante, La méthode-courante, la la méthode monétaire-non monétaire et la méthode temporelle.

Devant cette divergence des points de vue et afin de mieux élucider le problème, nous commencerons par une discussion des effets comptables du FAS #8. Notons que ses principales exigences se résument en 3 points:

(a) L'ensemble des Actifs et Passifs monétaires, incluant les dettes à long terme, doivent être traduits aux taux de change courants.

(b) Tous les autres postes du bilan doivent l'être aux taux de change historiques.(2)

(c) Finalement, tous les gains et pertes sur change causés par la conversion des Etats financiers des filiales doivent être rapportés dans le compte des revenus de la période courante.

Ces exigences peuvent aussi contredire souvent les pratiques anciennes en matière de conversion des Etats financiers des filiales à l'étranger à trois différents niveaux:

1e) Au niveau du poste des "Inventaires": les méthodes classiques permettaient leur conversion aux taux de change courants, alors que le FAS #8 exige leur conversion aux taux historiques.

2e) Au niveau du poste "Dettes à long terme": les méthodes classiques permettaient leur conversion aux taux de change historiques, alors que le FAS #8 exige leur conversion aux taux courants.

3e) Au niveau, finalement, du traitement des gains et pertes sur change: jusqu'au mois d'octobre 1975, les firmes multionationales américaines, FMA, conservaient toute latitude, en ce qui concernait le traitement de ces pertes et gains: Elles pouvaient les différer, en les inscrivant dans un compte de "réserves", comme elles pouvaient opter pour leur reconnaissance immédiate, en les reportant dans le compte des revenus de la période. Le FASB #8 est venu leur enlever la première alternative. Dès 1976, la reconnaissance immédiate des pertes et gains de traduction est obligatoire.

Ainsi à la veille du 30 octobre 1975, date d'adoption du FAS #8, les FMA se trouvaient en contradiction avec le nouveau standard en matière de change, à des degrés différents. Celles qui avaient l'habitude de différer leurs pertes et gains sur change étaient susceptibles de sentir un plus grand effet sur leurs bénéfices rapportés.

Généralement, tout changement de standard de conversion des états financiers des filiales à l'étranger aura un impact sur les bénéfices rapportés. Cet impact dépend, cependant, de deux éléments à savoir:

1) l'importance de la différence entre les taux de changes historiques et courants;

---

(2) Sauf pour le cas des "titres négociables" et "inventaires" inscrits au bilan à leur valeur marchande qui sont traduits dans ce cas aux taux courants.

2) l'importance relative des postes du bilan à être convertis.

Pour mieux faire ressortir ces effets, nous examinons l'exemple hypothétique d'une multinationale américaine qui serait propriétaire à 100% d'une filiale anglaise dénommée "Britanica". Le Bilan de cette filiale, son état des résultats ainsi que les taux de change courants et historiques, aussi bien dans le cas d'un affaiblissement du dollar américain que dans celui de son affermissement, apparaissent aux tableaux 1, 2, 3 et 4. Pour obtenir son bilan converti en dollar américain il nous suffit d'appliquer les taux de changes courants et historiques appropriés. Cette conversion est accomplie par 4 méthodes différentes à savoir la temporelle du FASB, celle des valeurs vénales fixes et variables qui lui est identique[3], celle du court terme/long terme et celle courante.

Les détails de la procédure de conversion dans les cas d'un affaiblissement et d'un affermissement du dollar américain sont présentés respectivement aux tableaux 5 et 6. Chaque tableau est divisé en quatre parties correspondant chacune à une méthode de conversion déterminée. La première colonne dans chacune des parties intitulée "T de T", indique le taux de conversion employé: Taux courant (TC) ou taux historique (TH); la deuxième indique le résultat de la conversion par chacune des méthodes et la troisième indique la différence entre une méthode quelconque de conversion et la méthode temporelle du FASB.

Les différences de pertes et gains sur change de conversion qui résultent de la substitution de la méthode du FASB #8 aux autres méthodes de conversion sont mises en évidence par le tableau 12. Les taux de conversion étant différents, suivant que la devise américaine est en position de force ou de faiblesse, les résultats de la conversion des états financiers des filiales diffèrent avec la méthode de conversion employée. C'est ainsi que la méthode temporelle et la méthode des valeurs vénales fixes et variables qui lui est semblable[4] aboutissent à une variation dans les bénéfices comptables de $\pm$ 5000. Cette somme est le montant nécessaire pour solder le bilan de "Britanica" converti en dollar américain. Une fois que tous les postes ont été convertis aux taux de change appropriés, la méthode du court terme/long terme aboutit à un résultat différent. Cette divergence s'explique par les différences de traitements qu'elle réserve aux postes de "stocks" et de "dettes à long terme". Etant donné que la méthode courante convertit tous les postes du bilan aux taux courants, elle n'amène aucune variation dans les bénéfices comptables. Tel qu'il en ressort du tableau 12, les pertes et gains sur change peuvent passer de $6000 de gains à $5000 de pertes en cas d'affaiblissement du dollar U.S. et vice versa en cas de son affermissement.

En résumé nous pouvons dire que dans le cadre du FAS #8, tout affaiblissement de la devise américaine par rapport à la monnaie d'une filiale, aboutit en une perte comptable pour la maison-mère américaine. Tout affermissement aboutit à une situation inverse. Bien entendu, une structure financière différente aboutirait à des résultats différents.

---

(3) Sauf pour les cas des postes "comptes à recevoir" et "stocks" qui sont comptabilisés aux taux historiques.

(4) Nous avons déjà mentionné que ces deux méthodes sont identiques excepté pour les postes "comptes à recevoir" et "inventaires" qui seraient comptabilisés aux taux historiques.

Tableau 1

Bilan de la Filiale Britanica en livres sterling
197.

| ACTIF | £ | PASSIF | £ |
|---|---|---|---|
| Espèces | 2,000 | Comptes à payer | 6,000 |
| Comptes à recevoir | 5,000 | Dettes à long terme | 6,000 |
| Stocks | 5,000 | Capitaux propres | 8,000 |
| Valeur immobilières nettes | 10,000 | Bénéfices non distribués | 2,000 |
| TOTAL ACTIF | 22,000 | TOTAL PASSIF | 22,000 |

Tableau 2

Etat des résultats de Britanica
en livres sterling - 197.

| Comptes | Livres sterling |
|---|---|
| Ventes (1100 unités à 10 /L'U) | 11,000 |
| Coûts directs (1100 U à 6 /L'U) | 6,600 |
| Frais généraux | 900 |
| Amortissements | 1,500 |
| Bénéfices avant impôts | 2,000 |
| Impôts sur les sociétés | 1,000 |
| Bénéfices après impôts | 1,000 |

Tableau 3

Taux de conversion en cas d'affermissement du dollar US (5)

| Taux | £ | $ |
|---|---|---|
| Taux courant | 1 | 2 |
| Taux historique | 1 | 3 |

Tableau 4

Taux de conversion en cas d'affaiblissement du dollar US

| Taux | £ | $ |
|---|---|---|
| Taux courant | 1 | 3 |
| Taux historique | 1 | 2 |

5. Le taux de change est défini comme le nombre de dollars US que l'on échange contre une livre sterling.

Tableau 5

Bilan de la filiale "Britanica", converti en $
par différentes méthodes (cas d'affaiblissement du $)

| Méthodes de conversion / Poste de bilan | temporelle | | des valeurs vénales fixes et variables | | | du court terme/long terme | | | courante | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | T de T | T | T de T | VVFV | (T-VVFV) | T de T | CTLT | (T-CTLT) | T de T | C | (T - C)[8] |
| ACTIF | | | | | | | | | | | |
| Espèces | TC[7] | 6,000 | TC | 6,000 | - | TC | 6,000 | - | TC | 6,000 | - |
| Comptes à recevoir | TC | 15,000 | TC | 15,000 | - | TC | 15,000 | | TC | 15,000 | - |
| Stocks | TH | 10,000 | TH | 10,000 | - | TC | 15,000 | - 5,000 | TC | 15,000 | - 5,000 |
| Immobilisations nettes | TH | 20,000 | TH | 20,000 | - | TH | 20,000 | - | TC | 30,000 | -10,000 |
| Pertes de traduction[15] | | *5,000* | | *5,000* | - | | | *5,000* | | - | *5,000* |
| TOTAL ACTIF | | 56,000 | | 56,000 | | | 56,000 | | | 66,000 | -10,000 |
| PASSIF | | | | | | | | | | | |
| Comptes à payer | TC | 18,000 | TC | 18,000 | - | TC | 18,000 | - | TC | 18,000 | - |
| Dettes à long terme | TC | 18,000 | TC | 18,000 | - | TH | 12,000 | 6,000 | TC | 18,000 | |
| Capitaux propres | TH | 16,000 | TH | 16,000 | - | TH | 16,000 | - | TC | 24,000 | - 8,000 |
| Bénéfices | TH | 4,000 | TH | 4,000 | - | TH | 4,000 | - | TC | 6,000 | - 2,000 |
| Gains de traduction[6] | | - | | - | | | *6,000* | *- 6,000* | | - | - |
| TOTAL PASSIF | | 56,000 | | 56,000 | | | 56,000 | | | 66,000 | -10,000 |

6. Les gains et pertes sur change de traduction ont été inscrits séparément uniquement dans un souci de mise en évidence ; habituellement ils sont incorporés dans le Poste "Bénéfices" (pertes)
7. TC = Taux courant, TH = Taux historique.
8. T = temporelle ; VVFV = des valeurs vénales fixes et variables; CTLT = du court terme/long terme et C = courante.

Tableau 6

Bilan de la filiale "Britanica" converti en $ par
par différentes méthodes (cas d'affermissement du $)

| Méthode de conversion / Poste de bilan | Temporelle | | des valeurs vénales fixes et variables | | | du court terme/long terme | | | Courante | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | T de T | T | T de T | VVFV | (T-VVFV) | T de T | CTLT | (T-CTLT) | T de T | C | (T-C)[11] |
| ACTIF | | | | | | | | | | | |
| Espèces | TC[10] | 4,000 | TC | 4,000 | - | TC | 4,000 | - | TC | 4,000 | - |
| Comptes à recevoir | TC | 10,000 | TC | 10,000 | - | TC | 10,000 | - | TC | 10,000 | - |
| Inventaires | TH | 15,000 | TH | 15,000 | - | TC | 10,000 | 5,000 | TC | 10,000 | 5,000 |
| Immobilisations nettes | TH | 30,000 | TH | 30,000 | - | TH | 30,000 | - | TC | 20,000 | 10,000 |
| Pertes de transaction[18] | | | | | | | *6,000* | *-6,000* | | | |
| TOTAL ACTIF | | 59,000 | | 59,000 | | | 60,000 | -1,000 | | 44,000 | 15,000 |
| PASSIF | | | | | | | | | | | |
| Comptes à payer | TC | 12,000 | TC | 12,000 | - | TC | 12,000 | - | TC | 12,000 | - |
| Dette à long terme | TC | 12,000 | TC | 12,000 | - | TH | 18,000 | -6,000 | TC | 12,000 | - |
| Capitaux propres | TH | 24,000 | TH | 24,000 | - | TH | 24,000 | - | TC | 16,000 | 8,000 |
| Bénéfices | TH | 6,000 | TH | 6,000 | - | TH | 6,000 | - | TC | 4,000 | 2,000 |
| Gains de traduction[9] | | *5,000* | | *5,000* | | | | *5,000* | | | *5,000* |
| TOTAL PASSIF | | 59,000 | | 59,000 | | | 60,000 | -1,000 | | 44,000 | 15,000 |

9. Les gains et pertes sur change de conversion ont été inscrit séparément uniquement dans un souci de mise en valeur; habituellement ils sont inclus dans le poste "bénéfices" (pertes).
10. TC = Taux courant, TH = Taux historique.
11. T = temporelle; VVFV = des valeurs vénales fixes et variables; CTLT = du court terme/long terme, et C = courante.

Tableau 7

Différence dans les gains et pertes de conversion

| Situation \ Différence entre méthodes [12] | Temporelle | (T - VVFV) | (T - CTLT) | (T - C) |
|---|---|---|---|---|
| AFFAIBLISSEMENT DU DOLLAR US | | | | |
| - Différence dans les gains et pertes de conversion (#PGT) | (-5000) | "0" soit (-5000)-(-5000) | "+1000" soit (-5000)-(6000) | "-5000" soit (-5000)-(0) |
| AFFERMISSEMENT DU DOLLAR US | | | | |
| - Différence dans les gains et pertes de conversion (#PGT) | ( 5000) | "0" soit (5000) - (5000) | "-1000" soit (5000)-(-6000) | "+5000" soit (5000)- (0) |

12. T = temporelle; VVFV = des valeurs vénales fixes et variables; CTLT = du court terme/long terme, et C = courante.

Si le point de vue des institutions comptables est le vrai, c'est-à-dire si les investisseurs réagissent mécaniquement aux méthodes de conversion des états financiers des filiales à l'étranger, nous devons nous attendre à ce que la réaction boursière soit différente suivant l'impact senti par les bénéfices reportés de multinationales à cause de l'application du FAS #8, à savoir impact positif, neutre ou négatif.

## II Echantillon et méthodologie

Le présent travail porte sur toutes les firmes multinationales américaines apparaissant dans les publications du "Business International" de 1976 et répondant aux conditions suivantes:

1) les rendements boursiers de leurs titres doivent être disponibles au CRSP, "Centre of Research on Stock Prices" de Chicago.

2) l'impact du FAS #8 sur leurs bénéfices rapportés doit être possible à déterminer par questionnaire. (13)

Notre questionnaire a été envoyé à 169 multinationales réparties sur onze secteurs. Les réponses reçues nous ont permis de subdiviser notre echantillon en 3 groupes:

(13) Il nous était impossible de nous procurer les états financiers des filiales à l'étranger des FMA, ces dernière repugnaient toute communication du genre.

a) FMA dont le bénéfice comptable à accusé un accroissement à cause de l'adoption du FAS #8, soit 22 FMA;

b) FMA dont le bénéfice comptable n'a subi aucun changement à cause de l'adoption du FAS #8, soit 9 FMA;

c) FMA dont le bénéfice comptable a accusé plutôt, une diminution à cause du FAS #8, soit 26 FMA.

En ce qui a trait à la méthodologie, nous discuterons tout d'abord des dates à être examinés pour nous occuper ensuite du modèle à employer.

Pour ce qui est du premier point, il s'avère très difficile d'identifier avec précision, une date à laquelle l'adoption du nouveau standard du FASB, en matière de change étranger, aurait pu avoir un effet quelconque sur les prix boursiers des titres des multinationales américaines. Le FASB a débuté dès le mois d'avril 1973, l'examen préliminaire d'un nouveau standard pour compagnies multinationales. Suite au mémorandum-discussion daté de février 1974, et à l'exposé-sondage daté de décembre de la même année, il a finalement réussi, en octobre 1975, à faire adopter son FAS #8. Traditionnellement, la procédure d'adoption de standards similaires, s'arrêtait à la date d'adoption effective. Il n'en est rien, en ce qui concerne le FAS #8. En effet, bien que la nouvelle réglementation ait été adoptée dès la fin octobre 1975, il existait toujours, au début de l'année 1976, bien des multinationales qui continuaient à croire que le FASB allait se livrer à une certaine reconsidération des termes de son nouveau "statement", en faveur d'une certaine libéralisation. Certaines croyaient même en son abandon pur et simple. C'est peut-être pour ces raisons que le FASB a cru nécessaire de réaffirmer le 29 avril 1976, son intention de maintenir le nouveau standard comptable dans sa forme initiale, c'est-à-dire celle d'octobre 1975. Comme on peut déjà le constater, cette réaffirmation du FASB nous suggère une date supplémentaire à considérer dans notre analyse. En outre, il est tout à fait possible comme l'avancent Ball et Brown (1972), qu'une partie de l'information comptable, 20% en "moyenne", ne puisse pas être anticipée,[14] elle ne devient disponible que lors de la publication des données comptables. Il est de ce fait probable que la nouvelle information contenue dans le FAS #8, n'ait été transmise dans sa totalité qu'à l'occasion de la publication des états financiers du 1er trimestre le 1976 et qu'aussi à cette date la comparabilité entre les FMA était assurée.

Nous avons donc décidé d'examiner l'effet possible du FAS #8, au niveau de 4 différentes dates que nous avons considérées comme essentielles:

1) Le 20 février 1974, date du mémérandum-discussion;

2) Le 31 décembre 1974, date de l'exposé-sondage;

3) Le 29 octobre 1975, date de l'adoption; et

4) Le 30 avril 1976, date de réaffirmation.

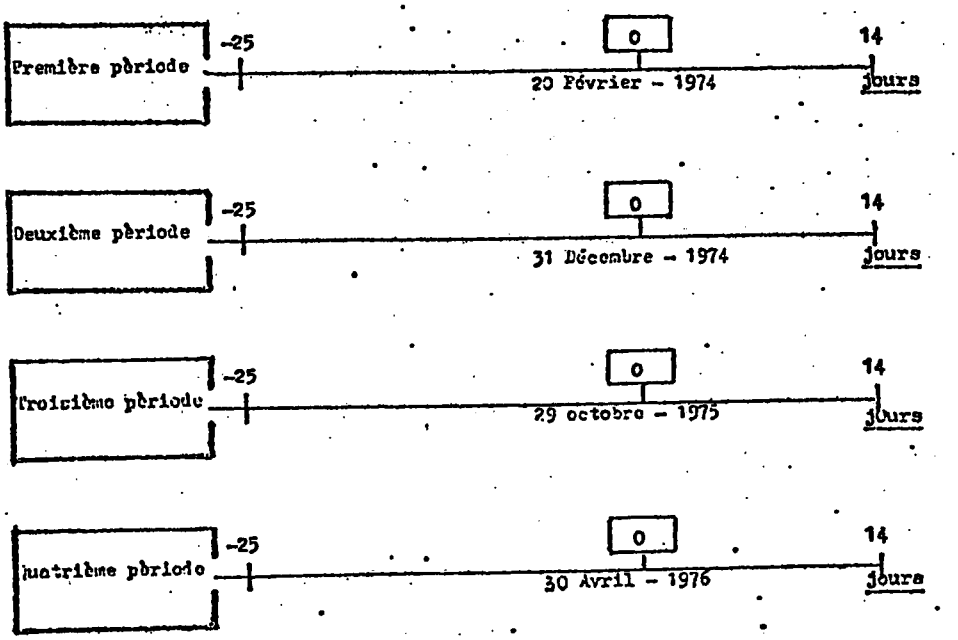
---

(14) Les 80% restant peuvent être anticipés

Les périodes d'analyse autour de ces différentes dates sont schématisées dans le tableau 8. Les résidus calculés en soustrayant du rendement observé le rendement théorique donné par le modèle seront estimés sur une période de 25 jours antérieurs à l'évènement et de 14 jours postérieurs à ce dernier.

Tableau : 8

Les différentes période à analyser




Nous nous tournons maintenant vers la discussion du modèle à utiliser. Nous sympathisons assez avec les résultats de Brown et Warner (1980), qui affirmaient que les méthodologies les plus simples donnaient souvent de bien meilleurs résultats. C'est ainsi que le modèle ajusté pour le risque sera utilisé dans une approche résiduelle[15] afin de mesurer l'impact du FAS #8 sur les rendements boursiers de FMA. Cette approche nous permettra de mesurer les effets du FAS #8 sur une FMA donnée, à partir des variations anormales dans ses rendements boursiers. Pour chacune des FMA dans chacun des 3 sous-échantillons, nous mesurerons le taux de rendement normal quotidien selon le modèle que nous discuterons plus loin. Ce rendement normal sera ensuite soustrait du rendement observé:

$$\hat{U}_{it} = RO_{it} - \hat{RE}_{it} \qquad \text{(Equation 1)}$$

(15) Cette approche fut introduite par Fama (1969).

où $\hat{U}_{it}$ = rendement anormal du titre i au temps t

$RO_{it}$ = rendement observé du titre i au temps t

$\hat{RE}_{it}$ = rendement estimé du titre i au tempt t

Les résidus $\hat{U}_{it}$ seront alors transformés en moyenne quotidienne pour toutes les FMA dans l'échantillon global ainsi que dans les différents sous-échantillons. Le résidu moyen pour un certain jour et pour un certain échantillon sera calculé de la façon suivante:

$$\bar{R}_t = \frac{1}{N} \sum_{t=1}^{n} \hat{U}_{it} \qquad \text{(Equation 2)}$$

où N représente le nombre de FMA dans l'échantillon.

Le résidu cumulé moyen est la somme des résidus quotidiens moyens pour un certain échantillon, depuis le début de la période jusqu'au (et incluant le) jour courant (t), et où (t) représente le nombre de jours considérés.

$$\overline{RC}_t = \sum_{t=1}^{t} \bar{R}_t \qquad \text{(Equation 3)}$$

S'il existe aucun changement associé au FAS #8, nous nous devons d'observer aucune tendance dans les résidus. Ces derniers doivent fluctuer autour de zéro et leur moyenne devrait être égale à ce dernier.

Pour pouvoir juger de l'importance de la réaction boursière à l'application des exigences la FAS #8, il nous faut déterminer si les résidus sont significatifs. Les tests statistiques sont traditionnellement employés afin d'atteindre cet objectif. Ils peuvent être effectués sur l'ensemble agrégé des séries de résidus, comme ils peuvent l'être au niveau de chaque série individuelle.(16) Tout comme Vermaelen (1981) nous avons opté pour la première solution.

En supposant que les résidus moyens et résidus moyens cumulés suivent une distribution normale, nous pouvons tester si le résidu moyen cumulé du jour t au jour t + n, $\overline{RC}_t^{t+n}$, est significativement différent de zéro, en calculant la statistique de la façon suivante:(17)

$$t = \overline{RC}_t^{t+n} \,/\, \hat{\sigma}\,(\overline{RC}_t^{t+n}) \qquad \text{(Equation 4)}$$

où $\hat{\sigma}(\overline{RC}_t^{t+n}) = \sqrt{n} \cdot \hat{\sigma}(\bar{R}_t)$ et $\hat{\sigma}(\bar{R}_t)$ est l'écart type du portefeuille des résidus moyens durant la période d'analyse comprenant 25 jours avant l'évènement et 14 jours après, l'évènement est défini comme le jour zero.

Il est actuellement bien admis que les prix des titres sont associés avec l'information du marché en général. Et afin de pouvoir isoler les effets du

---

(16) P. Brehain (1980) Page VI-12.

(17) Voir Vermaelen pour plus de détail.

FAS #8 sur ces derniers, nous nous appuyons sur une approche résiduelle. Nous utiliserons la méthode conventionnelle basée sur le modèle du marché qui consiste premièrement à estimer les paramètres du modèle du marché proposé par Sharpe. Ce modèle suppose que les rendements d'un titre individuel, $\hat{R}_{it}$, sont linéairement reliés aux rendements du portefeuille du marché, $\hat{R}_{mt}$; il suppose aussi que les hypothèses habituelles du modèle de la régression sont satisfaites. Ce dernier indique que:

$$\hat{R}_{it} = \alpha_i + \beta_{sw} \hat{R}_{mt} + \hat{\varepsilon}_{it} \qquad \text{(Equation 5)}$$

où $\hat{R}_{it}$ = rendement pour la période t du $i^{ème}$ titre,

$\hat{R}_{mt}$ = rendement moyen du portefeuille du marché pour la période t,

$\alpha \varepsilon \beta_{sw}$ = paramètres à être estimés par la méthode des moindres carrés, et la technique du Scholes et William,

$\hat{\varepsilon}_{it}$ = terme de résidu pour la période t.

La technique de Scholes et William (1977), consiste à employer trois régressions distinctes afin de calculer le coefficient $\beta_{sw}$ qui est égal à:

$$\beta_{sw} = \frac{\beta_{-1} + \beta_0 + \beta_{+1}}{1 + 2_\rho} \qquad \text{(Equation 6)}$$

où $\beta_{-1} = \dfrac{\text{cov}\ (R_{it}, R_{mt-1})}{\text{var}\ (R_{mt})}$

$$\beta_0 = \frac{\text{cov}\ (R_{it}, R_{mt})}{\text{var}\ (R_{mt})}$$

$$\beta_{+1} = \frac{\text{cov}\ (R_{it}, R_{mt+1})}{\text{var}\ (R_{mt})}$$

$$\rho = \frac{\text{cov}\ (R_{mt}, R_{mt+1})}{\text{var}\ (R_{mt})}$$

Cette façon de faire nous permet d'éviter le biais engendré par les erreurs qui peuvent provenir de l'emploi de prix établis sur le marché à des dates différentes. C'est-à-dire quand ces derniers ne sont pas synchronisés.

Les paramètres du modèle du marché seront estimés en utilisant 110 données de rendements quotidiens[18], sur chaque titre, entourant le jour de l'évènement

(18) M.S. Scholes (1972) a utilisé le même nombre de données quotidiennes.

à l'exclusion de 10 observations avant et 10 observations après, incluant ce dernier. Le résidu $\hat{U}_{it}$, sera calculé pour une période de 25 jours antérieurs à l'évènement et 14 jours postérieurs. Le résidu tel que défini dans l'équation 1 est égal:

$$\hat{U}_{it} = RO_{it} - [\hat{a}_i + \hat{b}_i R_{mt}] \qquad \text{(Equation 7)}$$

où $RO_{it}$ est le rendement actuel, ou observé du titre i au jour j; le dernier est défini comme le changement dans la valeur totale du titre i, sur une période d'une journée en dollar d'investissement initial.

$R_{mt}$ = rendement pondéré du portefeuille du marché au jour (J). Qui est calculé comme la moyenne pondéré par rapport à la valeur marchande des rendements de tous les titres individuels cotés au "New York Stock Exchange" et à l'"American Market exchange". $\hat{a}_i$ et $b_i$, représente les coefficients estimés du modèle du marché.

L'approche discutée fournira les éléments de mesure des effets moyens du FAS #8 sur les prix boursiers des FMA. Les résidus sont les rendements anormaux dont ne tiennent pas compte la relation normale qui lie un titre au marché. En calculant les résidus moyens pour chaque jour relatif aux évènements du FAS #8, nous serons capables de mesurer les effets qui leur sont associés. Le résidu moyen cumulé servira à estimer la performance anormale cumulée, ou l'effet cumulé du nouveau standard.

## III Résultats empiriques

Notre investigation nous a amené à considérer l'évolution des rendements anormaux cumulés, $\overline{RC}$, durant les 4 périodes d'analyse mentionnées précédemment. La méthodologie décrite à la section II a été appliquée à chacun de nos sous échantillons. Le tableau 9 résume les résultats de cette analyse pour chacun des sous échantillon et pour chacune des périodes. La première colonne du tableau 9, intitulée "jour" indique les jours relatifs à l'évènement défini comme le jour zéro. Les 3 groupes de 4 colonnes suivantes donnent pour chaque jour le résidu moyen comulé $\overline{RC}$ pour chacun des échantillons et pour les 4 périodes, a savoir dans l'ordre, la période du memorandum, discussion de l'exposé, sondage de l'adoption et de la réaffirmation. Les résidus moyens cumulés ne semblent pas différer significativement d'un échantillon à l'autre mieux encore lorsqu'ils sont soumis au test statistique, aucun d'eux ne s'avère significatif. Ce résultat nous pousse à conclure que le marché ne semble pas se limiter à la méthode de conversion rapportée, il semble plutôt capable de la dépasser en utilisant une information plus détaillée.

Tableau 9

**Résultat de l'analyse résiduelle**

| | Echantillon des FMA dont le bénéfice comptable n'a pas été affecté | | | | Echantillon des FMA dont le bénéfice comptable a augmenté | | | | Echantillon des FMA dont le bénéfice comptable a baissé | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Années | $\overline{RC}$ 1 (20) | $\overline{RC}$ 2 | $\overline{RC}$ 3 | $\overline{RC}$ 4 | $\overline{RC}$ 1 | $\overline{RC}$ 2 | $\overline{RC}$ 3 | $\overline{RC}$ 4 | $\overline{RC}$ 1 | $\overline{RC}$ 2 | $\overline{RC}$ 3 | $\overline{RC}$ 4 |
| 25 | 0.0111 | -0.0082 | 0.7231 | -0.0007 | -0.0015 | -0.0054 | 0.0008 | -0.0102 | -0.0038 | 0.0005 | 0.0041 | 0.0044 |
| 24 | 0.0188 | -0.005 | 1.1762 | -0.0009 | -0.0038 | -0.0128 | 0.0053 | -0.0143 | 0.0024 | -0.0002 | -0.0071 | 0.0066 |
| 23 | -0.0113 | 0.0124 | -0.0409 | 0.0013 | -0.0025 | 0.0081 | 0.0096 | -0.0112 | -0.0021 | -0.0050 | -0.0056 | 0.0022 |
| 22 | -0.0085 | 0.0288 | 0.5117 | -0.0037 | -0.0019 | -0.0045 | 0.0097 | -0.0059 | -0.0067 | -0.0120 | -0.0016 | 0.0026 |
| 21 | -0.0062 | 0.0330 | 1.1236 | 0.0024 | -0.0032 | -0.0048 | 0.0055 | -0.0040 | -0.0092 | -0.0099 | -0.0029 | -0.0003 |
| 20 | -0.0059 | 0.0244 | 0.5233 | -0.0049 | -0.0032 | -0.0032 | 0.0041 | -0.0020 | -0.0116 | 0.0004 | -0.0019 | -0.0009 |
| 19 | 0.0075 | 0.0229 | 0.2737 | -0.0074 | -0.0085 | -0.0094 | 0.0109 | -0.0037 | -0.0185 | 0.0000 | -0.0021 | -0.0050 |
| 18 | 0.0198 | 0.0218 | 0.1345 | -0.0101 | -0.0146 | -0.0020 | 0.0077 | -0.0061 | -0.0206 | -0.0042 | -0.0062 | -0.0014 |
| 17 | 0.0287 | 0.0170 | -0.0443 | -0.0034 | -0.0132 | -0.0041 | 0.0013 | -0.0004 | -0.0193 | -0.0070 | -0.0101 | -0.0033 |
| 16 | 0.0221 | 0.0236 | 0.5278 | -0.0052 | 0.0006 | -0.0084 | 0.0096 | 0.0002 | -0.0089 | -0.0013 | -0.0115 | -0.0077 |
| 15 | 0.0249 | 0.0253 | 0.4988 | -0.0022 | -0.0000 | -0.0192 | 0.0037 | -0.0031 | -0.0104 | -0.0138 | -0.0147 | -0.0098 |
| 14 | 0.0264 | 0.0159 | 0.6216 | -0.0045 | -0.0065 | -0.0172 | -0.0023 | -0.0057 | -0.0059 | -0.0146 | -0.0172 | -0.0116 |
| 13 | 0.0233 | 0.0100 | 0.2209 | -0.0052 | -0.0007 | -0.0200 | -0.0056 | -0.0053 | -0.0028 | -0.0038 | -0.0174 | -0.0065 |
| 12 | 0.0144 | 0.0066 | 0.2813 | -0.0100 | -0.0023 | -0.0118 | -0.0120 | -0.0024 | -0.0033 | 0.0007 | -0.0189 | -0.0059 |
| 11 | 0.0075 | 0.0079 | 0.0845 | -0.0052 | -0.0017 | -0.0156 | -0.0075 | -0.0054 | -0.0050 | 0.0019 | -0.0121 | 0.0014 |
| 10 | 0.0012 | -0.0094 | 0.0570 | -0.0029 | -0.0105 | 0.0017 | 0.0031 | -0.0008 | -0.0019 | -0.0021 | -0.0163 | 0.0025 |
| 9 | -0.0044 | -0.0121 | -0.1944 | -0.0057 | -0.0058 | 0.0037 | -0.0003 | -0.0026 | -0.0042 | -0.0098 | -0.0170 | 0.0049 |
| 8 | 0.0001 | -0.0108 | -0.1061 | -0.0019 | 0.0055 | 0.0176 | -0.0002 | -0.0029 | 0.0013 | -0.0089 | -0.0220 | 0.0047 |
| 7 | -0.0068 | -0.0141 | 0.1004 | 0.0033 | 0.0089 | 0.0176 | 0.0004 | 0.0011 | 0.0015 | -0.0112 | -0.0269 | -0.0008 |
| 6 | 0.0017 | -0.0082 | 0.1357 | 0.0052 | 0.0008 | 0.0171 | 0.0024 | 0.0058 | 0.0044 | -0.0044 | -0.0263 | 0.0023 |
| 5 | 0.0144 | -0.0197 | -0.0060 | 0.0115 | 0.0067 | 0.0142 | 0.0098 | 0.0092 | 0.0099 | -0.0011 | -0.0231 | 0.0054 |
| 4 | 0.0064 | -0.0167 | 0.2300 | 0.0078 | 0.0058 | 0.0121 | 0.0137 | 0.0088 | 0.0113 | 0.0050 | -0.0109 | 0.0112 |
| 3 | 0.0004 | -0.0011 | 0.3438 | 0.0107 | 0.0060 | 0.0169 | 0.0151 | 0.0026 | 0.0143 | 0.0064 | -0.0014 | 0.0090 |
| 2 | 0.0029 | 0.0005 | 0.3712 | 0.0125 | 0.0053 | 0.0198 | 0.0118 | 0.0043 | 0.0135 | -0.0018 | 0.0012 | 0.0064 |
| 1 | 0.0032 | 0.0036 | 0.4266 | 0.0130 | -0.0007 | 0.0254 | 0.0108 | 0.0078 | 0.0100 | -0.0059 | 0.0116 | 0.0079 |
| 0 | -0.0033 | 0.0035 | 0.6330 | 0.0149 | 0.0041 | 0.0239 | 0.0145 | 0.0068 | 0.0100 | -0.0179 | 0.0104 | 0.0066 |
| 1 | 0.0021 | 0.0106 | 0.5025 | 0.0140 | -0.0074 | 0.0144 | 0.0185 | 0.0068 | 0.0115 | -0.0096 | 0.0135 | 0.0078 |
| 2 | 0.0019 | 0.0050 | 0.3734 | 0.0153 | -0.0042 | 0.0155 | 0.0131 | -0.0000 | 0.0125 | -0.0028 | 0.0147 | 0.0079 |
| 3 | 0.0065 | 0.0034 | 0.1143 | 0.0121 | 0.0000 | 0.0167 | 0.0032 | -0.0009 | 0.0160 | 0.0008 | 0.0111 | 0.0093 |
| 4 | 0.0032 | 0.0160 | 0.1465 | 0.0134 | -0.0096 | 0.0102 | 0.0196 | -0.0043 | 0.0134 | 0.0003 | 0.0085 | 0.0065 |
| 5 | 0.0123 | 0.0098 | -0.0501 | 0.0152 | 0.0036 | 0.0169 | 0.0236 | -0.0038 | 0.0099 | -0.0046 | 0.0060 | 0.0031 |
| 6 | 0.0134 | 0.0156 | -0.3675 | 0.0112 | -0.0011 | 0.0136 | 0.0193 | -0.0019 | 0.0029 | -0.0099 | 0.0036 | 0.0014 |
| 7 | 0.0161 | 0.0298 | -0.5125 | 0.0127 | -0.0085 | 0.0105 | 0.0254 | -0.0051 | 0.0053 | -0.0089 | 0.0027 | -0.0003 |
| 8 | 0.0111 | 0.0344 | -0.7612 | 0.0160 | -0.0048 | 0.0188 | 0.0232 | -0.0040 | 0.0086 | -0.0005 | 0.0085 | -0.0008 |
| 9 | 0.0041 | 0.0293 | -0.9963 | 0.0121 | 0.0002 | 0.0236 | 0.0155 | -0.0001 | 0.0126 | -0.0066 | 0.0066 | 0.0028 |
| 10 | -0.0088 | 0.0177 | -0.7162 | 0.0122 | -0.0011 | 0.0200 | 0.0141 | 0.0059 | 0.0112 | -0.0087 | 0.0031 | 0.0027 |
| 11 | -0.0049 | 0.0245 | -0.9210 | 0.0158 | -0.0110 | 0.0166 | 0.0190 | 0.0063 | 0.0105 | -0.0071 | 0.0052 | -0.0006 |
| 12 | 0.0022 | 0.0165 | -0.7112 | 0.0132 | -0.0044 | 0.0186 | 0.0092 | 0.0028 | 0.0144 | -0.0087 | 0.0073 | 0.0007 |
| 13 | 0.0073 | 0.0284 | -0.6181 | 0.0118 | 0.0133 | 0.0104 | 0.0123 | 0.0069 | 0.0174 | -0.0075 | 0.0012 | -0.0009 |
| 14 | 0.0147 | 0.0137 | -0.5942 | 0.0163 | 0.0052 | 0.0080 | 0.0067 | 0.0052 | 0.0184 | 0.0018 | 0.0023 | 0.0022 |

20 $\overline{RC}$ 1 : Memorandum discussion
$\overline{RC}$ 2 : Exposé - sondage
$\overline{RC}$ 3 : Adoption
$\overline{RC}$ 4 : Réaffirmation

## IV Conclusion

L'utilisation pour la première fois, à notre connaissance des données quotidiennes pour examiner les éventuels effets économiques du FAS #8 nous a permis de réaliser un certain progrès. Il nous a apparu évident que le marché ne semble pas réagir mécaniquement à l'information comptable. Cependant comme l'à mentionné Naciri (1982-b) en ce qui concerne le FAS #8 cela ne serait vrai que si le changement de méthode ne provoque, chez les firmes intéressées aucune réaction susceptible d'affecter leur cash-flow.(19)

Nos résultats ajoutent une pierre au construit déjà grand, d'évidences qui ont abouti à des changements radicaux, dans le comportement des investisseurs dont le seul souci aujourd'hui est la gestion du risque et la minimisation des coûts de la firme. Et nous nous pouvons que déplorer la lente réaction des institutions comptables a de telles tranformations. Nous déplorons aussi leur conservatisme envers la nouvelle loi du marché financier celle de l'efficience. Mais que se passera-t-il si une telle efficience existe, ou du moins, si la majorité des investisseurs y croient?

La réponse, c'est que bon nombre de concepts et pratiques aujourd'hui bien établis gagnent à être reconsidérer. L'information comptable, tout particulièrement, qui est toujours d'une grande utilité, doit évoluer dans sa sélection et dans sa diffusion qui sont devenues d'une nature bien différente de ce que traditionnellement on pense.

---

(19) Il en ressort du travail de Naciri (1982-b) que 25% des FMA repondant a un questionnaire que leur cash-flows a été affecté par suite d'opérations fictives entreprises dans le seul but d'attenuer l'effet comptable du FAS #8.

## Bibliographie

Archibald, T.R., "Stock Market Reaction to the Depreciation Switchback", The Accounting Review (Janvier 1972).

Ball, R.J., "Change in Accounting Techniques and Stock Prices", Empirical Research In Accounting, Selected Studies, 1972.

Ball, R.J. et P. Brown, "An Empirical Evaluation of Accounting Income Numbers", Journal of Accounting Research, automne 1968.

Brehain, P., "Modifications Internes du Capital et de sa Représentation, un Test de l'Efficience de la Bourse de Bruxelle". Thèse, Université de Louvain, 1980.

Brown, S.J. et J.B. Warner, "Measuring Security Prices Performance", Journal of Financial Economics, Vol. 8, 1980.

Fama, E.F., "The Bahavior of Stock Market Prices", The Journal of Business, (Janvier 1965).

"Efficient Capital Markets: A Review of Theory and Empirical Work", The Journal of Finance (mai 1970).

Kaplan, R.S. et R. Roll, "Investor Evaluation of Accounting Information: some empirical evidence", Journal of Business (avril 1972).

Naciri, A., "La réaction boursière aux nouvelles règlementations: Le cas du FAS #8 Université d'Ottawa (1982) (Document non publié).

Scholes, M.S., "The Market For Securities: The Substitution vs. Price Pressure and the Effects of Information on Share Prices", The Journal of Business, 1972.

Scholes, M.S. et J. Williams, "Estimating Betas from nonsynchronous Date", Journal of Financial Economics, (December 1977).

Sunder, S., "Stock Price and Risk Related to Accounting Changes in Inventory Valuation", The Accounting Review, Avril 1975.

Vermaelen, T., "Common Stock Repurchases and Market Signalling: An Empirical Study", Journal of Financial Economics, (Juillet 1981).

CAAA 1982 Conference
University of Ottawa

John Macintosh
Faculty of Business
McMaster University
Hamilton, Ontario

# ARE ACCOUNTING CONCEPTS ASSUMPTIONS, PROPOSITIONS OR OBJECTIVES?[1]

During the past two decades accounting literature has reflected an increased use of the term, accounting concept, by accounting academics, practitioners and others. At times the term is used to refer to the basic ideas or assumptions underlying accounting practice whereas in others it is used either as a substitute for the word theory or to refer to anything other than the procedural aspects of the discipline. This multiplicity of uses is apparently due to the fact that where the term, accounting concept, has been defined, its meaning has been phrased in general terms and, consequently, it has been interpreted in various ways. For example, the Accounting Principles Board (APB) of the American Institute of Certified Public Accountants (AICPA) (1970) referred to the basic concepts of accounting as "...the observations concerning the environment, the objectives of financial accounting and financial statements, and the basic features and elements of financial accounting..." which provides ample scope for more than one interpretation. And, the Statement of Financial Concepts No. 1 of the Financial Accounting Standards Board (FASB) (1978) deals with nothing but the objectives of financial reporting.

These various interpretations of the word, concept, in accounting raise the question of what is the meaning of the term? Are accounting concepts just ideas and assumptions regarding accounting or do they form the bases or objectives on which accounting theory is based? In order to answer these questions, the development and usage of the term in accounting has been examined.

## The Nature and Use of the Word Concept

The idiomatic usage of the word concept is that it is an idea or notion. In this respect, the Oxford English Dictionary (1961) defines the word, concept, inter alia, as "The product of the faculty of conception; an idea of a class of objects, a general notion or idea." The application of the word notion (i.e. as notional) is similarly defined as "A mere supposition or idea" and is "...the action of assuming, or usually that which is assumed..., as a basis of argument or a premiss from which a conclusion is drawn." Furthermore, in addition to its use as an idea or notion, a concept is also an assumption or a postulate because to postulate is "...to assume [some thing or fact] as a basis of reasoning...".

Of particular interest to this study is the use of the term concept in relation to theory formulation. Here, concepts are considered those ideas or notions underlying the explanatory statements making up theories (Lastrucci,

---

[1]The writer wishes to acknowledge with thanks the constructive criticisms and comments of an anonymous reviewer of this paper.

1963). Popper (1968), in describing these concepts, distinguishes between those which are universal in nature (i.e., relating to classes of objects or to hypotheses) and singular concepts (i.e., those relating to specific observations, elements in a class of objects, or the event in question). It is also pointed out by Popper that the relationship between universal and singular concepts depends upon their position in a structure of theory because concepts may not only be elements but also sub-classes of a class of objects. Therefore, concepts may be present at various levels in a hierarchial structure of a theory and those concepts at one level may give rise to concepts at another level. In addition, concepts may be considered axioms when they refer to self-evident assumptions underlying the reasoning process.

It appears that the first writer to use the word concept in relation to accounting theory was Littleton (1939) who stated that:

> "...accounting theory, since it has grown largely out of accounting practice, may seem to serve principally as a means of explaining and illuminating what is done in accounting. But theory has a further obligation, that of strenthening practice by subjecting customs to analysis and testing their justification by finding the relation of customary ideas to basic concepts and purposes." (Emphasis added)

This statement by Littleton shows that he saw accounting concepts as the ideas or assumptions underlying accounting theory. These concepts were derived from accounting practice and therefore represented a positivist approach to theory formulation because theory was viewed as a consequence of actual experiences.

The term concept was used soon after words by Paton and Littleton (1940) in An Introduction to Corporate Accounting Standards, as part of an explanation of a theoretical framework of accounting. Here these authors stated that in their assessment:

> "The fundamental concepts or propositions of accounting, like those in other fields, are in themselves assumptions in considerable measure or are predicated upon assumptions which are not subject to conclusive demonstration or proof."

The importance of this statement is twofold in nature because it specifically defined accounting concepts as assumptions and substituted concepts for postulates.

The fact that the word, concept, was substituted for postulates by Littleton (1939), and Paton and Littleton (1940), was an interesting development because the Executive Committee of the American Accounting Association (AAA) (1936) had used the term postulates and not concepts throughout "A Tentative Statement of Accounting Principles Underlying Corporate Financial Statements." Both Paton and Littleton were members of the Executive Committee of the AAA in 1936 and An Introduction to Corporate Accounting Standards was, as Hendriksen (1982) tells us, generally considered an attempt by the authors to present the theory underlying the "Tentative Statement."

Adoption of the term concept by the AAA is evident from the fact that it was used extensively in the two revisions (i.e., in 1948 and 1957) of the

"Tentative Statement" and in subsequent publications of the AAA. Here, the usage of the term in A Statement of Basic Accounting Theory (ASOBAT) published by the AAA (1966) was probably the most significant because ASOBAT was considered a statement embodying leading accounting theoretical thought at that time. In fact, ASOBAT defined accounting theory as "...a coherent set of concepts explaining and guiding the accountant's actions in identifying, measuring, and communicating economic information."

The AICPA was apparently more reticent than the AAA in accepting the term, concept, and even in the 1960's it was still using the term, postulate, in its official pronouncements. The turning point was apparently the issuing of APB Statement No. 4: Basic concepts and Accounting Principles Underlying Financial Statements of Business Enterprises (AICPA, 1970). Here, in dealing with the development of generally accepted accounting principles it reaffirmed that the words concepts and postulates were interchangeable by stating that accounting principles become generally accepted by agreement rather than by "...formal derivation from a set of postulates or basic concepts."

Notwithstanding the apparent reluctance of the AICPA to adopt the term, concept, individual writers were using the term rather than postulates. For example, Grady (1965) stated in his preface to Accounting Research Study (ARS) No. 7: Inventory of Generally Accepted Accounting Priciples for Business Enterprises, published by the AICPA, that the term, concept, had been used by him because he felt that the term was better understood than postulates. It appears that this is also the viewpoint of the majority of contemporary writers on accounting theory because today the use of the word, concept, has virtually replaced postulates in accounting literature.

## The Place of Concepts in Accounting Theory

Although theory may be defined in many ways, the definitions which appear to meet the requirements of accounting are, first, that theory is a "...system of ideas or statements held as an explanation or account of a group of facts or phenomena..." and, secondly, "...a statement of what are held to be the general laws, principles or causes of something known or observed" (Oxford English Dictionary (1961). Accounting theory may, therefore, be viewed as an explanation or formal expression of its elements which have either been induced from accounting practice or inferred by deduction from normative considerations of what the system should or ought to achieve. As a result, we speak of either an inductive or a deductive approach to accounting theory.

The inductive approach to accounting theory is to examine current accounting practice and to induce from these observations a theory of accounting. Although the process is an abstraction from singular concepts (e.g. observations) to universal concepts (e.g. hypotheses), inductive inference may lead to conclusions which may be false; no matter how many white swans have been observed, this does not justify the conclusion that all swans are white (Popper, 1968).[2] As a result, accounting theory derived from existing practice is based on a priori reasoning because, no matter how true the observations or concepts at one level may be, the conclusions drawn or

---

[2]This situation was recognized by David Hume (1750) in his Treatise on Human Nature where he argued that "...even after the observation of the frequent constant conjunction of objects, we have no reason to draw any inference concerning any object beyond those of which we have no experience."

concepts which are formulated can only be presumed to be valid. The deductive approach, on the other hand, operates in a manner whereby the objectives of the accounting system are derived from logical reasoning and used to establish principles or standards and practices of accounting without reference to existing practice. The reasoning process operates by establishing universal concepts which are then used to develop singular accounting concepts. The deductive approach to theory formulation is normative because it is essentially concerned with "what should be" considerations rather than the positive approach where "what is" considerations apply. Neither approach is entirely satisfactory because the inductive approach tends to justify existing practice whereas the deductive approach may lead to unsound principles or standards and practices if the reasoning process is itself unsound or is not concerned with practical considerations. Consequently, theory formulation in practice is normally a combination of the two approaches and a theory is therefore predominantly inductive or predominantly deductive in nature.

Irrespective of which approach to accounting theory applies, the framework of accounting theory put forward by the Special Committee on Research Program of the AICPA (1958) appears to fit both the inductive and deductive approaches. Here, the Special Committee on Research Program stated that it viewed accounting theory as comprising a three-tiered structure of postulates, principles and rules. And, in describing the relationship between these tiers it stated:

> "Postulates are few in number and are the basic assumptions on which principles rest. They necessarily are derived from the economic and political environment and from the modes of thought and customs of all segments of the business community."

However, the AICPA (1973) adopted a structure of accounting theory which equated accounting concepts with the objectives of accounting. In this respect, the AICPA stated:

> "...the accounting process should consist of an inter-related and compatible system of objectives, standards or principles and practices or procedures. Objectives should identify the goals and purposes of accounting. Standards should follow logically from objectives, and should provide guidelines for the formulation of accounting practices compatible with the desired goals."

The effect of these two approaches on accounting theory is that it appears that accounting concepts may be considered either the assumptions or propositions underlying accounting or the objectives of accounting. Support for this viewpoint is evidenced by the fact that whilst Hendriksen (1982) defined accounting postulates as the "...basic assumptions or fundamental propositions concerning the economic, political, and sociological environment in which accounting must operate..." he also stated that in accounting, "... the objectives can be considered part of the postulates in the formal structure or they can be viewed as a set of propositions above or at the same level as the postulates."

As Dopuch and Sunder (1980) point out, the objectives of accounting represent the aims or purposes of the social activity which, in turn, is based on the needs of those persons involved with the social activity. They consist of functional, common or dominant group objectives which, respectively, relate to their purposes, acceptance and imposition. In many respects they are

similar to concepts and this relationship is examined later in the study.

## The Analysis of the Term Concept in Accounting

When Paton and Littleton (1940) defined accounting concepts as the assumptions underlying accounting it was, as the AAA (1977) points out, a rationalization of existing accounting practice. In this respect, An Introduction to Corporate Accounting Standards (Paton and Littleton 1940) was inductive in nature and the concepts considered by these authors were those which are now known as the entity, continuity (i.e., going-concern), unit-of-measurement, time-period, realization, matching and objectivity concepts or principles. When examined objectively and in relation to the definition that accounting concepts represent the assumptions on which accounting practice is based, their contentions are quite valid even today because they are basically the ideas or assumptions underlying present structures of accounting theory (Belkaoui, 1981).

The reason why these inductively established concepts are considered ideas or assumptions is that, although they may be based on observations of existing accounting practice, they are not always valid. This is because inductively derived concepts may be based on observations and although they are true at one level they are not necessarily valid at a higher or universal level. For example, in inflationary times the unit-of-measurement concept may provide some valid valuation of monetary assets but not of all assets. However, Hendriksen (1982), points out that the validity of these accounting concepts is of little consequence provided these assumptions meet the criteria of being relevant or are accepted as being valid in providing a starting point in the development of accounting logic. This is based on the instrumentalist role of theories where the validity or truth of any aspects of a theory is considered irrelevant for all practical purposes provided the conclusions derived logically from them achieve their purposes (Boland, 1979). Consequently, these inductively derived concepts like unit-of-measurement or continuity are described as the basic assumptions on which accounting theory is based.

Acceptance of accounting theory by professional accounting associations was at first restricted to theory formulated though the inductive approach. However, this changed during the 1950's and it was, for example, in 1958 that the AICPA endorsed a more deductive approach to the development of accounting theory. This occurred when the AICPA (1958) accepted the recommendations of its Special Committee on Research Program to reorganize itself in a manner whereby the Accounting Principles Board (APB) was formed to allow, as one of its functions, the AICPA to "...advance the written expression of what constitutes generally accepted accounting principles...". The adoption of a deductive approach to the formulation of accounting theory by the AICPA is evident from the statement by its Special Committee on Research Program that "...this means something more than a survey of existing practice."

As outlined earlier, the Special Committee on Research program of the AICPA considered accounting theory to consist of a hierarchy of postulates, principles and rules. They did not, however, concern themselves with the various elements of accounting theory and the matter of examining the postulates of accounting for the AICPA was left to Moonitz (1961) who was commissioned by them to undertake a research study on the topic, namely Accounting Research Study No. 1: The Basic Postulates of Accounting.

In ARS No. 1 Moonitz viewed postulates or concepts as generalizations about the environment, scope and operation of accounting which could be stated in the form of specific propositions or proposals. His approach to accounting theory was deductive in nature as is evidenced by his statement that he believed that:

> "...heavy reliance must be placed on deductive reasoning in the development of accounting postulates and principles. We must first recognize and define the problems to be solved, then move to their solution by careful attention of what 'ought' to be the case, not what 'is' the case."

Moonitz's findings were not accepted by the AICPA mainly because he advocated the use of market (or exchange) prices and a stable unit of measurement which, at that time, represented too great a departure from existing accounting practice (Hendriksen, 1982). However, what is important to the topic under discussion is that Moonitz examined the environment in which accounting operates as well as accounting itself and put forward thirteen postulates of accounting classified into three groups. The first group were what he referred to as the environmental postulates and consisted of the quantification of data, the operation of an exchange economy, the entity, time-period and unit-of-measurement postulates. The second group included the entity postulate and this together with reporting through financial statements, the use of market (or exchange) prices and the tentativeness of the results of operations for short periods formed the postulates relating to the field of accounting. The third group Moonitz called the "imperatives" because he believed that, like objectives, they stressed what ought to be the position and were the continuity, objectivity, consistency, stable measuring unit and adequate disclosure postulates.

It is generally accepted today that accounting is influenced by the environment in which it operates because it involves the measurement and reporting of economic activity. This accounts for the fact that the definition of accounting concepts by the APB of the AICPA (1970) included "the observations concerning the environment" and that Hendriksen (1982), in his definition of accounting postulates, referred to them as basic assumptions or propositions concerning the "economic, political and sociological environment" in which accounting operates. Moonitz (1961) may not have been the first person to recognize the influence of the environment on accounting but he certainly drew attention to this fact by classifying certain postulates as environmental postulates. Furthermore, Moonitz's classification of certain postulates as "imperatives" because they were concerned with what ought to be the position is important because it linked concepts with objectives. In this respect, objectives relate to the desired effect or outcome and this is obviously the position with those accounting concepts like objectivity and consistency, etc.

As indicated before, the ASOBAT (AAA, 1966) definition of accounting theory provides another but not dissimilar viewpoint of accounting concepts. This definition bears repeating and was "...a coherent set of concepts explaining and guiding the accountants' action in identifying, measuring and communicating economic information" (Emphasis added). Not only is this definition deductive in its approach but is also normative because accounting concepts are no longer just the assumptions or propositions underlying accounting but are the actual explanations or guidelines for the development of accounting standards and practices.

The tendency to consider accounting concepts and objectives to be similar in nature was continued in APB Statement No. 4 (AICPA, 1970). Here, the APB viewed the generally accepted accounting principles (GAAP) of financial reporting as being made up of general and qualitative objectives and features of accounting. The general objectives were considered those objectives governing the content of the accounting information produced whereas the qualitative objectives indicated the qualities making that information useful. Insofar as the features of accounting are concerned, these were represented by those accounting assumptions or characteristics which, with some exceptions and additions, had previously been considered accounting concepts. For example, the entity, going-concern and unit-of-measurement concepts were, amongst others, now classified with accrual accounting, the use of approximations and informed judgments, etc. as features of accounting.

APB Statement No. 4 was essentially descriptive in nature because it identified and organized ideas which had, for the most part, been accepted by the accounting profession. The result was that it proposed a structure of GAAP of financial reporting consisting of pervasive principles, broad operating principles and detailed principles. The significance of this structure of GAAP is that, in relation to the structure of accounting theory put forward by the AICPA (1958), it shifted the deductive process of determining what the accounting system should achieve from concepts to pervasive principles. These pervasive principles were described in APB Statement No. 4 as being "...few in number and fundamental in nature" and apparently replaced concepts in this theoretical structure of GAAP for financial reporting.

Exactly three years later the AICPA (1973) presented their three-tiered structure of accounting theory consisting of objectives, standards, and practices. The influence of APB Statement No. 4 is obvious and when this structure of accounting theory is examined in the light of the previous structure of postulates, principles and rules (AICPA, 1958) there is little doubt that insofar as the AICPA was concerned, objectives had either replaced or been equated with concepts in the structure of accounting theory.

Complete consensus on the nature of accounting concepts or their position in a structure of accounting theory may not be possible but Goldberg (1971) provides an explanation of the relationship between concepts and objectives and the various uses of the term concept. In this respect Goldberg distinguishes between accounting theory and accounting doctrine by stating:

> "...in accounting theory we are concerned with discovering propositions of a generalizing nature which express facets of truth about the phenomena of accounting; whereas, in accounting doctrine we are interested in propounding or laying down standards which are to govern the activities of accountants in their work. Under this distinction, accounting theory deals with concepts, accounting doctrine with precepts; theory with examination of what is, doctrine with what should be."

The relationship between accounting concepts and objectives can be explained by this distinction between accounting theory and doctrine. In fact, this relationship is essentially between deductively derived accounting concepts and objectives. The reason is that although deductively derived accounting concepts are concerned with "what should be" considerations, they are similar to the objectives or standards of accounting "propounded" or "laid

down" to guide, govern or direct the activities of accountants. The distinction between objectives and concepts is not always clearcut because it depends upon what objectives are under consideration. In this respect, accounting objectives can be viewed as being part of the concepts of accounting in a structure of accounting theory, provided these objectives have some general or global application. If not, these objectives relate to some aspect of accounting doctrine and should, at best, only be considered as singular concepts in any theoretical framework of accounting.

Support for this viewpoint is provided by Dopuch and Sunder (1980) in their review of the FASB Statement of Financial Accounting Concepts No. 1 (1978) Here, in examining the objectives of financial accounting put forward by the FASB they argue that where objectives relate to a social activity like accounting there are three possible interpretations of the meaning of these objectives. First, these objectives may be functional and based on the consequences of observable phenomena. It is assumed that practice reflects the preference of individuals, and in these circumstances, the consequences may be regarded as the objectives of the social activity. Secondly, the objectives may apply to all individuals and be considered common objectives. They either become functional objectives if all individuals are motivated by the same objectives or cease to exist in the absence of such a common motivation. Thirdly, objectives may be dominant group objectives where the objectives of a dominant group reflect their self-interest and are imposed upon society. Minority viewpoints become irrelevant because the dominant group objectives become the objectives of the social activity itself.

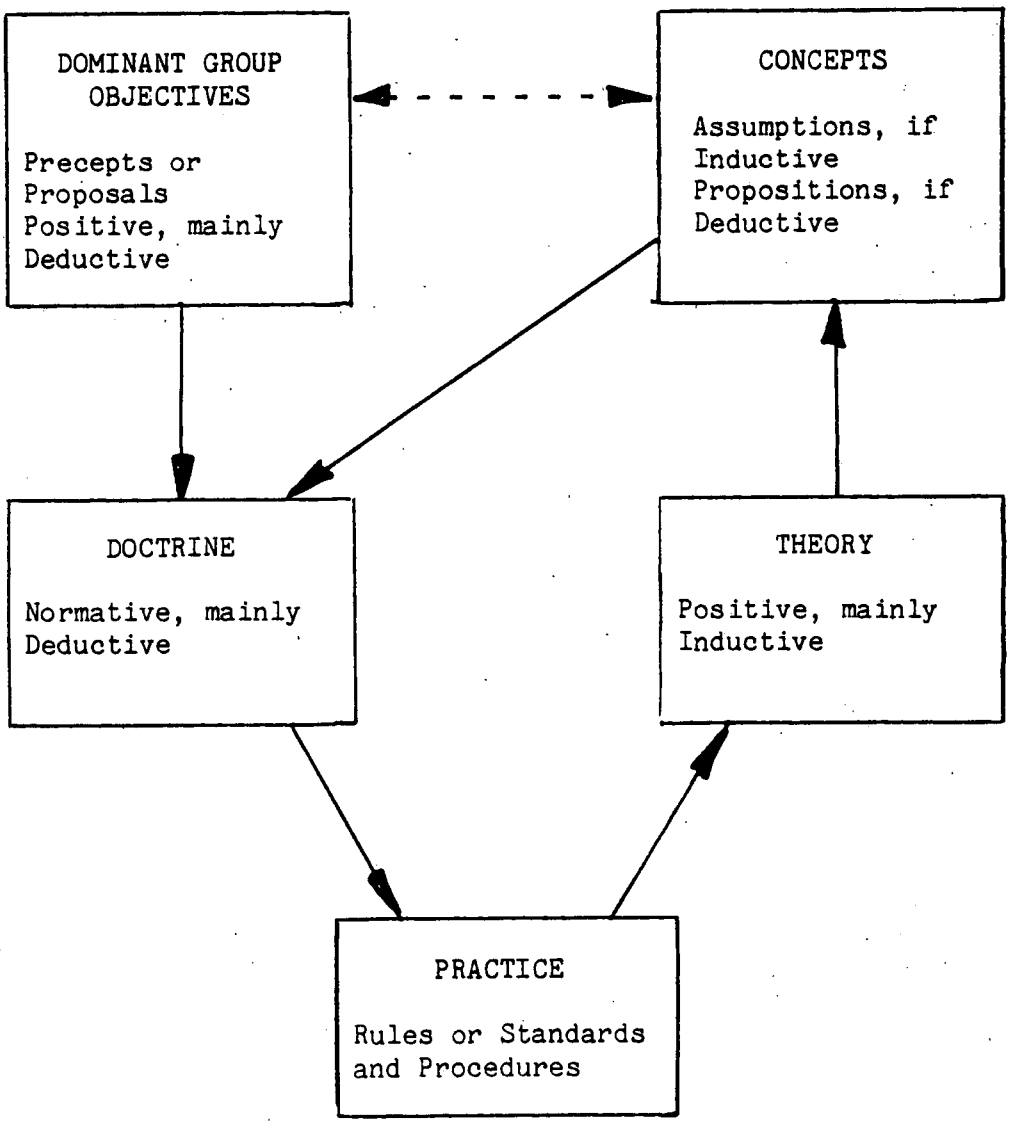
When the relationship between concepts and objectives is examined following Dopuch and Sunder's (1980) analysis of accounting objectives it appears that functional and common objectives may be considered at the same level as singular concepts in a structure of accounting theory. In this respect, these objectives describe observable phenomena or are merely propositions of accounting. On the other hand, dominant group objectives may only be considered objectives at the same level as universal concepts because they have been placed at this level in a structure of accounting theory by the dominant group. This methodological structure of accounting is illustrated by figure 1.

Therefore, the placing of dominant group objectives in the same position as concepts in a structure of accounting theory may be viewed as the expression of current accounting doctrine. The problem is that in these cases accounting objectives are formulated to satisfy what are perceived as the needs of the dominant group and with use, these objectives become accepted as concepts. The result is that it becomes difficult to distinguish between positive and normative considerations as these dominant group objectives assume the role of concepts.

Furthermore, by looking at what is accepted as being accounting theory in the light of Goldberg's distinction between theory and doctrine it is obvious why accounting concepts are defined in different ways. In fact, the generalized nature of most definitions is a compromise between theory and doctrine. From an objective point of view, accounting concepts are the self-evident observations regarding the accounting system or are those which are essentially inductive in nature and have been established by empirical means. In this sense they are those observations or explanations which are held to be"the general laws, principles or causes" of accounting, and represent assumptions or ideas put forward as the rationalization of existing accounting

FIGURE 1

A METHODOLOGICAL FRAMEWORK OF ACCOUNTING



practice. Accounting doctrine on the other hand is essentially deductive (and mostly normative) in nature and accounting concepts are concerned with what the accounting system should achieve. Consequently, accounting concepts, like objectives, become the guidelines for developing practice or merely proposals or propositions regarding what it is hoped will be achieved by the accounting system.

Finally, there is also one additional use of the term concept in accounting; its use as a substitute for the word theory. This use applies particularly to academic circles where, for example, a theoretical approach to teaching accounting is often referred to as a conceptual approach. This obviously represents a specific use of the term because the word does not fit any of the uses discussed earlier. In this respect, one would not describe a less procedural approach to teaching accounting as an assumptive, notional, propositional or objective approach. Therefore it appears that the use of the term in this context represents an evolution of a specific term in accounting because its origin obviously lies with the acceptance and application of a more deductive approach to the establishment of accounting theory.

## Conclusions

By tracing the use of the term concept in accounting it soon became obvious that the problem of defining accounting concepts in specific terms was mainly due to the two approaches to the development of accounting theory. From an inductive approach accounting concepts are essentially empirical in nature whereas from a deductive approach accounting concepts represent logical conclusions. In this sense, accounting concepts are the assumptions or ideas underlying accounting induced from existing practice or the propositions of the discipline deduced logically from considerations of what the accounting system is expected to achieve. As one would expect, many definitions have supported one or the other approach and where both approaches have been recognized, the definitions have been expressed in general terms.

The position has been further complicated by the fact that objectives have either been considered part of the concepts of accounting or have been placed at the same level as concepts in a structure of accounting theory consisting of a hierarchy of concepts, standards, and practices. Although these objctives may be similar in many respects to deductively derived accounting concepts, the extent of this similarity depends upon the nature of these objectives. In this respect, functional or common objectives pose no difficulties because they either describe existing phenomena or are similar to accounting propositions. However, dominant group objectives, which represent the viewpoint of the dominant group and are based upon accounting doctrine, cannot reasonably be considered to be similar to accounting concepts. This is because they are not based entirely upon deductive reasoning or enjoy complete acceptance amongst accountants. Consequently, they can only be placed at the same level as concepts in a structure of accounting theory.

In addition, the term concept is also used as a general term to describe a theoretical or deductive approach to accounting. Its use in this context is prevalent amongst accounting academics and appears to be the evolution of a specific term in accounting from the common or idiomatic usage of the word.

Bibliography

American Accounting Association (AAA), Executive Committee, "A Tentative Statement of Accounting Principles Underlying Corporate Financial Statements," The Accounting Review, Vol. XI, 1936.

American Accounting Association (AAA), Executive Committee, "Accounting Concepts and Standards Underlying Corporate Financial Statements: 1948 Revision" and "Accounting and Reporting Standards for Corporate Financial Statements: 1957 Revision", Accounting and Reporting Standards for Corporate Financial Statements and Preceding Statements and Supplements, College of Business Administration, University of Iowa, Iowa City, Iowa, 1957.

American Accounting Association (AAA), A Statement of Basic Accounting Theory, Evanston, Ill., 1966.

American Accounting Association (AAA), Committee on Concepts and Standrds for External Financial Reports, Statement on Accounting Theory and Theory Acceptance, 1977.

American Institute of Certified Public Accountants (AICPA), Special Committee on Research Program, "Report to Council", Journal of Accountancy, December, 1958.

American Institute of Certified Public Accountants (AICPA), Accounting Principles Board (APB) Statement No. 4: Basic concepts and Accounting Principles Underlying Financial Statements of Business Enterprises, 1970.

American Institute of Certified Public Accountants (AICPA), Report of the Study Group on the Objectives of Financial Statements, Objectives of Financial Statements, New York, 1973.

Belkaoui, Ahmed, Accounting Theory, New York: Harcourt Brace Jovanovich, 1981.

Boland, Lawrence A., "A Critique of Friedman's Critics," Journal of Economic Literature, 17 June, 1979, pp. 503-522.

Dopuch, Nicholas and Shyam Sunder, "FASB's Statements on Objectives and Elements of Financial Accounting: A Review," The Accounting Review, Vol. LV January, 1980, pp. 1-21.

Financial Accounting Standards Board (FASB), Statement of Financial Accounting Concepts No. 1: Objectives of Financial Reporting by Business Enterprises, Stamford, Conn., November 1978.

Grady, Paul, Accounting Research Study No. 7: Inventory of Generally Accepted Accounting Principles for Business Enterprises, American Institute of Certified Public Accountants, 1965.

Goldberg, Louis, "Varieties of Accounting Theory," in Foundations of Accounting Theory, Williard E. Stone (Ed.), Gainsville, Fa.: University of Florida Press, 1971.

Hendriksen, Eldon, S., Accounting Theory, Fourth Ed., Homewood Ill.: Irwin, 1982.

Hume, David, (1750). Treatise on Human Nature, Reprinted London: Dent, 1939.

Lastrucci, Carlo L., The Scientific Approach, Cambridge, Mass.: Schenkman, 1963.

Littleton, A.C., "The Uses of Theory," Journal of Accountancy, April, 1939, pp. 227-230.

Moonitz, Maurice, Accounting Research Study No. 1: the Basic Postulates of Accounting, American Institute of Certified Public Accountants, 1961.

Oxford English Dictionary, Oxford: Clarendon Press, 1961.

Paton, W.A. and A.C. Littleton, An Introduction to Corporate Accounting Standards, Monograph No. 3, American Accounting Association, 1940.

Popper, Karl R., The Logic of Scientific Discovery. New York: Harper and Row, 1968.

CAAA 1982 Conference
University of Ottawa

James Pesando
Carol Clarke
University of Toronto

# Economic Models of the Labour Market: Their Implications for Pension Accounting

Accountants are now inclined to accept the economic view that pension benefits represent a form of deferred wages (Skinner (1980), Archibald (1981), and the FASB (1981)) and are thus a part of the worker's total compensation. If pensions are deferred wages, then workers must forgo current wages in order to acquire their pension benefits. If total labour costs are to be charged to the period in which labour services are performed, it is the value of the wages forgone to acquire pension benefits which is the most useful accounting measure of pension costs. This result requires only the standard economic assumptions of rational behaviour by workers and the existence of competitive labour markets. Economic analysis thus focuses attention on the nature of the tradeoff between current and deferred wages as the analytical foundation for pension accounting. One need not directly measure the actual reduction in the current wage received by the worker in exchange for the promised pension benefit. One can simply infer this current wage concession if the pension benefit and the relevant discount rate are well defined.

In principle, and perhaps contrary to the pessimism of some observers, the allocation of pension costs need not contain a largely arbitrary element. In practice, there are two major difficulties in implementing the principle that forgone wages represent the most useful accounting measure of pension costs. The first of these difficulties stems from the fact, noted by Skinner (1980), Archibald (1981) and the FASB (1981), that pension benefits may be moral or implicit as well as legal and explicit. Consider, for example, the fact that most large firms in the private sector grant "ad hoc" cost-of-living adjustments to retired workers in spite of the fact that the pensions due under the formal terms of the plan are purely nominal (i.e. not indexed). Relative to the case in which pension benefits are truly nominal, workers presumably forgo additional current wages in exchange for the firm's implicit promise to help offset the eroding impact of inflation on pensions being paid to retired workers.

The second of these difficulties stems from a related problem, the fact that there is no unique model of the labour market which economists agree best fits the real world. Further, as emphasized in the present study, alternative models of the labour market may have different implications for the nature of the tradeoff between current and deferred wages, and thus different solutions to the problems of accounting for pension costs. To the extent that empirical evidence favours the validity of a particular model, one is particularly interested in its implications for pension accounting. To the extent that available evidence does not permit one to discriminate among competing models, one can at least identify the empirical questions that must be addressed in future work.

The purpose of this study is thus two-fold. First, to analyze the implications of alternative models of the labour market for pension accounting. Second, to summarize the available evidence regarding the empirical validity of the alternative models, and to draw attention to the empirical questions whose answers will ultimately resolve some of the more contentious issues in pension accounting. The study is exploratory in the sense that its primary purpose is to set out an analytical framework within which accounting issues can be addressed, rather than to make specific recommendations regarding the problem of accounting for pension costs.

Throughout, the analysis proceeds on the assumption that firms and workers

act rationally. This assumption, which is central to most economic analysis, may appear less restrictive if one views it as a statement about long-run or equilibrium behaviour. In commenting upon pension matters, some observers have - in effect - argued that "agency" problems must be taken into account. The managers (agents) of the firm, while acting in their own self-interest, may not act in the best interest of the principals (shareholders). Suppose, for example, that management's rewards are linked solely to current earnings. Management might then be willing to grant unfunded, retroactive plan amendments even if they cannot extract the full and appropriate wage concession. Under current accounting practice this increase in pension benefits will not necessarily be reflected on the income statement. Thus the firm may report higher earnings than would be the case if wages had been increased instead of pension benefits. No explicit attention is given to potential agency problems in our study. To the extent that agency problems do exist, it is perhaps reasonable to assume that they will be eliminated in the long run by improved monitoring and incentive programs, as well as by improved disclosure.

The study focuses on three models of the labour market: the Spot Auction/Explicit Contract Model (SAEC), the Spot Auction/Implicit Contract Model (SAIC), and the Lifetime Contract Model. The assumptions underlying each of these and their empirical relevance have been summarized in Table 1.

To the extent that empirical evidence favours a particular model, or that the preferred accounting practice is independent of the model selected, explicit recommendations regarding pension accounting are possible. With this in mind, the implications of the alternative models of the labour market are summarized in Table 2. To place them in perspective, the parallel recommendations of Skinner (1980) and Archibald (1981) are also recorded.

Note first that there are implications common to all of the models of the labour market. In all models, experience gains and losses should be expensed immediately. The sole exception occurs when "excess" investment earnings are being accumulated in anticipation of future payments to offset the eroding impact of inflation. In all models, the extended amortization of retroactive plan amendments which are vested is unwarranted. Economic analysis indicates that it is inappropriate to allocate pension costs (and thus, implicitly, to assume wage concessions) when the promised benefits are due the worker regardless of whether or not he remains with the firm. Retroactive plan amendments which are vested should be expensed fully in the period in which they are granted, unless they are awarded on the basis of prior "excess" investment earnings or an equivalent, predictable rule. In this case, they should be prefunded by (say) accumulating the "excess" investment earnings in anticipation of future benefit enrichments. In the absence of an implicit or explicit commitment to use "excess" investment earnings to enrich benefits, the models indicate that the interest rates used to value the plan's liabilities be standardized. On the assumption that benefits are secure, the risk-free nominal rate of interest should be used if benefits are nominal, and the risk-free real rate if benefits are real. On the maintained hypothesis that capital markets are efficient, economic analysis suggests - independent of our analysis of the labour market - that pension assets be valued at market. This, of course, remains a highly controversial issue within the accounting profession.

The key accounting issue that does depend upon the specific model of the

labour market is the choice of a valuation method with which to determine pension expense. Under the SAEC and SAIC models, only an accrued benefit method is useful for accounting purposes. Under these auction models, the wages paid to a worker who is a member of a final earnings plan must "flatten out" as he ages in view of the enrichment of all prior service credits which accompanies each wage increase. If wages tend to rise steadily over time, perhaps in tandem with the value of the worker's marginal product, then it is unlikely that an auction model is valid. Instead, it is likely that the total compensation paid to the worker is less than the value of his marginal product when he is young, and larger when he is old. If there is an implicit contract to allow the wage to rise in tandem with the value of the worker's marginal product, then the contributions established by a projected benefit method may prove to be a satisfactory accounting measure of pension costs. Because of the equality of lifetime compensation and the lifetime value of the worker's marginal product the initial wage paid to the worker under this implicit contract must be less than that in an auction model. As a result, the use of an accrued benefit valuation method to establish plan contributions (to be used, in turn, as the accounting measure of pension costs) will not be correct since total labour costs so recorded will not equal the value to the firm of the labour services performed on a period by period basis.

The formal analysis of these alternative models draw attention to a key empirical issue that has as yet received too little attention. This issue is the extent to which the more rapid accrual of pension benefits as the worker ages is or is not offset by a commensurate slowdown in the rate of growth of his current wages. The resolution of this question is central to the choice of the appropriate valuation method. The fact that the choice of the valuation method depends solely on the answer to this question also illustrates the most important theme of the present study. This is the fact that a careful assessment of the nature of the tradeoff between current and deferred wages is the only analytically rigorous means of establishing appropriate rules to account for pension costs.

Finally, the SAEC model is distinct from the other models in its implications that (1) vested should be distinguished from nonvested benefits and (2) unfunded pension liabilities do not represent an implicit liability of the firm and thus need not be disclosed.

There are two alternative strategies that the accounting profession must consider in its continuing assessment of the problem of accounting for pension costs. The first is to try to impose increased uniformity by standardizing valuation methods and/or actuarial assumptions. The second is to allow firms to continue to exercise their considerable flexibility in this area, but to provide perhaps more guidance than in the past. Pension reform -such as the legislation of "excess" interest, the introduction of plan termination insurance, the elimination of certain valuation methods (such as aggregate funding) - may reduce the flexibility of firms in any event.

If the evidence cited in this report provided unambiguous support for a particular model of the labour market, then there would be a strong case for seeking uniformity in terms of the underlying economic reality. In fact, the available evidence - perhaps because it is incomplete - does not provide unambiguous support for any of the alternative models. If firms do differ in the extent to which pension benefits are traded off against current wages, presumably because of the different implicit contracts that might exist, then the attempt to

impose uniformity may be counterproductive. If the decision is made to permit firms to be flexible in their choice of actuarial methods, then firms should be required to justify their choice in terms of the current versus deferred wage tradeoffs examined at length in this study. There are a number of questions that should be posed, all of which focus on the implicit contracts that may exist between the firm and its workers. The prior behaviour of the firm, as evidenced in its history of benefit enrichments, ad hoc cost-of-living adjustments, and the age-earnings profiles of its workers, provides potentially valuable information to guide not only the choice of the valuation method, but also the choice of the interest rate and perhaps other actuarial assumptions.

The topic which requires the most urgent research is the nature of age-earnings profiles in firms which provide different types of pension plans and/or differ in their valuation methods. Exploration of this issue will shed light both on the preferred valuation method to be used to calculate pension expense and on the possibility of increased standardization of valuation methods across firms.

A second area which merits continuing attention is the quantity and financing of cost-of-living adjustments in plans whose legal pension benefits remain nominal. If firms are relying upon "excess" investment earnings (in the main) to finance these payments, then (1) the use of the plan's valuation rate to value pension liabilities and (2) the prefunding method suggested by Skinner are both appropriate.

Finally, pension reform directed toward improving the delivery of retirement incomes through private pension plans is likely in the near future. To the extent possible, this should be seized as an opportunity for the accounting profession to standardize at least some areas of pension accounting to conform to the new economic reality. The legislation of the "excess" interest approach, for example, invites standardization both in the choice of interest rate assumptions and the treatment of accumulating surpluses. The introduction of plan termination insurance in Ontario makes shareholders legally responsible for unfunded (statutorily vested) pension liabilities in the event of plan wind-up. This suggests, especially if similar legislation is enacted elsewhere, that improved disclosure in this area may be essential if users of financial statements are to be adequately serviced.

Table 1

Economic Models of the Labour Market - Basis Assumptions and Empirical Relevance

### Spot Auction/Explicit Contract Model (SAEC)

Assumptions

a. each worker receives total compensation equal to the value of his marginal product in every period.
b. only benefits legally due under the terms of the plan are part of the worker's compensation and are factored into the tradeoff between current and deferred wages

Empirical Relevance

Too restrictive to have universal validity.

Assumption (a) - Wages of older workers do not appear to decline sufficiently to offset the increased cost of their pension benefits while supervisors' evaluations indicate their productivity is actually declining.

Assumption (b) - Most large firms in Canada do grant cost-of-living adjustments to retired workers in spite of the fact that they have no legal obligation to do so.

The sizeable adjustments in the current wage required when benefits vest, when employees become eligible for actuarially unreduced early retirement benefits and when plans are retroactively improved, have not been observed in practice.

### Spot Auction/Implicit Contract Models (SAIC)

Assumptions

a. each worker receives total compensation equal to the value of his marginal product in every period.
b. possible existence of implicit contracts between workers and firms, and hence the possible existence of implicit pension liabilities

(i) implicit contract to use "excess" investment earnings above the plan's evaluation rate to retroactively enrich nominal pension benefits and/or to provide cost-of-living adjustments to pensions in pay.

(ii) implicit commitment of an on-going firm to honour vested benefits regardless of the funded status of the pension plan.

(iii) implicit contract not to fire workers in order to prevent their non-vested benefits from vesting.

Empirical Relevance

Assumption (a) - see SAEC

Assumption (b)(i) - No hard evidence that firms behave this way. The granting of ad hoc cost-of-living adjustments is not universal. However, Ontario's Select Committee recommended that "excess" investment earnings be used to preserve the value of both current and deferred annuities.

Assumption (b)(ii) - There is an absence of plan terminations by on-going firms. In Ontario, termination insurance holds shareholders fully responsible for vested pension liabilities in the event of a plan wind up. Unfunded vested pension liabilities depress the aggregate value of the firm's common stock by somewhat in excess of $1.

Assumption (b)(iii) - There is little direct evidence. However, workers do agree to join pension plans with delayed vesting. If this did not exist, there would be no incentive to grant wage concessions for non-vested benefits.

### Lifetime Contract Model

Assumptions

a. Compensation of each worker equals the value of his labour services over his lifetime but not necessarily in each period.

Empirical Relevance

There is little direct evidence. However, mandatory retirement provisions and pension plans tend to co-exist. This may be a result of older workers receiving compensation which exceeds the value of their marginal product.

Implications of Alternative Models for Selected Issues in Pension Accounting, together with Recommendations of Skinner (1980) and Archibald (1981)

| Issue | SAEC Model | SAIC Model | Lifetime Contracts Model | Skinner (1980) | Archibald (1981) |
|---|---|---|---|---|---|
| 1. valuation method | accrued benefit | accrued benefit | projected benefit or accrued benefit with salary projection | preference for accrued benefit method, with salary projection for final earnings plan | strong preference for accrued benefit method, with salary projection for career average and final earnings plans |
| 2. definition of liability vested vs non-vested benefits | vested | vested and non-vested | vested and non-vested | vested and non-vested | vested and non-vested |
| 3. interest rate assumption | (i) risk-free nominal rate (nominal, secure benefits)<br>(ii) risk-free real rate (real secure benefit) | (i) risk-free nominal rate (nominal, secure benefit)<br>(ii) plan's valuation rate, if escalate via "excess" earnings<br>(iii) risk-free real rate (real,secure benefit) | (i) risk-free nominal rate (nominal, secure benefit)<br>(ii) plan's valuation rate, if excalate via "excess" earnings<br>(iii) risk-free real rate (nominal, secure benfit) | (i) risk-free nominal rate (nominal, secure benefit); valuation rate, if "excess"<br>(ii) risk-free real interest rate (real, sesure benefit) | not addressed |
| 4. asset valuation | market | market | market | disclose market, but may use other valuation method | disclose market, but may use other valuation method |
| 5. experience gains/ losses | expense immediately | expense immediately[a] | expense immediately[a] | expense immediately[a] or amortize, depending upon source | extended amortization |
| 6. unfunded pension liabilities | not relevant (in absence of termination insurance) | disclose | disclose | disclose | disclose |
| 7. vested retroactive plan amendments | expense immediately | 1. non-union<br>(i) if nominal,financed by "excess" earnings, then prefund<br>(ii) if real, expense immediately<br>2. union<br>expense immediately | (i) if nominal, financed by "excess" earnings, then prefund<br>(ii) if real, expense immediately | (i) if nominal, financed by "excess" earnings, then prefund<br>(ii) if real; extended amortization | extended amortization |
| 8. post-retirement cost-of-living adjustments | not applicable[b] | 1. non-union<br>prefund if financed by "excess"<br>2. union<br>expense immediately | if financed by "excess", then prefund; otherwise, expense immediately | if financed by "excess", then prefund; otherwise, expense immediately (or over arbitrarily short period) | extended amortization |

Notes: [a] Except in the case in which "excess" investment earnings are being accumulated in anticipation of future nominal benefit enrichments, including "ad hoc" cost-of-living adjustments to retired workers.

[b] In the SAEC model, no firm would make voluntary cost-of-living adjustments. If the firm did, the result would be a gratuitous transfer of shareholder wealth and would be expensed immediately.

CAAA 1982 Conference
University of Ottawa
Ottawa, Canada

Murray J. Bryant
Daniel B. Thornton
University of Toronto, and
University of Toronto and
Queen's University

# RESPONSIBILITY CENTRES: A RECONSIDERATION

The costs and benefits of establishing profit centres in lieu of cost centres are largely unexplored in the management accounting literature.[1] A complaint frequently voiced by managers of profit centres is that "it is terribly frustrating to be evaluated as a profit centre when I do not have complete control over revenues" (Barrett and Bruns 1982).[2] Yet, arguments against the profit centre concept based upon such impressions alone are not helpful, because they ignore the potential benefits of profit centres that may offset such "frustration costs".

The present paper has two major objectives. First, it seeks to identify reasons for organizing corporate responsibility centres as profit or cost centres based upon economic arguments. Second, it investigates formally some of the logical results of establishing profit centres in a corporate setting where opportunism exists (Williamson 1981). Opportunism involves the pursuit of local or personal goals to the possible detriment of the organization as a whole. We conclude that profit centres are apt to encourage destructive opportunism in a wider variety of circumstances than has generally been acknowledged in the management accounting literature, though they are necessary if top management wishes to extend its span of control in large organizations. We offer some suggestions for remedying such problems based upon an analysis of a related situation in the law-and-economics literature, and develop testable hypotheses as to when profit or cost centres might be observed as control mechanisms.

## I. On the Economics of Internal Control

Coase (1937) has argued that the firm is best viewed as an alternative to markets as a means of coordinating productive activity. The purpose of the firm, in his view, is to supercede the market mechanism: within the firm, coordination of the factors of production is achieved by administrative direction instead of market clearing prices for labour and capital. If there were no costs of using prices, no firms would be needed. Coase identifies four important costs of using prices to coordinate production:

1. The costs of discovering what the relevant prices are.
2. The costs of contracting repeatedly on the basis of market clearing prices. (Within a firm, one standard wage contract is substituted for the many agreements that would be required among the factors of production).
3. The uncertainty of future supply.
4. The lack of adaptability of capital intensive production processes to changes in prices.

If it ever becomes cheaper to use markets than to organize transactions internally, firms can revert to the market for certain transactions. Coase maintains that the firm will grow to an equilibrium size at which the marginal cost of organizing one more transaction is equal to the cost of carrying out

that transaction on the open market. Moreover, firm A will acquire firm B if A's cost of organizing B's work is less than B's cost of organizing his own work plus the cost of using prices to accomplish exchange transactions between the two firms. In the present paper, we view profit centres as a compromise between the central direction envisaged by Coase and the total reliance on markets to coordinate production. This compromise is made primarily to ensure that sufficient information is available to coordinate activities within large organizations.

Arrow (1964) pointed out that even the most talented managers have a limited "span of control". As organizations grow larger, it becomes more and more difficult and costly to collect the information that would be required to administer all of the firm's activities centrally. It becomes necessary to delegate authority instead of directing, because it is much cheaper simply to tell managers to "do whatever is required to maximize your objective function" than to collect enough information to be able to tell them precisely what to do. Somewhat ironically perhaps, such delegation requires that parameters analogous to prices be negotiated internally, and many of the costs (outlined by Coase above) of using real markets resurface within the entity. Yet without these internal cousins of market prices, it is impossible to design the incentive contacts and performance measurement schemes that Arrow holds to be essential for coordinating large firms.

Williamson (1970, 1975) elaborates considerably on the notions of control mentioned above. In his view, as the firm expands, it becomes increasingly subject to external or environmental disturbances. This, in turn, calls for better inter-functional communication, which increases the probability of cumulative error in information transfer. Information, Williamson maintains, is the glue that holds the organization together. In a neo-classical economic environment prices alone would perform this function. In a modern corporation, however, coordination requires information that cannot be found in market prices. In the present paper, the establishment of cost and profit centres is regarded as primarily a means of generating such information in a cost-efficient manner. If the internal costs of administering these semi-autonomous profit centres and cost centres are not less than the costs of using real markets to carry out the transactions, such units will be "spun off" as separate firms: a sort of reverse-Coasian takeover. To the best of our knowledge, these ideas have not been widely adopted or applied in the management accounting literature.[3]

## II. Organizational Control: A Short History of Accounting Thought

In the management accounting literature, the problem of organizational control and the related issue of the design of supporting accounting systems has been examined in three separate, but not unrelated, ways. One approach, information economics, is the application of statistical decision theory to problems involving a single decision-maker. The contribution of this methodology has been the explicit recognition of uncertainty, which in turn implies a consideration of information costs, these being irrelevant in a world characterized by certainty. The conclusion which therefore follows is that the "best accounting system" is person-specific, depending on the decision-maker's tastes, endowments and preferences for contingent outcomes (Demski and Feltham 1976). Agency theory adds opportunism or "moral hazard" to the information economics approach, thereby permitting optimal incentive contracts and performance measurement systems to be derived endogenously. Contingency

theory argues that the firm's accounting and control systems depend upon environmental, organizational and personal variables with complex interrelationships between all three types of variables (Hayes 1977, Waterhouse and Tiessen 1978). A firm confronting a highly uncertain environment with a known technology (e.g., the movie industry) would logically employ a different control system than one facing a more certain environment (e.g., a public utility): the latter firm's control system would more likely focus on inputs, since monitoring outputs is not crucial. None of these approaches provides significant guidance to managers who wish to design a mix of profit centres and cost centres to further organizational goals. One reason is that it is difficult to generalize one-or-two person results to a multi-person setting. Another is that it is difficult to know which contingent factors operate and how they operate, except at a very global level.

The analysis as developed in the economics of internal control leads us to expect that larger firms will tend to utilize more semi-autonomous units than smaller ones as a way to economize information collection and processing costs. Scapens and Sale (1981) observed that divisions of large companies were more commonly established as profit centres than investment centres. In fact they asserted that it was difficult to assess whether investment centres existed at all because of the lack of autonomy of responsibility centres with respect to investment decisions. We view this result as consistent with the opportunism notion developed earlier; more opportunism is possible in investment centres, though less information needs to be processed centrally. The prevalence of profit centres represents a rational trade-off between the costs of information processing and the costs of destructive opportunism.

A profit centre is by definition a responsibility centre in which the manager must answer for both costs and revenues. In our view, it is not necessary for revenues to be controllable by manager for the profit centre concept of control. The expected economies obtainable in information transmission may more than outweigh the potential costs of "frustration" felt by the manager and the costs of destructive opportunism.

Commonly the evaluation devices used to control profit centres are based upon two criteria: 1) absolute profit or contribution margin, and 2) conformity with a budget. Zimmerman (1979) argues also for cost allocation of central office charges as surrogates for the opportunity costs of such services. Zimmerman's paper may be regarded as one part of the information-transmission theory developed above. We view a charge for a cost not controllable by a responsibility centre merely as a signal that motivates the manager to employ the related facility in an economic manner from the viewpoint of the organization as a whole. We regard such allocations as prerequisites for the negotiation of organizational counterparts of prices that are meant to coordinate productive activities in large organizations. The fact that such allocations are arbitrary is not in itself relevant: what matters, in our theory, is what is done with this data in establishing price-like parameters, given the allocations. We call these parameters II-prices, since they are based on what we have termed elsewhere, "institutional information" (II).

Bodnar and Lusk (1977) apply conditioning theory to the use of cost allocations as a means to motivate managers to take actions in accordance with the overall organizational goals. We view our approach as the product of negotiation between different levels in the organization. The negotiations result in reward systems which have the character of prices and all the advantages which flow from such a characterization. This is discussed in more detail in the following section.

## III. Institutional Information and the Budget

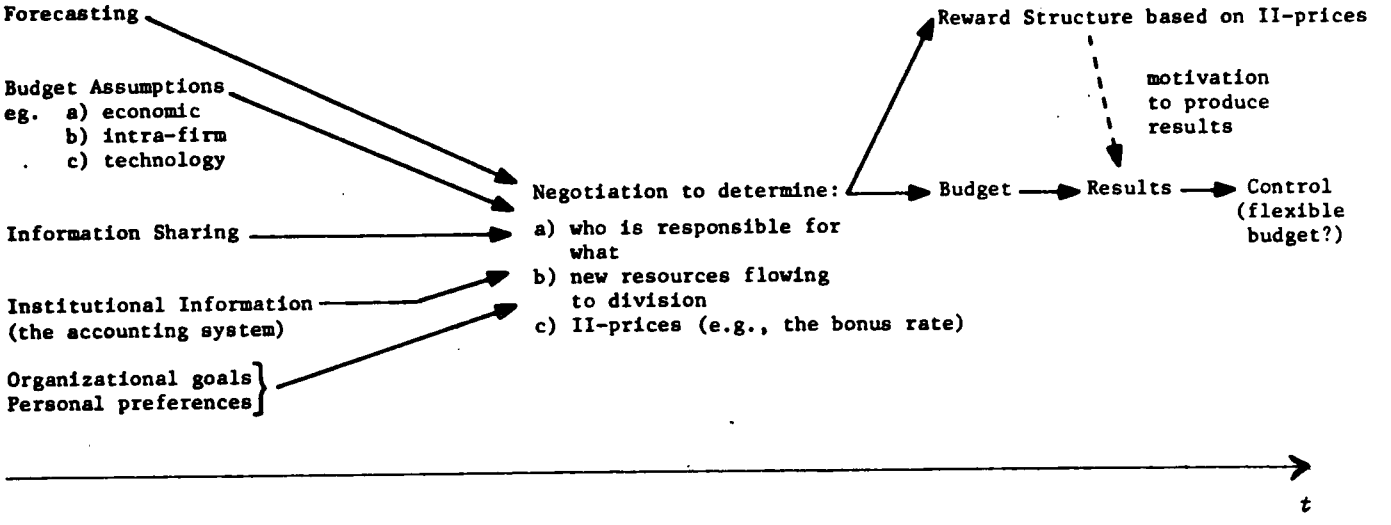
Elsewhere we have put forth the theory that the chief role of generally accepted accounting principles is to establish arbitrary but stable II (Thornton 1979, 1982 and Bryant and Thornton 1981). This II has value to contractors in labour and capital markets: holding II exogenous, the parties bargain for II-parameters (or II-prices), for example incentive contracts based upon accounting profits or debt/equity constraints based upon accounting book values. As long as the contractors know that II is arbitrary, but predictable, and as long as they understand its properties when they negotiate the IIPs, there are economies to be gained in not having to bargain for a custom-made information system simultaneously with the parameters in the agreements.

In the present paper, we maintain that similar economies are available internally, within the firm, among semi-autonomous bargaining units. Contrary to Zimmerman, we believe that the crucial stage in control is not the selection of an optimal allocation scheme (optimal in terms of providing the best proxy for hard-to-observe economic costs), but the negotiation of IIPs based upon some arbitrary allocation scheme. Internally, IIPs will consist of bonus or incentive schemes for managers of profit centres, based on accounting measures such as the centre's net income, and benchmarks such as net profit or contribution margin, against which the success or failure of the responsibility centre will be judged. This notion of II and IIPs, we believe, is consistent with both the contingency theories of control and the power theories of Cooper, Hayes and Wolf (1981). We view the widespread utilization of profit centres as an organizationally rational response to the control problems and information problems identified in section I of the paper. Our explanation is incomplete, however, without a formal consideration of the budget process, for it is this process that leads to the formation of IIPs and the consequent exercise of coordination and control.

As Hofstede (1968) observed, a budget process is characterized by long negotiation between organizational units. Our thesis is that the negotiation of budget parameters for profit centres is often cheaper than other forms of administrative control, such as those associated with pure cost centres. We view the budget process[4] and the II on which it is based as a means of coping with bounded rationality within the organization, (Simon 1973). It is an attempt to arrive at a satisfactory solution to a complex, real world problem as opposed to an optimal solution to a highly simplified problem: in large organizations costs alone cannot convey enough information to coordinate activities satisfactorily. Our view differs from Simon's in that it recognizes bounded rationality as the principal reason for establishing profit centres, rather than the vehicle for global optimal decision making. The individuals within the organization, in our theory, bargain for IIPs during the budget process. The accounting system employed in the budget is the II. The negotiation process allocates responsibility within the organization. It also conveys the information, through IIPs, that could never be transmitted by human beings with limited mental capacity from "head office",[5] in much the same way that market prices convey more information than any government could disseminate to individuals in a market-based economy. The IIPs in our theory reflect the preferences of the individuals within the organization as well as the "organizational goals". In fact, organizational goals in our framework are merely viewed as another set of preferences that are reflected in the IIPs. Presumably, these preferences are traceable to top management,

shareholders, and other people who have significant influence on the organization: but how these preferences get aggregated and reflected in the IIPs will remain as mysterious as how prices of real goods can ever reconcile the tastes and beliefs of individuals in a market economy. The invisible hand (Smith 1776) is too powerful and useful a force to suppress, except in the most autocratic organizations. The costs of using IIPs within a firm are much the same, in our view, as the costs of using real prices in real markets (see section I). If it is cheaper merely to exert direction and control by fiat from head office, profit centres will not, we argue, be used. The next section of the paper attempts to deal more explicity with why profit centres would be preferred to cost centres in some situations, and vice versa. Figure 1 summarizes schematically the discussion in the present section.

Figure 1
A Budget Process




## IV. Some Costs and Benefits of Cost and Profit Centres

The budget process consumes considerable resources (Hofstede 1968). How do we know that the sacrifice is worthwhile? To consider the costs, we must formally consider the costs of alternative methods of controlling large organizations. As was argued above, a pure market system would entail substantial costs of using prices. Under the profit centre concept, market prices are replaced with IIPs within the firm. If it were not cheaper to organize production by negotiating these prices internally than to rely on external markets, the centres would be spun as separate firms. Internally then negotiation costs replace the search costs of determining prices in a market system.

Another alternative to establishing profit centres would be to set up cost centres. In the budget process the flow of information is two-way, from responsibility centre to senior manager and back. With profit centres, the negotiation of IIPs in the budget process largely relieves senior management from explicitly considering information flows between responsibility centres. With cost centres, on the other hand, the sequential and reciprocal relation-

ships between linked cost centres has to be explicitly considered by senior management prior to setting standards. This makes the budget process much more complex from the viewpoint of central headquarters: much more information sharing is necessary, and rationality may be strained to the breaking point. Clearly, vertical information flows alone (needed in profit centre administration) may be cheaper to induce than the combination of horizontal and vertical flows necessary to coordinate cost centres. In large organizations, strong incentives exist for top management to rely on profit centres as a means of extending their span of control. As in a market economy, not every actor need know every price. As Hayek (1945) pointed out, this latter factor is what makes markets able to accomplish far more than any of the traders can comprehend individually.

What leads to market failure outside the firm can also lead to problems with profit centres within the firm. There can be little doubt that many externalities can result from relying upon prices. The following section identifies one externality that is particularly relevant, but should be viewed as merely an example of a cost of using profit centres. We feel that there are many opportunities to tap the economics literature on market failure to identify problems of control in large organizations.

Credence Goods and Responsibility Centres. Darby and Karni (1973) define a credence good as one whose properties cannot be evaluated in normal use (e.g., the tune up of a car's engine) or one for which the costs of learning the good's real properties are too high in relation to the benefits of investigation (e.g., a taxi ride in a strange city). In the first case, the performance of the car is stochastic after the repair: if it breaks down soon afterward, it is generally impossible to know whether to blame the mechanic, ill-fortune, or both. Further, because performance depends jointly on so many features of the car's engine, it is usually impossible to trace the breakdown to a specific input by the mechanic. Under these conditions, there is an incentive for the mechanic to oversupply service when there are few customers in his service queue, and to undersupply when the demand for his service exceeds capacity. In the second case, the lack of repeat business allows the taxi driver to take many customers for a ride figuratively as well as literally.

Service centres within a firm are often in a position to exercise opportunism of the first type. For this reason, we hypothesize that service centres generally will not be set up as profit centres. It is much more likely that units producing well-defined outputs (experience goods, in the Darby-Karni framework) will be established as profit centres.[6] To set up profit centres for service centres would merely reproduce the Darby-Karni problem inside the firm where credence goods are involved. Moreover, it is highly unlikely, that traditional accounting systems would ever be able to monitor these sorts of problems.

Watson and Baumler (1975), in their negotiation approach to transfer pricing, show that incentives exist not to share all information. But what about the fact that the client department must engage in repeat business with the service centre? Will this not lead eventually to a situation in which opportunism by the service centre is minimal? We think not, for two reasons. In the first place, dollar amounts of past service costs often become sticky in the budget process: this year's costs are often regarded as a function of prior years' costs, with suitable allowances made for factors such as inflation and growth. Furthermore, the managers of responsibility centres change over

time as the firm grows and prospers. We doubt that there is much carry-over in the knowledge gained by successive managers as to the "proper" level of service to be provided by service centres. Moreover, whether the service centre has the opportunity to sell its services outside the firm is not relevant: opportunism exists regardless, and there is no reason a priori to expect loyalty to the firm to get in the way of profit maximization by the service centre.

One strong argument for the internalization of a service centre, such as an automotive repair centre, is that the centre can reduce the total costs of repair by reducing the variance of the length of the service queue. For instance, it can call vehicles for prophylactic work (oil changes, tune-ups) when the queue for emergency repairs is short. A profit centre, in our opinion, would have no particular incentive to do so. Opportunism leads inevitably to a strategy on the part of the service centre management that will maximize his or her expected profits. There is no reason to believe that the firm's total service costs will be lower than if it dealt at arm's length with a separate service firm. If the service centre were a cost centre, on the other hand, there would be fewer reasons for the manager to engage in destructive opportunism.[7] The relative costs of using profit centres for controlling service centres whose output has credence good qualities are high. Consequently, we expect such arrangements to be rare in practice.

## V. Summary

We suggest that the primary reason for establishing profit centres is to transmit the information that is needed to control large organizations. There are costs, however, involved in using the prices that are necessary to make profit centres work. These costs become large enough to abandon the profit centre concept in much the same set of situations in which prices fail to achieve efficient allocation in real markets. For example, we suggest that setting up profit centres for the production of credence goods is dysfunctional, since no accounting system known to us could ever detect the misallocation of resources that would result from opportunism (or "moral hazard").

The importance of contingency theory is acknowledged and extended by focusing on the important role played by the budget process within the organization. We argue that accounting allocations play the important role of generating institutional information (II), which allows the actors within the firm to negotiate parameters that have many of the features of prices in external markets. These parameters, which we term II-prices, are of crucial importance for coordinating productive activity, and for extending top management's span of control.

Generally, we expect that profit centres will be found in large organizations, the output of which contains few, if any, credence properties. Moreover, we suggest that, ceteris paribus, large organizations will have more semi-autonomous units than smaller ones. Correspondingly more reliance will be placed on II-prices to cope with the limited cognitive ability of managers whose rationality is bounded, and whose span of control can therefore be augmented ultimately only in a way that they cannot individually understand, through a price mechanism.

## Footnotes

1. This is notwithstanding that most textbooks in the area of management accounting are able to distinguish the character of a profit centre or a cost centre. An example of the presumed dichotomy is provided by DeCoster, D.J. and E.G. Schafer, (1982),

   > Cost centres: Organizational units where costs naturally come together. A natural clustering of costs by functional areas. (p. 678)
   >
   > Profit centres: Organizational units where both revenues and costs naturally come together and net profit or net contribution margin are used as control measures. (p. 689)

2. Laiter, S.A., case in Barrett, M.E. and W.J. Bruns, (1982) pp. 209-220.

3. Amey, L.R. and D.A. Egginton, (1973) is a notable exception.

4. The distinction is between the process of negotiation of the budget, and the budget itself. The former establishes the parameters or IIPs in our terms. Wildavsky (1964) was the first to make the distinction between the process and the outcome.

5. Prices cannot convey information that no one knows however: prior to 1974 the fact that oil prices would soon triple was not reflected in the current prices of oil or automobiles.

6. In many ways this discussion is a theoretical analogue of the case, Shuman Automobiles Inc., Anthony and Reese (1979). A careful reading of this section will show that the problem is not resolved using transfer prices.

7. Stucturing the service department as a cost centre does not ensure an optimal result either; when we have the problem of credence goods and we organize as a cost centre, we focus on inputs alone. Unfortunately we cannot say ex ante whether the inputs are at a proper level. All we can say is that there is less incentive for destructive opportunism.

## References


Anthony R.N. and J.S. Reece, (1979), Accounting Text and Cases. R.D. Irwin and Co.

Amey, L.R., and D.A. Egginton, (1973), Management Accounting: A Conceptual Approach. Longman.

Arrow, K.J., (1964), "Control in Large Organizations," Management Science 10 (April): 397-408.

Barrett, M.R., and W.J. Bruns, (1982), Case Problems in Management Accounting. R.D. Irwin and Co.

Bodnar G., and E.J. Lusk, (1977), "Motivational Considerations in Cost Allocation Systems: A Conditioning Theory Approach," Accounting Review (October), pp 857-868.

Bryant, M.J. and D.B. Thornton, (1981), "Public Choice of Corporate Accounting Standards," Proceedings of the Canadian Academic Accounting Association.

Coase, R.H., (1937), "The Nature of the Firm," Economica New Series 4: 386-405.

Cooper, D.J., D. Hayes and T. Wolf, (1981), "Accounting in Organized Hierarchies," Accounting, Organizations and Society, Vol. 6, No. 3: 175-191.

Darby, M.R. and E. Karni, (1973), "Free Competition and the Optimal Amount of Fraud," Journal of Law and Economics 16 (April): 67-88.

Decoster, D.J., and E.G. Schafer, (1982), Management Accounting: A Decision Emphasis. Wiley.

Demski, J.S. and G.A. Feltham, (1976), Cost Determination: A Conceptual Approach. Iowa State University Press.

Hayek, F., (1945) "The Use of Knowledge in Society," American Economic Review 35 (September): 519-530.

Hayes, D.C., (1977), "The Contingency Theory of Managerial Accounting," Accounting Review (January): 22-39.

Hofstede, G., (1968), The Game of Budget Control. Van Gorcum.

Jensen, M.C. and W.H. Meckling, (1976), "Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure," Journal of Financial Economics 3 (October): 305-360.

Ross, S.A., (1973), "The Economic Theory of Agency: The Principal's Problem," American Economic Review 63 (May): 134-139.

Scapens, R.W. and J.T. Sale, (1981), "The Organizational Context of Accounting and Divisionalized Companies: An International Comparison," Proceedings of the European Accounting Association (August).

Simon, H.A., (1973), "Applying Information Technology to Organizational Design," Public Administration Review 33 (May-June: 268-278.

Simon, H.A., (1979), "Rational Decision Making in Business Organizations," American Economic Review 68: 493-513.

Smith, A., (1176), The Wealth of Nations.

Thornton, D.B., (1979), "Information and Institutions in the Capital Market," Accounting, Organizations and Society, Vol. 3, No. 2: 211-234.

Thornton, D.B., (1982), "Economic Consequences of Lease Capitalization in Canada: Implications for Standard Setting." Chapter 5 in The Nature and Role of Research to Support Standard-Setting in Financial Accounting in Canada, Clarkson Gordon Foundation.

Waterhouse, J.H. and P. Tiessen, (1978), "A Contingency Framework for Management Accounting Systems Research," Accounting, Organizations and Society, Vol. 3, No. 1: 65-78.

Watson, D.J.H. and J.V. Baumler, (1975), "Transfer Pricing: A Behavioral Context," Accounting Review (July): 466-474.

Wildavsky, A., (1964), The Politics of the Budgetary Process. Little, Brown and Co.

Williamson, O.E., (1970), Corporate Control and Business Behavior. Prentice-Hall, Inc.

Williamson, O.E., (1975), Markets and Hierarchies: A Study in the Economics of Internal Organization. Free Press.

Williamson, O.E., (1981), "The Modern Corporation: Orgins, Evolution, Attributes," Journal of Economic Literature XIX (December): 1537-68.

Zimmerman, J.L., (1979), "The Costs and Benefits of Cost Allocations," Accounting Review (July): 504-521.

CAAA 1982 Conference
University of Ottawa

Robert L. Simons, Doctoral Candidate
Faculty of Management
McGill University
Montreal, Quebec

# Control in Organizations: A Framework for Analysis*

This paper presents a typology which may be useful in classifying the variety of controls encountered in organizations. Such a typology, it is argued, is a necessary antecedent to the development of a contingency theory of control.

## Introduction

A number of writers have recently argued for the formulation of a contingency theory of control - a conceptual matching of control procedures with organizational variables (Otley and Berry, 1980; Ouchi, 1979; Waterhouse and Tiessen, 1978; Ansari, 1977; Hayes, 1977; San Miguel, 1977). This literature is a reaction to the belief, expressed by Otley and Berry, that, "the neglect of control by organisational theorists has been paralleled by the neglect of organisations by control theorists" (1980: 234).

Recognizing the necessity for understanding control within organizational contexts (Arrow, 1964; Etzioni, 1965; Jensen and Meckling, 1976), accountants have become increasingly interested in integrating their knowledge with theories of organizational structure and process. However, one of the bottlenecks encountered by accountants attempting to develop a contingency theory of control is the lack of a detailed, theoretical framework to categorize actual control procedures. Accountants have found rich contingency theories of organization which focus on independent variables such as technology (e.g., Woodward, 1965), environment (e.g., Lawrence and Lorsch, 1967), and size (e.g., Pugh et al., 1969); but attempts to graft the subject of control to these theories have been hampered since the nature of control, in organizational terms, has not yet been sufficiently clarified.

As a first step, control theorists must clearly document the recurring patterns and consistencies which make the study of control generic among diverse organizations. This requires some inductive work (Mintzberg, 1979a). As a prelude to normative contingency theories of control, observed control procedures must be systematically catalogued into a coherent, generic framework.

In many respects, organizational activities are overdetermined, subject to a surprising variety of guiding and monitoring influences which assure system stability over time (Weick, 1979). To appreciate the full range of control

---

* I wish to thank Lloyd Amey, Haim Falk, and Henry Mintzberg for helpful comments on an earlier version of this paper. The paper has also benefited from the suggestions of an anonymous reviewer.

processes within any organization, it becomes necessary to consider not only traditional monitoring procedures, but also those noncybernetic forces which represent loosely coupled controls (Weick, 1976).

There appears to be, therefore, a need for accountants to use more inclusive control typologies: this paper is an attempt to codify the variety of control processes and procedures encountered in organizations. A typology is described for classifying extant controls by reference to the type of activity being controlled, the stage and level at which control is exerted, and the operative feature of the control mode.

## A Problem of Definition

The definition of control is problematic: Rathe (1960) found some 57 connotations to the term (reported in Otley and Berry, 1980). Sociologists and organization theorists usually equate control with influence and/or power (e.g., Etzioni, 1965; Tannenbaum, 1964); management theorists, including accountants, tend to be more circumspect, generally linking control with planning, feedback, and organizational goals (e.g., Koontz and O'Donnell, 1974; Horngren, 1981).

Accountants are particularly interested in exploring the possibilities for systematic intervention in organization processes including ex ante design and the monitoring of outputs. Since, ultimately, control in organizations involves getting people to do what you want them to do, effective control must include both guidance and constraint.

Ideally, control actions are in accord with organization goals, but, as recent theories of organization suggest, teleologically based accounting and control models may be a poor mapping of reality (Swieringa, 1980). Notwithstanding this caveat, it is useful to recognize, as a minimum, the need for complex systems to maintain some level of dynamic stability (Amey, 1980). For our purposes, therefore, organizational control is concerned with the maintenance of patterns in the stream of organizational activity. These patterns may be in response to an intended, preconceived strategy or goal, or may emerge as a function of dynamic organizational tensions (Mintzberg, 1978).

## Control Types

The starting point in developing this typology is the distinction, made in the organization theory literature, between control applied at the task process stage (behavior control) and at the output stage (output control). This distinction has been made by several authors (March and Simon, 1958; Thompson, 1967; Rosner, 1968; Ouchi, 1979).

While this dichotomy, because of its generality, is of limited use to accountants in detailing appropriate procedures for internal control and management accounting systems, it may be usefully extended by considering, in addition, the nature of the task to be performed and the enabling or operative features of the control device.

Seven major categories of control are listed below (and summarized in

Table 1): it is hypothesized that these seven categories represent the major possibilities for the control by management of human effort in an organizational setting. The criterion for selection is manageability: each category represents a different type of opportunity to design or intervene in organizational processes to affect behaviors and/or outcomes. The seven control types are not meant to be mutually exclusive; in fact, individuals often experience compounding or conflicting pressures as the controls act in unison or at cross purposes.

1. Direct Surveillance and Physical Control

The first, and most direct, category of behavior control is direct surveillance allowing real time intervention. Direct surveillance is the most rudimentary type of control, yet may be highly effective. Early intervention in the production process is predicted whenever the process is easier or more important to control than the output.

Most activity of interest to managers can be conceptualized in terms of input, process, and output. If we assume, for the moment, that appropriate inputs are provided to the process, we have a choice: control the process or control the output (or both). Organizations can be expected to monitor the process on a real time basis in two situations. First, when the process is critical to the organization. Thus, two or more authorized employees are usually required to be present during the mechanical signing of paycheques in large organizations or for access to company securities held in safety deposit boxes.

The second situation in which direct surveillance is beneficial occurs when it is easier to observe the process than to attempt to control the output. The toll booths of a Montreal bridge all contain closed circuit television cameras which are monitored by the toll captain in the main bridge building. In this instance, it is far easier to observe the employees collecting fares than to attempt a later output reconciliation of massive coin receipts and lane usage statistics.

Closely tied in with direct surveillance are the myriad physical controls encountered in organizations. Guards, body checks, fences, and locks are designed to control employees' access to assets by physical constraints.

2. Programmed Feedback

The second control category, programmed feedback, refers to control processes employing formal feedback on a regular, short interval basis. Standards are set and routinely compared with observed results. Significant deviations are investigated.

Programmed feedback control is generally employed for programmed, as opposed to unprogrammed, tasks: those routine and standardized activities which are well understood (Simon, 1977). Quality control procedures are applied to routinized assembly line production activities; cost accounting variance analysis is applicable when the relationship of product input to output is known.

Programmed feedback control differs from direct surveillance in three important aspects:

i. A formal standard against which to measure performance is established (for direct surveillance, standards are in the form of contextual expectations).
ii. There is a delay ranging from hours to, say, a month before any deviation in the process is subject to scrutiny and subsequent correction.
iii. Outputs rather than processes are the units of analysis.

Programmed feedback control may be expected when it is more convenient or effective to monitor the output. Rather than trying to observe the process of a purchasing agent buying raw material on the telephone, it is far easier to calculate a material price accounting variance at the end of each period as an indication that he is securing favorable prices.

Programmed feedback control is also appropriate when output quality is critical to effectiveness. For example, the monthly balancing of accounting records ensures that the organization's informational output is computationally accurate.

The process of setting standards is central to programmed feedback: this type of control rests heavily on short-term, formal planning. Programmed feedback control standards are almost invariably ex ante. This fact reflects the relatively deterministic nature of the processes being controlled and the high cost/benefit relationship which could be expected from attempting to make the standard setting process more flexible. Also, by definition, the feedback delay is brief (an hour or a week, for example) and therefore this control mode typically exhibits high intraperiod stability, i.e., there is not sufficient time for significant change. Programmed feedback controls are predicted to predominate in the operating core of the enterprise where the stable production technology is insulated from significant uncertainties (Thompson, 1967) making ex post adjustments relatively minor.

### 3. Synoptic Feedback

Synoptic feedback (holistic review) is substantially different from programmed feedback, but it is a difference of degree: the feedback model is still central to understanding this control mode.

The defining characteristics of synoptic feedback control relate to the nature of the activity being controlled, the nature of the standards against which output is measured, and the length of the delay in information feedback.

(i) Nature of activity

This control mode is concerned with unprogrammed activities: unusual sets of problems or decisions which have not previously been encountered, problems which are complex or ill-defined, and problems which are unusually significant to the organization (Simon, 1977).

(ii) Length of feedback delay

Synoptic feedback control typically exhibits infrequent or irregular feedback and a long delay between activity and feedback. Surprise branch audits in the banking system is an example of <u>irregular</u> feedback. Annual budgeting pro-

cedures and financial audits are examples of long, but not irregular, feedback delays. Feedback delay is significantly longer than for programmed feedback control; as a result, causality becomes blurred, unplanned factors intervene, and the complexity of effective intervention increases over time.

(iii) Nature of standards

Given the nature of unprogrammed activities and the typically long feedback delays of the synoptic feedback control mode, standards are difficult to set in advance. Accordingly, this feedback mode may operate without any preset or formal standards; output may instead be compared with informal ex post expectations. The issuance of annual financial information may be a synoptic feedback mechanism for the shareholder; performance is evaluated against current expectations in light of industry and environmental conditions, relative risk, and alternatives open to the investor. There is no preset standard.

To the extent, however, that ex ante standards are desirable or necessary for purposes of motivation (Stedry, 1960) or to reduce uncertainty (Cyert and March, 1963), organizations can be expected to incorporate formal planning into synoptic feedback control. Accounting theorists have sought to overcome the deficiencies of employing ex ante standards in synoptic feedback control by investigating ways of incorporating ex post standards in this type of output control (Itami, 1977; Demski, 1980).

The authorization function is an important form of synoptic feedback (called appellate function by Simon, 1976); if a decision has important consequences for the organization, it may be submitted to a higher authority for review before action is taken. The authorization review generally focuses on unprogrammed, high level decisions. However, in certain settings, e.g. capital asset acquisition rules, it may be institutionalized to the extent that it may almost be considered programmed feedback.

From the discussion of synoptic feedback and the illustrations provided, it is apparent that this type of control often rises above the operating core of the enterprise where direct surveillance and programmed feedback are mainly directed. It is predicted that synoptic feedback is found mainly in the middle and upper echelons of the organization for it is at these levels that the unprogrammed decision activity is concentrated. It is the middle and senior managers who most often employ, and are themselves controlled by, this type of control mechanism. Synoptic feedback control, in the form of financial information releases, is the main mechanism by which shareholders control top management.

## 4. Feedforward

We now break away from the traditional feedback model by identifying feedforward control as the fourth control category. In this control mode, a formal standard is set and communicated to the individual, but there is neither a mechanism nor an intention of monitoring behavior with respect to the standard: in other words, there is no feedback loop.

Feedforward standards are always explicit: they may be formalized through codification, i.e., written down in manuals or directives, or transmitted verbally through formal training programs and briefing sessions. Examples of

codified feedforward controls are organization charts, departmental manuals, and job descriptions. These devices supply information in the form of standards to guide behavior, but are not intended as input in performance evaluation.

Feedforward control can be found throughout the organization; feedforward is intended to draw boundaries on behavior, to control the process rather than the output. For the programmed clerical activities of the operating core, operation manuals may be an important control mechanism. For members at all levels of the organization, job descriptions and organization charts may be important in prescribing activity and drawing functional organizational boundaries.

There is one important top-level unprogrammed activity which may also be tentatively considered feedforward - strategic planning. In terms of feedforward control, strategic planning can be thought of as a continuous, global, standard setting process, in which long run standards or organizational goals are communicated throughout the organization to influence behavior. Because strategic plans are subject to continuous review and revision (Beer, 1969), there is often no intention that the standard set today, the current strategic plan, will be used to monitor performance five years from now. Properly used, strategic plans are a form of feedforward control influencing the organization at its highest, adaptive level.

5. Input Control

When inputs are supplied to or withheld from an organizational unit, control is exercised at the boundary of that unit (Emery and Trist, 1960). The action of the unit can be controlled by selectively controlling the material, human, or informational inputs which the unit receives. We label this, our fifth control category, input control.

The most fundamental input control, operating at the boundary of the organization, is personnel selection (Etzioni, 1965). Considerable care may be exercised by recruiters to ensure that only individuals with organizationally acceptable qualities and characteristics are brought into the organization.

Much of the input control in organizations is related to the control of information flows at various boundaries: boundaries surrounding the individual at one extreme and the global organization at the other. One of the most important global input controls is the filtering of environmental information at the boundary of the organization. Information systems specify which environmental variables are coded for transmission within the organization: the extent and level of monitoring can be specified by managers and system designers, subject only to their ingenuity in capturing this highly textured information (Demski and Feltham, 1976; Gordon and Miller, 1976).

Within the organization, information flows are controlled so that they are selectively received by departments or individuals. This routing procedure within the organization conserves organizational attention by sending information to those best able to deal with it, but is also used to consciously conceal information as a method of controlling behaviour. Many of the so-called 'internal accounting controls' operate using this principle. The purchase

order copy sent to the receiving department has the order quantity blanked out so that the receiver, in completing his records, will be forced to manually count the goods when received; his 'independent' count is later verified against the invoice prior to payment. Transfer pricing of intermediate products within the firm is an example of controlling information between divisions in order to guide divisions to optimize production levels (Ronen and McKinney, 1970; Watson and Baumler, 1975).

Finally, input control may act to constrain physical workflows. The flow of production in a manufacturing plant or documents in an insurance company is established in advance: the inputs at each step are clearly specified through a routing process (Chapple and Sayles, 1961). By constraining workflow, behavior alternatives are also constrained to a feasible set.

Thus, for all types of input control, an attempt is made to constrain process possibilities by filtering or boosting the inputs to the process. Input control is not limited to any specific level in the organization; it is encountered throughout the organization and thus may be used by managers to influence programmed and unprogrammed behavior.

6. Social Control

Social control refers to the moulding of individual behavior as a result of interaction or affiliation with other individuals or groups. Norms provide the foundation of social control.

Most of the control from superiors, those with legitimate authority roles, is in the form of the five control modes enumerated thus far. That is, control is exercised by superiors largely through direct surveillance, programmed or synoptic feedbacks, feedforward, and input control. However, these controls all imply a reciprocal relationship between controller and subordinate (Hopwood, 1974): the controller exercises formal control over his subordinate, but that relationship implies that the subordinate will only accept to be controlled within defined limits. These limits constrain or control the behaviour of the superior.

Social control is also important when considering an individual's relationship with peers and reference groups, both internal and external. March and Simon (1958) list factors affecting the strength of group control. They hypothesize that the strength of group pressure depends on variables such as identification with the group, uniformity of group opinion, and the range of group control over the environment. One can easily multiply the complexity of the analysis by referring to the social psychology literature on conformity (see, for example, Kiesler and Kiesler, 1969).

Social control focuses on processes rather than outputs: the sanctions and guidance provided in the form of expectations and norms can be expected to provide strong signals as to appropriate task or role behavior. Social control may relate to programmed or unprogrammed behavior. At lower levels of the organization where most of the programmed activity occurs, social control may limit or bend the effectiveness of traditional programmed controls such as direct surveillance and programmed feedback. For the unprogrammed decisions and activities of the upper organizational strata, social control

may be the most important and most effective type of control. For the complex and difficult decisions made by managers at high levels, the other control modes applicable to unprogrammed activities such as synoptic feedback, feedforward, and input controls may provide little help in constraining the unprogrammed decision activity to organizationally acceptable limits.

## 7. Cultural Control

The seventh, and final, category of control to be considered is cultural control. The culture of the organization is the knowledge about the organization and its qualities which is shared by organizational members (called clan control by Ouchi, 1979 and organizational identification by Simon, 1976). Cultural control is different from social control: social control is activated by norms and the dynamics of group interaction; cultural control is anchored in the past, based on tradition. It is a textured history embedded in the beliefs of members; some would call it indoctrination.

Cultural control transcends all six control modes previously discussed. It is an ethereal control which can guide **behavior** in the absence of all other forms of influence. Belonging to an organization results in internalizing its cultural values (Simon, 1976); the qualities of an organization will determine how members perceive their role in the organization and the extent to which they are expected to be proactive or reactive in performing their functions (Pettigrew, 1979).

Cultural control is predicted to be increasingly important as we move up the organizational hierarchy. At the lowest level of the organization, the operating core, tasks are clearly specified and controlled through direct surveillance, programmed feedback, feedforward, and input control. Activity is tightly circumscribed and, although the organization culture may pervade the operating core, there is usually little need to rely on culture as a primary coordination and control mechanism. Higher in the organization, the control mechanisms become more indeterminate: there is wider latitude for individual initiative and effective control becomes more difficult. At the limit, all control mechanisms discussed so far may become completely inappropriate in guiding the behaviour of top management, which may be only indirectly answerable to shareholders. Cultural control at these levels becomes an important means of constraining and guiding acceptable behavior in such decision areas as acceptable levels of risk, amount of information search, and types of analyses conducted.

The culture of organizations is transmitted in much the same way as the culture of any society: through folktales, myths, and sagas (Clark, 1972). Another familiar means of disseminating the organization's culture to new members is the planned system of departmental rotation (Buchanan, 1974).

The culture of the organization signals its purposes, its motives, its means, its past, and its future. Organization culture broadly determines which types of activity are acceptable to the organization and which are not. Culture is the shared paradigm of organizational members (Hedberg and Jonsson, 1978): as such, it is a powerful control process in the organization and comes closest to aligning with the concept of organizational goal (Mintzberg, 1979(b)).

Table 1 Summary of Seven Control Categories

| | Category | Type of Activity | Controls | Operative | Encountered | Examples |
|---|---|---|---|---|---|---|
| (1) | Direct Surveillance | Programmed | Process | Expectations of superior | Operating core | Visual surveillance<br>Physical controls |
| (2) | Programmed feedback | Programmed | Output | Formal standards | Operating core | Time clocks<br>Time standards<br>Quality control<br>Standard cost variance analysis |
| (3) | Synoptic feedback | Unprogrammed | Output | Formal standards or expectations | Middle levels | Budgeting<br>Audits<br>Annual reports<br>Authorization review |
| (4) | Feedforward | Programmed and unprogrammed | Process | Formal standards | Operating core and middle levels Strategic Apex | Organization charts and manuals<br>Job descriptions<br>Training<br>Strategic planning |
| (5) | Input control | Programmed and unprogrammed | Input | Filtering | All levels | Personnel selection<br>Information routing<br>Workflow specification |
| (6) | Social control | Programmed and unprogrammed | Process | Norms | All levels | Peer group affiliation<br>Behaviour imposed by professional societies |
| (7) | Cultural control | Unprogrammed | Process | Tradition | Middle levels and Strategic Apex | Shared myths<br>Slogans describing company or product |

## Conclusion

Table 1 captures the essential elements of each control category: the type of activity controlled, the operative used to guide or constrain behavior, and the organizational level most likely to employ the control. In reading down the list, differences in observability, formalization, and ease of manipulation are apparent. Controls at the top of the table are for the most part deliberate controls: these are the formal rules, programs, and procedures which are embedded in organizational structure. Lower down the list are the emergent controls, such as social and cultural control, which relate to the norms and unwritten codes of behavior resulting from organizational processes and socialization.

A number of assertions have been made in this paper as to when certain types of procedures are likely to be encountered in organizations. Organizational choice is likely to depend on technical factors such as the availability and accuracy of output measures, knowledge of cause-effect relationships, opportunities to observe behavior, the cost and reversibility of errors, and the costs of monitoring. Moreover, effective control, i.e., the maintenance of patterns in organizational activity, is a function of the interaction between deliberate controls and emergent controls. Thus, a complete analysis of organizational choice would require careful consideration of motivations, rewards and sanctions, contributions and inducements, and the possible dysfunctional effects of certain control devices.

Empirical research has tended to start with a specific control process as the independent variable and study the effect on human behavior or system behavior as the dependent variable. However, starting with control as an independent variable has tended to obscure the complex (or perhaps multiplex is a better word) nature of the subject. What is now needed is to take organizational strategies, structures, and tasks as independent variables and ask what types of control result and with what effect.

Under what circumstances are different controls encountered in the organization? How do they cluster? What are their relative weights and directions? What are their advantages and disadvantages in each situation? A comprehensive theory of control must contain hypotheses concerned with control as a function of organizational context. We must begin to design fieldwork studies which can provide a global contingency framework: as a first step, we require a theoretical language broad enough to cover all major types of control and general enough to be conceptually portable from organization to organization.

The framework presented here is, of course, only one of many possible classification schemes. Organizational typologies are intended to highlight underlying similarities and differences in variables of interest; the value of this typology in helping to develop testable hypotheses is left as an empirical question.

## References


Amey, L.R. "Systems Objectives and Budgetary Control," Behavioral Science, 25 (1980), 130-139.

Ansari, S.L. "An Integrated Approach to Control System Design," Accounting, Organizations and Society, (1977), 101-112.

Arrow, K.J. "Control in Large Organizations," Management Science, (April 1964), 397-408.

Beer, S. "The Aborting Corporate Plan" in E. Jantsch, ed., Perspectives on Planning: Proceedings of the OECD Working Symposium on Long Range Forecasting and Planning, Paris: OECD, 1969.

Buchanan II, B. "Building Organizational Commitment: The Socialization of Managers in Work Organizations," Administrative Science Quarterly, (1974), 533-546.

Chapple, E.D., and Sayles, L.R. The Measure of Management, New York: MacMillan, 1961.

Clark, B. "The Organizational Saga in Higher Education," Administrative Science Quarterly, (June, 1972), 178-184.

Cyert, R.M., and March, J.G. A Behavioural Theory of the Firm, Englewood Cliffs, N.J.: Prentice-Hall, 1963.

Demski, J.S. Information Analysis, 2nd ed. Reading, Mass.: Addison Wesley, 1980.

Demski, J.S. and Feltham, G.A. Cost Determination: A Conceptual Approach, Ames: Iowa State University Press, 1976.

Emery, F.E., and Trist, E.L. "Socio-technical Systems" in C.W. Churchman and M. Verhulst, eds., Management Science: Models and Techniques, London: Pergamon, 1960.

Etzioni, A. "Organizational Control Structure" in J.G. March, ed., Handbook of Organizations, Chicago: Rand McNally, 1965.

Gordon, L., and Miller, D. "A Contingency Framework for the Design of Accounting Information Systems," Accounting, Organizations and Society, (1976), 59-69.

Hayes, D. "The Contingency Theory of Managerial Accounting," The Accounting Review, January 1977, 22-39.

Hedberg, B., and Jonsson, S. "Designing Semi-Confusing Information Systems for Organizations in Changing Environments," Accounting, Organizations and Society, (1978), 47-64.

Hopwood, A. Accounting and Human Behaviour, Englewood Cliffs, N.J.: Prentice-Hall, 1974.

Horngren, C.T. Management Accounting, 5th ed., Englewood Cliffs, N.J.: Prentice-Hall, 1981.

Itami, H. Adaptive Behavior: Management Control and Information Analysis, Studies in Accounting Research #15. Sarasota, Fla.: American Accounting Association, 1977.

Jensen, M.C., and Meckling, W.H. "Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure," Journal of Financial Economics, (October 1976), 305-360.

Kiesler, C.A., and Kiesler, S.B. Conformity, Reading, Mass.: Addison-Wesley, 1969.

Koontz, H., and O'Donnell, C. Essentials of Management, New York: McGraw-Hill, 1974.

Lawrence, P.R., and Lorsch, J.W. Organization and Environment, New York: Irwin, 1967.

March, J.G., and Simon, H.A. Organizations, New York: Wiley, 1958.

Mintzberg, H. "Patterns in Strategy Formation," Management Science, (May 1978), 934-948.

Mintzberg, H. "An Emerging Strategy of 'Direct' Research," Administrative Science Quarterly, (December, 1979a), 582-589.

Mintzberg, H. "Organizational Power and Goals" in D.F. Schendel and C.W. Hofer, eds., Strategic Management: A New View of Business Policy and Planning, New York: Little, Brown 1979b.

Otley, D.T., and Berry, A.J. "Control, Organisation and Accounting," Accounting, Organizations and Society, (1980), 231-244.

Ouchi, W.G. "A Conceptual Framework for the Design of Organizational Control Mechanisms," Management Science, (September, 1979), 833-848.

Pettigrew, A.M. "On Studying Organizational Cultures," Administrative Science Quarterly, (1979), 570-581.

Pugh, D.S., Hickson, D.J., and Hinings, C.R. "An Empirical Taxonomy of Structures of Work Organizations," Administrative Science Quarterly, (1969), 115-126.

Rathe, A.W. "Management Controls in Business" in D.G. Malcolm and A.J. Rowe, eds., Management Control Systems, New York: Wiley, 1960.

Ronen, J., and McKinney, G. "Transfer Pricing for Divisional Autonomy," Journal of Accounting Research, (Spring, 1970), 99-112.

Rosner, M.M. "Administrative Controls and Innovation," Behavioral Science, (1968), 36-43.

San Miguel, J.G. "The Behavioral Sciences and Concepts and Standards for Management Planning and Control," Accounting, Organizations and Society, (1977), 177-186.

Simon, H.A. Administrative Behavior, 3rd ed., New York: Free Press, 1976.

Simon, H.A. The New Science of Management Decision, Revised ed., Englewood Cliffs, N.J.: Prentice-Hall, 1977.

Stedry, A.C. Budget Control and Cost Behavior, Englewood Cliffs, N.J.: Prentice-Hall, 1960.

Swieringa, R.J. "Behavioral Implications of Planning and Control Systems" in H.P. Holzer, ed., Management Accounting 1980: Proceedings of the University of Illinois Management Accounting Symposium, University of Illinois at Urbana-Champaign, 1980.

Tannenbaum, A.S. "Control in Organizations: Individual Adjustment and Organizational Performance" in C.P. Bonini, R.K. Jaedicke and H.M. Wagner, eds., Management Controls: New Directions in Basic Research, New York: McGraw-Hill, 1964.

Thompson, J. Organizations in Action, New York: McGraw-Hill, 1967.

Waterhouse, J., and Tiessen, P. "A Contingency Framework for Management Accounting Systems Research," Accounting, Organizations and Society, (1978), 65-76.

Watson, D., and Baumler, J., "Transfer Pricing: A Behavioral Context," The Accounting Review, (July, 1975), 466-474.

Weick, K.E. "Educational Organizations as Loosely Coupled Systems," Administrative Science Quarterly, (March, 1976), 1-19.

Weick, K.E. The Social Psychology of Organizing, 2nd ed. Reading, Mass.: Addison-Wesley, 1979.

Woodward, J.M. Industrial Organization: Theory and Practice, London: Oxford University Press, 1965.

CAAA 1982 Conference
University of Ottawa

Daryl Lindsay
George Murphy
Harold Silvester
University of Saskatchewan
Morina Rennie
Peat, Marwick, Mitchell & Co., Regina

# INDEPENDENCE OF AUDITORS: AN EMPIRICAL STUDY OF THE ADAMS REPORT*

Independence has been formally recognized in Canada as being a necessary prerequisite to an effective audit for over eighty years (The Ontario Companies Act, 1897). The present presumed importance of auditor independence is evident in that it is considered to be one of the six fundamental principles around which the rules of professional conduct are centred (The Institute of Chartered Accountants of Saskatchewan, 1980). In addition, independence has been described as being the "sine qua non" of auditing (Calpin, 1979). Not only must an auditor be independent in fact, he must also appear to be independent in the eyes of a reasonable observer if an audit is to add credibility to a set of financial statements.

Until the past decade public confidence in the credibility of public accounting in Canada has been so widespread that auditor independence was seldom questioned. In the past ten years, however, considerable public criticism of the profession has arisen in the United States as well as in the United Kingdom and Canada. The Board of Governors of the Canadian Institute of Chartered Accountants (CICA) in April 1977, in response to the growing public concern, appointed a Special Committee to Examine the Role of the Auditor. The Committee (Adams Committee) issued its report in April 1978.

Section G of the Adams Report discussed four important current independence issues: financial involvement with clients, client size, "lower-than-usual fee" bidding, and management advisory services (Adams, 1978, pp. 54-59). This study will examine these issues in terms of their potential impact on auditor independence. In addition, the perceptions of auditors, financial analysts, and bank loan officers of these issues as determined by a survey of 400 individuals from each group will be presented. Discussion will then centre on the extent of agreement among the recommendations of the Adams Report, the rules of professional conduct and the perceptions of independence as indicated by the survey of auditors and the two user groups.

## Independence Issues in the Adams Report

### Financial Involvement with Clients

At present, legislation and the CA profession restrict or prohibit an auditor from directly or indirectly having beneficial holdings in the securities of any audit client. The Adams Committee viewed this

---

*Financial support for this study was provided by the Education Support Trust Fund founded by the Institute of Chartered Accountants of Saskatchewan. We gratefully acknowledge the anonymous reviewers for helpful comments.

prohibition as being potentially too burdensome on auditors. For example, the committee indicated that at present a public accounting firm would be in technical violation of the independence rules "if a partner anywhere in the firm had an adult son or daughter living at home who owns any securities in the firm's client or in a company in which the client has a significant interest" (Adams, 1978, p. 55). Although there is little likelihood that the auditors of a large industrial firm would conduct a substandard audit in order to profit from a small share holding in the firm, the profession appears to be concerned that such a share ownership might give the public the wrong impression of the relationship between the auditors and their clients.

Financial involvement also arises when an accounting firm becomes a creditor of the client because of nonpayment of fees. Such credit relationships may also create the appearance of lack of audit independence in the eyes of the public. The question, "is the auditor independent if the client still owes last year's audit fee?" was previously raised in Canada (Siblin, 1975). This latter credit issue as well as the general area of investment involvement were represented by four situations in the survey.

> Situation A: A partner in an accounting firm is a member of an investment club. The club owns shares in a company which is a client of the accounting firm. Neither the number nor the value of the shares purchased is material to the club or to the company.
>
> Situation B: A partner in an accounting firm has a dependent daughter living at home. The daughter has insignificant holdings in the securities of the client company.
>
> Situation C: Pursuant to a plan of recapitalization, the existing debt of the [client] company has been exchanged for five-year promissory notes. The accounting firm received the same kind of promissory note in payment of its audit fee.
>
> Situation D: An accounting firm has been engaged to perform a financial statement audit but the prior year's fees have not been paid. The client has agreed to pay 2/3 of the amount due before issuance of the current audit report and has given the firm a promissory note for the balance to be paid in 10 weekly installments starting at the approximate date of the audit report.

Client Size

When one client provides a large portion of an accounting firm's revenue, an independence problem could exist or be perceived to exist. The issue can be looked at from three perspectives. First of all, it is possible that the fees generated by one client of a multi-office firm represent a significant portion of the total firm's revenue. Many might perceive this as a threat to independence. On another level, it might be that no one client represents a significant proportion of total firm revenue but a particular office of the firm receives a large proportion of

its total fees from one client. This might be seen as no less a threat to the independence of that office than would the first situation. The third possibility is that the client does not represent a significant portion of total firm or office revenues, but that it is a major client of the partner in charge of the engagement. Again this may be considered a threat to the independence of this particular partner and to the staff involved in the audit. The issue of client size was represented by the following situation in the survey:

> Situation E: The fees paid to the accounting firm by the client company each year amount to 15%-16% of the accounting firm's total revenue.

"Lower-than-usual fee" Bidding

One of the problems with this practice identified by the Adams Committee is that it may create excessive time pressure in the early years' audits and thereby cause a lowering of audit quality. A second concern - more related to independence - which was pointed out in the report of the Commission on Auditors' Responsibilities, was that this practice is in substance a loan to the client company in the first few years to be, in effect, paid back in later years when the fees are raised. This creates an interest by the accounting firm in the client's financial success - at least until the revenue has been recouped (Cohen, 1978). A final concern with the practice is that "if national firms bid below cost until competition is eliminated in certain areas, this can have damaging effects for the public and the small practitioners (Causey, 1979). This last point may not cause direct impairment to independence but it could very easily cause the public to lose faith in the integrity of the accounting profession. "Lower-than-usual fee" bidding was represented by the following situation in the survey:

> Situation F: An accounting firm has made an arrangement with a new client company whereby audit fees will be fixed at a lower than normal rate for the first two years' audits.

Management Advisory Services

The provision of management advisory services to audit clients by public accounting firms has been perhaps the most contentious independence issue of the past two decades. At the same time, the rendering of these services has represented a steadily rising proportion of the work performed by public practitioners.

The Adams Committee advised the accounting firm to avoid taking over management's role. That is, the accountant should serve in an advisory capacity only. There are some, however, who contend that it is not easy to separate the advisory and decision-making functions. Mautz and Sharaf state, "Management wants the advice and intends to use it; advice is sought and paid for to be followed, not to be ignored. It seems folly indeed to separate advising and judgment making" (Mautz and Sharaf, 1961). Schulte adds:

> The consulting role, by its very nature, generally leads the consultant to empathize with management. . . . His professional status dictates that he endeavor to become an integral part of the decision-making process. This activity results in a subtle and delicate interplay of personalities between the consultant and management. It is an interplay that can entangle a CPA-consultant, either consciously or subconsciously, and impair his objectivity toward management (Schulte, 1966).

Another type of situation that an auditor should avoid is one that would cause the possibility of self-review. The benefit of a dispassionate review of a client's internal accounting controls may be lost if an auditor through his management advisory activities becomes too involved in systems design. Self-criticism is not easy.

Prior studies suggest that there is some problem with the appearance of independence in the provision of management advisory services to audit clients. Three management advisory situations were selected for study in this survey:

> Situation G: The controller of the client company was hired as a result of an executive recruitment service provided by the accounting firm.
>
> Situation H: 25%-30% of the total fees received by the accounting firm from the client are for the performance of management advisory services.
>
> Situation I: The accounting firm that does the annual audit was instrumental in setting up the client's accounting system.

As these situations indicate, there are a considerable number of auditor-client relationships which could cause the auditor to lose his appearance of independence. Empirical data on perceptions of auditor independence is virtually nonexistent. No evidence exists as to whether auditors agree with one another or whether there is or is not a consensus or divergence of opinion between auditors and financial statement users on these issues. To the extent that there are significant differences of opinion between the members of the profession and the selected user groups, a need may be indicated for the profession to be more sensitive to the users' opinions when developing the rules of professional conduct or to explain more fully the purpose of particular rules. It is for these reasons that the perceptions of auditors, bank loan officers and financial analysts are examined.

## Survey Data

A questionnaire was sent to a sample of public practitioners, bank loan officers and financial analysts from across Canada. The number of questionnaires mailed and completed is indicated in Table 1. The respondents were asked to respond to the following statement for each of the situations described above:

In this situation, the public accounting firm appears to be independent (able to act impartially) with respect to the financial statement audit of the client involved.

Table 2 provides a summary of each participant's response to each of the previously described situations.

Financial Involvement with Clients

The data for situations A and B in Table 2 indicate the respondents' perceptions of the two financial involvement situations. Even though the auditors tended to perceive the accounting firm as not being independent of the client, there was no consensus of opinion in either instance. Indeed, a large proportion of auditors (45% and 43% respectively) did not feel that such an involvement would create the appearance of lack of independence. There was a consensus of opinion among both the financial analysts and the bank loan officers that the audit firm appeared to be independent in each situation. The user groups do not appear to view these situations as being ones which might cause an auditor to lose his independence. The opinion of the Adams Committee that the profession's rules of conduct are unduly restrictive is accorded considerable support by both of the financial statement user groups. The divergence of opinion among the practitioners suggests that there is considerable disagreement as to whether the appearance of independence would be impacted even though the situations represent technical violations of the rules of conduct.

A large proportion of each of the respondent groups indicated that Situation C would cause an audit firm to lose its appearance of independence. The public practitioners and financial analysts had a consensus of opinion on this issue. This type of relationship is not allowed by the rules of professional conduct. The responses here do not reject the propriety of having such a rule.

The short-term financial agreement between the audit firm and client company depicted in Situation D was not viewed as adversely affecting the auditor's appearance of independence. However, there was no consensus of opinion among the financial analysts on this issue. A large proportion of this group (45 percent) were concerned about this relationship.

Client Size

The respondents' perceptions of an audit firm's appearance of independence when a single client represents 15% to 16% of the firm's total revenue is indicated in Situation E of Table 2. There was a consensus of opinion among the public practitioners that the audit firm appeared to be independent. Although the financial analysts tended to agree with the practitioners, there was no consensus among their membership. The bank loan officers tended to view the auditors as not being independent. The divergence of opinion among the financial statement user groups suggests that the concern of the Adams Committee on this issue was appropriate. It is doubtful whether there can be independence in both fact and appearance if the fees from one client make up a significant part of the total income of the firm. The profession should consider the recommendation in the

Adams Report to amend the rules of conduct regarding client size.

"Lower-than-usual fee" Bidding

There was a consensus of opinion among all three groups that the "lower-than-usual fee" bidding situation (Situation F in Table 2) would not seem to influence an audit firm's appearance of independence. The Adams Committee and the AICPA's Commission on Auditor's Responsibilities both disagree with this practice. The latter Commission reported evidence that pricing substantially below expected cost is a widespread technique for gaining new audit engagements. This low-ball bidding practice when combined with the high importance attached to meeting time budgets, means that the staff assigned to the audit may be subjected to potential pressure to reduce audit standards to improve profitability. The provincial institutes, through their professional practice review procedures, should assess whether such bidding practices do appear to impact upon the quality of audits.

Management Advisory Services (MAS)

The data in Table 2 indicate the respondents' perceptions of the three MAS situations (G, H and I) studied. As the data indicate for Situation G, the consensus of opinion among all three groups is that this example of executive recruitment will not adversely impact upon an audit firm's appearance of independence. Although the AICPA's Commission on Auditors' Responsibilities suggests that this type of practice be stopped, the Adams Committee did not exhibit a great deal of concern over the issue. The results of this study support the Adams Committee opinion.

The data for Situation H (see Table 2) indicate that public accountants commonly do not view this situation as being one which would impact unfavourably upon their appearance of independence. Although the two financial statement user groups tend to agree with the public practitioners, there is nevertheless a large number (45% of the financial analysts and 42% of the bankers) who view the situation with disfavour. This would indicate a cause for concern considering that there is no rule against such a practice. The results of this study indicate that many financial statement users will doubt independence where such a large proportion of the revenue from one client is derived from the performance of MAS. Perhaps the rule-making bodies in Canada should take another look at this issue and consider setting a limit as to how large a proportion of the fees from an audit client may be generated from providing MAS.

All three groups had a consensus of opinion that setting up a client's accounting system and then performing the annual audit would not give the audit firm the appearance of lacking independence (Situation I, Table 2). The AICPA's Commission on Auditors' Responsibilities investigated this issue in depth and concluded that "there is no evidence that provision of services other than auditing had actually impaired the independence of auditors (Cohen, 1978, p. 92).

## Summary and Conclusions

The perception of lack of independence has been widely cited as a significant element in the decline of the auditor's public image. In this

paper, we have reviewed key independence issues addressed by the Adams Committee and have gathered empirical data to appraise auditors and financial statement users' perceptions of the issues. The financial analysts and the bank loan officers did not view the direct or indirect beneficial holding of insignificant investments in clients (Situations A and B) as impinging on the auditor's independence. The auditor and user groups concurred that the long-term financing arrangement between audit firm and client (Situation C) could cause an audit firm to lose its appearance of independence., For the most part, the short-term financing arrangement depicted in Situation D was not viewed as one which would cause an auditor to appear to lack independence. There was a considerable divergence of opinion as to whether the existence of a single client of considerable financial importance to an audit firm (Situation E) might cause an auditor to lose his appearance of independence. The Adams Committee concerns on this issue seem to be well-founded. The "lower-than-usual fee" bidding issue (Situation F) was not viewed with disfavour by any group, even though it had been challenged in other studies due to its potential impact on audit quality. Executive recruitment and the designing of clients' accounting systems were not viewed as management advisory services which might cause an auditor to appear to lack independence. However, the financial statement users did express concern when the MAS revenue from a single client became a significant part of an audit firm's total revenue.

Independence in appearance has received growing attention in the literature. Different users and different groups of users have different concepts of what constitute independence. There appears to be an observable gap between the perceptions of public practitioners and user groups in Canada regarding a number of key independence issues. We believe that the opinions of financial statement user groups should be considered when the appropriate committees of the profession are drafting the rules of conduct. The profession should also consider initiating a program to promote a better understanding of the rules of professional conduct.

TABLE 1

PARTICIPATION OF SYSTEMATICALLY CHOSEN SUBJECTS

| | Public Accountants | Financial Analysts | Bank Loan Officers | Total |
|---|---|---|---|---|
| Original sample | 400 | 400 | 400 | 1,200 |
| Less: | | | | |
| - not locatable | 9 | 4 | 1 | 14 |
| - considered themselves unqualified to respond | - | 2 | 1 | 3 |
| - no longer in public practice | 4 | - | - | 4 |
| Adjusted sample | 387 | 394 | 398 | 1,179 |
| # of respondents* | 191 | 163 | 102 | 456 |
| Response rate | 48% | 41% | 26% | 38% |

*The number of responses for some of the individual situations is less than this total because some respondents did not give an answer for every situation.

TABLE 2

SUMMARY OF PARTICIPANT RESPONSE

| Situation | Perception | Public Practitioners # | Public Practitioners % | Financial Analysts # | Financial Analysts % | Bank Loan Officers # | Bank Loan Officers % |
|---|---|---|---|---|---|---|---|
| A | Agree | 86 | 45 | 122 | 75 | 70 | 69 |
| | Disagree | 105 | 55 | 40 | 25 | 32 | 31 |
| | Total | 191 | 100 | 162 | 100* | 102 | 100* |
| B | Agree | 82 | 43 | 125 | 77 | 73 | 73 |
| | Disagree | 109 | 57 | 37 | 23 | 27 | 27 |
| | Total | 191 | 100 | 162 | 100* | 100 | 100* |
| C | Agree | 79 | 42 | 55 | 34 | 42 | 42 |
| | Disagree | 111 | 58 | 105 | 66 | 59 | 58 |
| | Total | 190 | 100* | 160 | 100* | 101 | 100 |
| D | Agree | 143 | 75 | 89 | 55 | 72 | 71 |
| | Disagree | 48 | 25 | 73 | 45 | 30 | 29 |
| | Total | 191 | 100* | 162 | 100 | 102 | 100* |

Table 2 - continued

| Situation | Perception | Public Practitioners # | Public Practitioners % | Financial Analysts # | Financial Analysts % | Bank Loan Officers # | Bank Loan Officers % |
|---|---|---|---|---|---|---|---|
| E | Agree | 133 | 70 | 86 | 53 | 39 | 41 |
| | Disagree | 58 | 30 | 76 | 47 | 57 | 59 |
| | Total | 191 | 100* | 162 | 100 | 96 | 100 |
| F | Agree | 132 | 69 | 103 | 64 | 79 | 78 |
| | Disagree | 59 | 31 | 57 | 36 | 23 | 22 |
| | Total | 191 | 100* | 160 | 100* | 102 | 100* |
| G | Agree | 182 | 95 | 123 | 76 | 70 | 69 |
| | Disagree | 9 | 5 | 40 | 24 | 31 | 31 |
| | Total | 191 | 100* | 163 | 100* | 101 | 100* |
| H | Agree | 156 | 82 | 88 | 55 | 59 | 58 |
| | Disagree | 34 | 18 | 73 | 45 | 42 | 42 |
| | Total | 190 | 100* | 161 | 100 | 101 | 100 |
| I | Agree | 188 | 98 | 138 | 86 | 91 | 89 |
| | Disagree | 3 | 2 | 23 | 14 | 11 | 11 |
| | Total | 191 | 100* | 161 | 100* | 102 | 100* |

*Indicates a consensus of opinion. Perceptions of auditor independence were examined by the use of a binomial test between agreement and disagreement. Lack of consensus was defined to be where P (the number of respondents showing agreement with the statement) = Q (the number of respondents showing disagreement with the statement) = .5. Under the binomial test, the probability that the observed proportions could result under the given null hypothesis (P=Q=.5) was calculated. If the probability of this occurrence was less than 5%, then the null hypothesis was rejected and it was concluded that the group of respondents did have some consensus of opinion on the issue presented.

## Selected References

Berryman, R., "Auditor Independence: Its Historical Development and Some Proposals for Research." Contemporary Auditing Problems - Proceedings of Kansas Symposium on Auditing Problems, ed. Howard Stettler, Kansas: University of Kansas Printing Service, 1974, 1-15.

Caplin, M., Understanding Audits and Audit Reports, Toronto: CICA, 1979.

Commission on Auditors' Responsibilities, Report, Conclusions, and Recommendations, New York: The Commission on Auditors' Responsibilities, 1978.

Dermer, J., Evans, M., and Pick, T., "The Compatibility of Auditing and

Management Services." Canadian Chartered Accountant, 104 (January, 1971) 20-25.

Firth, M., "Perceptions of Auditor Independence and Official Ethical Guidelines." Accounting Review, LV (July, 1980) 451-466.

Hartley, R., and Ross, T., "MAS and Audit Independence: An Image Problem." Journal of Accountancy, 134 (November, 1972) 26-32.

Imhoff, E., "Employment Effects on Auditor Independence." Accounting Review, LIII (October, 1978) 869-81.

Institute of Chartered Accountants of Saskatchewan, "Rules of Professional Conduct." Member's Handbook, pp. 501-17.

_____, "Interpretations by the Council." Member's Handbook, pp. 601-37.

Klion, S, "MAS Practice: Are the Critics Justified?" Journal of Accountancy, 145 (June, 1978) 72-78.

Lavin, D. "Financial Statement Users' and Accountants' Perceptions of the Independence of the Auditor in Selected Client-Auditor Relationships." Unpublished Ph.D. dissertation, University of Illinois, 1974.

_____, "Perceptions of the Independence of the Auditor." Accounting Review, LI (January, 1976) 41-50.

Pany, K., and Reckers, P. "The Effect of Gifts, Discounts, and Client Size on Perceived Auditor Independence." Accounting Review, LV (January, 1980) 50-61.

Schulte, A., "Compatibility of Management Consulting and Auditing." Accounting Review, XL (July, 1965) 587-93.

_____, "Management Services: A Challenge to Audit Independence." Accounting Review, XLI (October, 1966), 721-28.

Seigel, S., Nonparametric Statistics for the Behavioral Sciences, New York: McGraw-Hill Book Company, Inc., 1956.

Shockley, R., "An Experimental Investigation into the Perceived Audit Independence of Certified Public Accountants." Unpublished Ph.D. dissertation, University of North Carolina, 1979.

Siblin, H., "Independence and the Public Practitioner." CA Magazine, 108 (June, 1975) 35-38.

Special Committee to Examine the Role of the Auditor, "The Report of the Special Committee to Examine the Role of the Auditor." CA Magazine, 111 (April, 1978) 35-67.

Titard, P., "Independence and MAS - Opinions of Financial Statement Users." Journal of Accountancy, 133 (July, 1971), 47-52.

# INDUSTRIAL CONCENTRATION AND THE INFORMATIONAL CONTENT OF FINANCIAL STATEMENTS

CAAA 1982 Conference
University of Ottawa

Daniel Zeghal
University of Ottawa

## Introduction

The hypothesis that accounting data possesses characteristics that differentiate them from one industry to the next is generally accepted by the users and analysts of accounting information and supported by a great number of empirical studies. The major conclusions of these studies may be summed up in the following three points:

1. significant industry differences in ratio exist [Bowen and Huber, 1972];
2. explicitly considering the industry factor would make for better forcasting, as, for example, in the case of accounting profit [Ball and Brown, 1968; Magee, 1974];
3. the inter-industry differences in accounting data could be explained by the economic characteristics of the industries, such as the degree of concentration [Weiss, 1971; Stigler, 1963; Bain, 1951].
4. there is a significant information transfer between the financial statements release firm and the other firms in its industry [Firth, 1976; Foster, 1981].

In this paper, we shall attempt to evaluate the effect of the industry factor on the utility for investors of the information contained in financial statements in making investment decisions on the capital market.

More specifically, we shall attempt to answer the following two questions:

1. Are there significant differences between the informational content of the financial statements of firms belonging to different classes of industry?
2. If so, what characteristics of the industry could explain these differences?

In the first section of this paper, we shall discuss the principles of market structure and look at the role of information in decision-making. In the second section, the implications for the evaluation of financial statements by the capital market will be discussed. The hypothesis to be tested and methodology in part three will be related to the evaluation of the informational content of financial statements discussed in the fourth section. Finally, in the fifth section, we shall analyze the effect of the industry factor and industrial concentration on the informational content of financial statements.

## I. Market Structure and Information

### 1. Pure Competition

Under pure competition, the number of firms is so large and each individual firm's share of the market so small that no firm finds itself able perceptibly to influence the overall market price by altering the quantity of output it supplies.

Adjustment to new information takes place impersonally, uniformly and without delay. For example, a change in the price of inputs in a competitive system is automatically transformed into a change in the price of outputs. In this context, the price system is seen as a communication and information mechanism [Hayeck, 1945].

Furthermore, the rather high number of participants in the market cannot but favour the production and dissemination of new information. The characteristics of a competitive market in combination with the fact that information is considered public property results in all new information having the same utility for all participants in the market.

In short, the price mechanism and the number of participants in a competitive market favor the production, dissemination and analysis of information. In this context of well-informed participants and prices that reflect all available information, it is easier to assess anticipation in the case of competitive firms.

2. Oligopolistic competition

Pure monopolists, oligopolists, and monopolistic competitors share a characteristic diametrically opposed to that of the pure competitor: each recognizes that his output decisions have a perceptible influence on price.[1] Some oligopolistic industries appear to maintain prices approximating those a pure monopolist would find more profitable. Others gravitate toward bitter price warfare. Recognizing the wide range of behavior predicted by theory and actually observed, some economists have concluded that the oligopoly problems is indeterminate. This is correct, at least in the sense that price equilibria cannot be linked to cost and demand conditions in any unique and compelling mechanistic way.

What are the informational implications of the oligopolistic system?

The characteristics which demarcate an oligopolistic market from a competitive one also mark the difference in available information and its role in the two markets. These characteristics include fewer participants and more interdependence among them, a complex price mechanism and personal decisions.

i) A smaller number of participants:

In general, the number of participants in an oligopolistic market is smaller than in a competitive market. We can expect, therefore, that the quantity of information produced and disseminated by participants in an

---

1. It would be of little use within the scope of our study, to consider the case of a monopoly for the following reasons:

   i) the irrelevance of the concept of industry when it is represented by a single firm;
   ii) the fact that a monopoly may be subject to regulation;
   iii) methodological problems such as identifying the monopoly and calculating and compiling the rate of concentration.

oligopolistic market will be less, other things equal, than in a competitive market.

ii) Complex price mechanism and decision-making:

With rivalry among the few, each firm recognizes that its best choice depends upon the choices its rivals make. In the real world, prices do not reflect the information available because of the strategic aspect of decision-making by oligopolistic firms and because these firms generally prefer stable prices.

Adjustment to new information by an industry and its oligopolistic firms usually takes place unpredictably and over the long term. Several strategic attitudes, such as inventory and order backlog fluctuation and hair-trigger price, allow oligopolistic firms to postpone their reaction to new information, as, for example, to a change in the price of outputs.

When market concentration is high, the pricing decisions of sellers are interdependent and the firms involved can scarcely avoid recognizing their mutual interdependence. Their decisions depend, then, on the assumptions they make about the decisions and reactions of rivals, and many possible assumptions may be entertained. This interdependence has several implications for the production and dissemination of information. First, oligopolistic firms cannot conclusively evaluate the effect of new information on their decisions without knowing or antitipating the decisions of rival firms. This context cannot but discourage the disclosure of information by these firms, information which is considered a comptetitive tool. Furthermore, for the outside observer, the interdependence of firms makes it difficult, if not impossible, to evaluate the effect of new information on the market and the decisions of participating firms.

Also because of the relatively smaller number of participants in oligopolistic industries and because of the strategic nature of information in these industries, there is relatively less information available, other things equal, in an oligopolistic than in a competitive market. Furthermore, because of the interdependence of participants and the complexity of the price mechanism, the production and dissemination of information in an oligopolistic context is not a very profitable undertaking.

In brief, it is in part because of the complexity and randomness of the analysis of oligopolies that information processing poses such a difficult problem and make any attempt at forecasting difficult and almost useless.

The amount and availability of information are the bases of a competitive system. They are particularly favored by a greater number of participants than in an oligopolistic market. Furthermore, the characteristics, functioning and impersonal mechanisms of the competitive market favor the disclosure and dissemination of new information. In contrast, in an oligopolistic system, information is a competitive weapon and consequently its disclosure and dissemination are greatly handicapped.

The independence of participants and the uniqueness and simplicity of the solution - as opposed to the interdependence of participants and the complexity of solutions in an oligopolistic system - facilitate the analysis and integration of all new information into prices and investors' expectations in firms operating in a competitive system. This makes more attractive the opportunities of producing and disseminating information on these industries and the firms involved in them.

## II. Implications on the Evaluation of Accounting Information on the Capital Market.

The above analyses deal mainly with the production and dissemination of information in general and its utility in terms of decision-making in competitive and oligopolistic markets. The rest of this paper will focus on accounting information in particular, or more precisely on the informational content of financial statements. At this point, it would be useful to recall the historical nature of accounting information. According to Gonedes [1972] the accounting numbers issued by any firm reflect events that impinged upon the firm's operations. Such events include those that occur within the factor-input markets regarding which the firm is a transactor, and those that occur within the output markets of the firm. These kinds of events may be mainly specific to a particular industry. Finally, some of the events that influence a firm's operations may be specific to that firm. On the capital market the major goal of accounting information is to confirm the expectations of investors or to cause them to revise or adjust their expectations. The fact that it is concerned with events which have already happened, reduces to a minimum, not to say eliminates, the problems of interpreting and forecasting mentioned earlier in the context of oligopolistic firms. The value of accounting information in the context described earlier is most affected by the proportion it constitutes of the total information, by the availability of substitutes and complements [Gonedes, 1972, 1978], and by the difficulty or ease with which one can process, interprete and evaluate the implications of all the information available. The effect of industrial structure on information production, dissemination and utilization in general has been described. What is the effect of industrial structure on the informational content of accounting information?

The discussion to this point reflects the author's belief that the publication of accounting information in financial statements of firms belonging to competitive industries adds relatively little information that investors could not already have anticipated and integrated into prices, as compared to the information content of oligopolistic firm's financial statements. More specifically, we expect the informational content of financial statements to be affected by the level of concentration of the industries with which they are concerned. Our next task is to empirically test this hypothesis.

## III Methodologie

### 1. Sample Selection

This study is based on a sample of 16,119 announcements of the publication of quarterly and annual financial statements for 1,402 companies for the years 1973, 1974 and 1975.

The sample includes all the firms listed on the New York and American Stock Exchanges which met the following criteria:

a) The returns were available in the Centre for Research in Security Prices (CRSP) data bank for the period 1/1/69 to 31/12/75.
b) The financial data were available in the 1976 version of the COMPUSTAT data bank.
c) The company did not changed industry (4 Digit SIC Code) during the period.

Other conditions had to be met for a company to be included in one or more of the sub-periods:[2]

d) The company had at least two annoucements of financial statement publication in the Wall Street Journal for each of the sub-periods considered, namely 1973, 1974 and 1975.
e) Observations on the relative returns for the day of publication of the financial statement announcements, and for the day immediately before and the day immediately after, were available for at least two financial statements in the same sub-period.
f) The number of missing return observations did not exceed ten during the formation period, or five during the estimation period.[3]

Taking into account the above restrictions, the number of companies in each subperiod is: 1973: 1303 companies; 1974: 1337 companies; 1975: 1362 companies.

Some of the major characteristics of this sample are:

i. The companies belonged to more than 200 groups of four-digit industries (according to the Standard Industrial Classification). Table no. 1 gives a description of the sample according to the industry classification.
ii. The fiscal period of 882 out of total of 1402 companies ended December 31.
iii. 389 companies out of a total of 1402 were listed on the American Stock Exchange (AMEX).

2. Identification of the Publication Dates of the Financial Statement Announcements.

The publication dates of the financial statement announcements were taken from the Wall Street Journal Index, and only the doubtful cases were checked in the newspaper itself.

3. Measurement of Industrial Concentration

In this study, market value of common stock was chosen as the measure of size of the firms because of its relevance to the subject discussed[4], and the Herfindahl index was adopted to measure the level of concentration in the industries.

4. Definition and Evaluation of Information

For the purpose of this study, the definitions of information are essentially those adopted by Beaver [1968]. There are two possible measures for the informational content of financial statements: 1) relative stock return variability and 2) relative volume.

2. A sub-period is equivalent to one year; thus there are three subperiods corresponding to the years 1973, 1974 and 1975.

3. Period of formation and period of estimation or analysis will be defined further on.

4. According to Stigler [1968], "two firms are equal in a market if they sell or buy equal quantities in that market. Hence measure a firm's size by sales in a product market, by employees in a labor market, by materials in a material market, by asset in a capital market". p. 30.

## 4.1. Informational content in Terms of Return

It is generally accepted in the financial and accounting literature that the informational content of a new piece of information on the capital market should be evaluated in terms of abnormal return [Fama, et.al., 1969; Gonedes and Dopuch, 1974.]

Usually, the abnormal return of a security is determined by the difference between its normal return, as defined by the risk-return relationship, and its actual return. Normal return will be estimated by a multiple regression of observed returns of a security on previous, synchronous and sebsequent market return. (An equally weighted index for all the firms on CRSP is calculated for market return). This approach was suggested by Scholes and Williams (1977) and by Dimson (1979), and seems to be more appropriate in the case of daily returns. The abnormal return is defined by the difference between the observed security return and its abnormal return:

$$\hat{u}_t = \hat{R}_t - R_t. \tag{1}$$

**Estimation of the Information content.**

The information content based on abnormal returns is estimated by the ratio of the variance of abnormal returns during the announcement period to the variance of abnormal returns during the rest of the analysis period,

$$\Phi_i^r = v_i^r / V_i^r \text{ or } \frac{\text{Var}[\hat{u}_{it},\ t \in A]}{\text{Var}[\hat{u}_{it},\ t \in A^c]} \tag{2}$$

where A is the set of announcement days in the period analyzed. In this study, the announcement period is equal to three days, namely the publication day of the financial statement announcement in the Wall Street Journal ($t = 0$), the day before the announcement day ($t = -1$) and the day after ($t = +1$). $A^c$ represents all the other days in the analysis period.

## 5.2 Informational content in Terms of Volume of Transactions

The measure of informational content of financial statements based on volume of transactions is similar to the measure developed on the basis of return. Essentially, the mean volume of transactions during the announcement period is compared to the mean volume of transactions during the rest of the period. This ratio is calculated using the following notation:

$q_{it}$ = volume of transactions for firm i on day t, adjusted for splits,
TA = The number of announcement days,
$TA^c$ = The number of all the other days in the analysis period,

$\bar{q}_i = \frac{1}{TA} \sum_{t \in A} q_{it}$ is the mean volume of transactions during the announcement period, and $\bar{Q}_i = \frac{1}{TA^c} \sum_{t \in A^c} q_{it}$ is the mean volume of transactions during the rest of the period.

The ratio $\Phi_i^v = \bar{q}_i/\bar{Q}_i$, based on volume of transactions, is the second measure of informational value.

The purpose of using ratios to calculate the value of information based on return and on volume of transactions is to control for any bias related to the firm in the information evaluation procedures.

### 5.3. Test of the Hypothesis Concerning the Informational content of Financial Statements

This hypothesis must be tested before going on to the other stages of this study, that is before examining the relationship between industry and the informational value of financial statements.

If there has been no unusual activity during the announcement period, the information ratio based on the adjusted returns for the periods $t \epsilon A$, that is: $\frac{Var[\hat{u}_{it},\ t \epsilon A\ ]}{Var[\hat{u}_{it},\ t \epsilon A^c]}$, will be equal to 1.0. The same holds true for the information ratio based on the volume of transactions and calculated for the same periods. The means of $\Phi_i^r$ and of $\Phi_i^v$ calculated under the same conditions will each equal 1.0.

The variables $\Phi_i^r$ and $\Phi_i^v$ may be regarded as two statistical variables for which observations may be drawn from the firms in the sample.

For example, the ratio $\Phi_i^r$, for firm i, shows the relationship between the price change during the announcement period and the average price change during the analysis period.

The main hypothesis concerning the informational value of financial statements is formulated in the following set of constituent hypotheses:

$$H_o: \bar{\Phi}^r = 1.0\ ;\ \bar{\Phi}^v = 1.0,$$

financial statements have no informational content useful to investors; and

$$H_1: \bar{\Phi}^r > 1.0\ \ ;\ \bar{\Phi}^v > 1.0,$$

financial statements have informational content useful to investors.

The mean of $\Phi^r$ is 1.74 and the mean $\Phi^v$ is 1.34; the standard deviations are 1.62 and .797 respectively, the values of t are 33.22 for $\Phi^r$ and 31.05 for $\Phi^v$. [8]

Since the two values are significantly greater than the critical value of t for a one-tailed interval with a 99% degree of confidence ($t = 2.57$), the null hypothesis is rejected, and the hypothesis that the means of the two ratios are greater than 1.0 is accepted. Therefore, the hypothesis that the publication of financial statements has a certain informational content for investors is supported by the results of this test.

Although the high value of t leaves no doubt that the significance of the test could not be due only to a distribution bias, Table 2 seems to indicate a slight asymmetry to the right in the two distributions.

## IV. Test for the Hypothesis Concerning the Effect of Industry on the Informational content of Financial Statement

The two constituent hypotheses are the following:

$H_0$ : the mean industry informational ratio is the same for all (n) industries;

$H_1$ : at least one industry mean informational ratio is significantly different from the other (n-1) industry mean informational ratios.

To test the null hypothesis, that industry has no effect on the informational value of financial statements, a one-way parametric analysis of variance was chosen.

For this analysis, we have chosen different selection criteria for industries, based on the companies that make them up: starting with the lowest criteria of two or more companies and adding one company per industry at a time until the highest critercum, sixteen companies or more, is reached. In all there are fifteen analyses. This procedure enables us to avoid results biased by the underrepresentativity of certain industries or by the elimination of certain industries. Moreover, it affords us the opportunity to observe the stability of the relation through different combinations of industries. Using the lowest criterion, the analysis is based on 149 industries and a total of 2872 companies, and using the highest, the figures are 23 and 970 respectively. The results of these analyses are shown in Table 3, and confirm, in general, the effect of industry on the informational value of financial statements. Indeed, all the values of F are significant.

Thus, the null hypothesis, that industry has no effect on the informational content of financial statements, is rejected, and the alternative hypothesis, that the informational content of financial statements is affected by industry, is supported. It now remains to be verified whether this effect can be explained by the concentration of the industries analysed. This will be done in the following section.

## IV. Test for the Hypothesis Concerning the Effect of Industrial Organization on the Informational Content of Financial Statements

According to the results we have just presented, the industry seems to have a significant effect on the informational content of a firm's financial statements. We shall now attempt to explain the inter-industry differences in the informational value of financial statements and to determine their nature.

Based on the analyses outlined in section 1, we expect to confirm the hypothesis that the financial statements of firms belonging to concentrated industries have a higher informational content than financial statements of firms belonging to competitive industries.

---

5. 1, 2, 3 and n stand for the different industries in the sample.

The hypothesis is formulated as follows:

$H_0$: there is no relation between informational content and industrial concentration;

$H_1$: financial statements of firms in concentrated industries, at the time of announcement publication, have greater informational content than the financial statements of firms in competitive industries.

To test the null hypothesis, that industrial concentration has no effect on the informational content of financial statements, an analysis of variance and a regression analysis were chosen.

Analysis of variance:

Three levels of concentration are adopted and the hypothesis is formulated as follows:[6]

$$H_0: \bar{\Phi}^r_w = \bar{\Phi}^r_m = \bar{\Phi}^r_h \; ; \quad \bar{\Phi}^v_w = \bar{\Phi}^v_m = \bar{\Phi}^v_h$$

The null hypothesis is that the level of concentration has no effect on the informational content of financial statements.

$$H^c_0: \bar{\Phi}^r_w = \bar{\Phi}^r_m = \bar{\Phi}^r_h \; ; \quad \bar{\Phi}^v_w \neq \bar{\Phi}^r_m \neq \bar{\Phi}^r_h$$

What is especially interesting in $H^c_0$ is the case in which the $\Phi^r(\Phi^v)$ mean for weak level of concentration industries is smaller then $\Phi^r(\Phi^v)$ mean for the group of medium level of concentration industries, which in turn is smaller than $\Phi^r(\Phi^v)$ mean for the high level of concentration industries, that is;

$$H_1: \bar{\Phi}^r_w < \bar{\Phi}^r_m < \bar{\Phi}^r_h \; ; \quad \bar{\Phi}^v_w < \bar{\Phi}^v_m < \bar{\Phi}^v_h$$

If this is true, the hypothesis that industrial concentration has no effect on the informational content of financial statements is rejected, and the alternative hypothesis, that industrial concentration has a positive effect on the informational content of financial statements is supported.

Table 4 shows the information on which the analysis of variance is based and the results for different subsets of data; the two values of F are generally highly significant and thus seem to be consistent over all the subgroups analyzed.

Thus, the null hypothesis, that the level of concentration has no effect on the informational content of financial statements, is rejected and the alternative hypothesis that the informational content of financial statements is positively affected by the level of concentration, is supported. In fact the $\Phi$ means for the groups of weak concentration are consistently smaller than those for the groups of high concentration. Similarly, the same trend is present in the analysis based on $\Phi^v$.

---

6. w, m and h stand for the levels of concentration weak, medium and high respectively.

## Conclusion

In this study, we have attempted to determine and analyze the effect of industries on the informational content of the financial statements of the firms that publish them. On the theoretical plane, we have established a relation between the industrial organization of markets and the amount of information available on these markets. This analysis is closely akin to the idea that perfect competition is generally based on perfect information, the same as perfect information is associated with perfect competition.

In this context, in particular because of the characteristics of accounting information, we have put forward the hypothesis that the publication of the financial statements of firms belonging to industries in a competitive system provide less information than the publication of financial statements of firms belonging to industries in an oligopolistic system.

The results of this research based on variance analysis and regression analysis fully support this hypothesis.

The results of this study have very important implications for the role of accounting information and the regulation of information production. Firstly, concerning the role of accounting information, the information in financial statements seems to have a valuable informational content on the industries to which the firms belong. This informational content increases in importance as the conditions of pure competition and perfect information deteriorate; it may be interesting to try to define more explicitly the role of the accounting information in determining the equilibrium of the goods market. Secondly, concerning the regulation of accounting information, it would be advisable to take into account not only the characteristics of the firm but also the characteristics of the industry in which it operates, when developing policies on the production and disclosure of accounting information.

Table n° 1
Firm frequency by industry

| Number of firms by industry | Number of industries | Total of firms | Cumulative |
|---|---|---|---|
| 1 | 30 | 30 | 30 |
| 2 | 35 | 70 | 100 |
| 3 | 35 | 105 | 205 |
| 4 | 18 | 72 | 277 |
| 5 | 12 | 60 | 337 |
| 6 | 12 | 72 | 409 |
| 7 | 13 | 91 | 500 |
| 8 | 10 | 80 | 580 |
| 9 | 7 | 63 | 643 |
| 10 | 7 | 70 | 713 |
| 11 | 4 | 44 | 757 |
| 12 | 1 | 12 | 769 |
| 13 | 1 | 13 | 782 |
| 14 | 2 | 28 | 810 |
| 15 | 5 | 75 | 885 |
| 16 | 1 | 16 | 901 |
| 17 | 2 | 34 | 935 |
| 18 | 1 | 18 | 953 |
| 19 | 1 | 19 | 972 |
| 20 | 1 | 20 | 992 |
| 22 | 2 | 44 | 1036 |
| 23 | 2 | 46 | 1082 |
| 24 | 2 | 48 | 1130 |
| 26 | 1 | 26 | 1156 |
| 27 | 1 | 27 | 1183 |
| 29 | 1 | 29 | 1212 |
| 30 | 2 | 60 | 1272 |
| 67 | 1 | 67 | 1339 |
| Total | 210 | 1339 | 1339 |

Table N° 2

SUMMARY OF THE DISTRIBUTION FOR THE VARIABLES $\phi^r$ and $\phi^v$

| FRACTILE | $\phi^r$ | | $\phi^v$ | |
|---|---|---|---|---|
| | Mean | Std.Dev. | Mean | Std.Dev. |
| 0.025 | .315 | .087 | .486 | .105 |
| .05 | .402 | .109 | .567 | .112 |
| .1 | .575 | .170 | .707 | .142 |
| .25 | .812 | .281 | .870 | .198 |
| .50 | 1.089 | .472 | 1.026 | .280 |
| .75 | 1.343 | .728 | 1.153 | .388 |
| .90 | 1.472 | .897 | 1.214 | .461 |
| .95 | 1.561 | 1.042 | 1.259 | .532 |
| .975 | 1.632 | 1.210 | 1.295 | .654 |
| 3702 observations | 1.74 | 1.62 | 1.34 | .797 |
| t calculated | 33.22 | | 31.05 | |

Table n° 3
Results of Variance Analysis for the Variables $\Phi^r$ and $\Phi^v$
according to industrial classification

| Number of firms by industry | Number of group | Total of observations analysed | Value of F | | Significance level | |
|---|---|---|---|---|---|---|
| | | | $\Phi^r$ | $\Phi^v$ | $\Phi^r$ | $\Phi^v$ |
| ≥ 2 | 446 | 2872 | 1.516 | 1.626 | 0.0001 | 0.0000 |
| ≥ 3 | 408 | 2796 | 1.518 | 1.585 | 0.0001 | 0.0000 |
| ≥ 4 | 263 | 2361 | 1.549 | 1.504 | 0.0002 | 0.0004 |
| ≥ 5 | 191 | 2073 | 1.621 | 1.699 | 0.0002 | 0.0000 |
| ≥ 6 | 141 | 1823 | 1.822 | 1.790 | 0.0000 | 0.0001 |
| ≥ 7 | 120 | 1697 | 1.824 | 2.038 | 0.0001 | 0.0000 |
| ≥ 8 | 93 | 1508 | 2.006 | 2.993 | 0.0000 | 0.0000 |
| ≥ 9 | 69 | 1316 | 2.447 | 2.753 | 0.0000 | 0.0000 |
| ≥ 10 | 69 | 1253 | 2.528 | 2.854 | 0.0000 | 0.0000 |
| ≥ 11 | 45 | 1083 | 2.856 | 4.282 | 0.0000 | 0.0000 |
| ≥ 12 | 45 | 1083 | 2.856 | 4.282 | 0.0000 | 0.0000 |
| ≥ 13 | 44 | 1071 | 2.934 | 4.436 | 0.0000 | 0.0000 |
| ≥ 14 | 42 | 1045 | 2.850 | 3.691 | 0.0000 | 0.0000 |
| ≥ 15 | 42 | 1045 | 2.850 | 3.691 | 0.0000 | 0.0000 |
| ≥ 16 | 37 | 970 | 3.131 | 4.046 | 0.0000 | 0.0000 |

Table n° 4

RESULTS OF VARIANCE ANALYSIS FOR THE VARIABLES $\Phi^r$ AND $\Phi^v$

ACCORDING THE LEVEL OF CONCENTRATION

| Number of firms by industry | Number of group | Total of observations | $\Phi^r$ | | | | $\Phi^v$ | | | | Value of F | | Significance Level | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | I | II | III | Total | I | II | III | total | $\Phi^r$ | $\Phi^v$ | $\Phi^r$ | $\Phi^v$ |
| ≥ 2 | 446 | 2872 | 1.59 | 1.75 | 1.77 | 1.71 | 1.23 | 1.34 | 1.37 | 1.31 | 4.33 | 8.89 | .01 | .0001 |
| ≥ 3 | 408 | 2796 | 1.58 | 1.76 | 1.78 | 1.71 | 1.23 | 1.35 | 1.37 | 1.31 | 4.98 | 9.07 | .006 | .0001 |
| ≥ 4 | 263 | 2361 | 1.53 | 1.76 | 1.83 | 1.71 | 1.20 | 1.35 | 1.39 | 1.31 | 8.145 | 13.97 | .0003 | .0000 |
| ≥ 5 | 191 | 2073 | 1.51 | 1.76 | 1.80 | 1.69 | 1.19 | 1.36 | 1.38 | 1.31 | 7.785 | 12.88 | .0004 | .0000 |
| ≥ 6 | 141 | 1823 | 1.45 | 1.73 | 1.83 | 1.67 | 1.15 | 1.36 | 1.38 | 1.30 | 11.514 | 18.01 | .0000 | .0000 |
| = 7 | 120 | 1697 | 1.46 | 1.69 | 1.81 | 1.65 | 1.14 | 1.35 | 1.38 | 1.29 | 8.98 | 16.97 | .0001 | .0000 |
| ≥ 8 | 93 | 1508 | 1.41 | 1.75 | 1.79 | 1.65 | 1.12 | 1.37 | 1.8 | 1.29 | 10.27 | 18.19 | .0000 | .0000 |
| ≥ 9 | 69 | 1316 | 1.41 | 1.73 | 1.84 | 1.66 | 1.10 | 1.33 | 1.43 | 1.29 | 10.52 | 19.44 | .0000 | .0000 |
| ≥ 10 | 69 | 1253 | 1.41 | 1.70 | 1.42 | 1.67 | 1.11 | 1.30 | 1.46 | 1.29 | 12.69 | 20.069 | .0000 | .0000 |
| ≥ 11 | 45 | 1083 | 1.42 | 1.59 | 1.90 | 1.64 | 1.10 | 1.28 | 1.40 | 1.26 | 10.46 | 19.72 | .0000 | .0000 |
| ≥ 12 | 45 | 1070 | 1.40 | 1.60 | 1.89 | 1.63 | 1.10 | 1.27 | 1.40 | 1.26 | 10.60 | 19.97 | .0000 | .0000 |
| ≥ 13 | 44 | 1045 | 1.39 | 1.63 | 1.83 | 1.62 | 1.10 | 1.28 | 1.35 | 1.24 | 8.28 | 14.94 | .0003 | .0000 |
| ≥ 14 | 42 | 970 | 1.41 | 1.52 | 1.89 | 1.61 | 1.11 | 1.22 | 1.38 | 1.24 | 10.26 | 14.53 | .0000 | .0000 |
| ≥ 15 | 42 | 922 | 1.39 | 1.51 | 1.82 | 1.58 | 1.10 | 1.20 | 1.36 | 1.22 | 7.35 | 13.07 | .0000 | .0000 |

# REFERENCES

Bain, J.S. (1951), "Relation of Profit Rate to Industry Concentration: American Manufacturing, 1936-40," QUARTERLY JOURNAL OF ECONOMICS (1951), pp. 293-324.

Ball R. and Brown, P. (1968), "An Empirical Evaluation of Accounting Income Numbers," JOURNAL OF ACCOUNTING RESEARCH (Fall 1968), pp. 159-178.

Beaver, W.H. (1968), "The Information Content of Annual Earnings Announcements," JOURNAL OF ACCOUNTING RESEARCH, EMPIRICAL RESEARCH IN ACCOUNTING: SELECTED STUDIES (1968), pp. 67-99.

Bowen, R.M. and Huber, C.C (1972), An Investigation of Industry Effects on Financial Structure (Unpublished Paper, Stanford University, 1972).

Dimson, E., 1979, Risk Measurement when Shares are Subject in Infrequent Trading, Journal of Financial Economics 7, 197-226.

Fama, E.F., Fisher, L., Jensen, M. and Roll, R. (1969) "The Adjustment of Stock Prices to New Information," INTERNATIONAL ECONOMIC REVIEW (February 1969), pp. 1-22.

Firth, Michael, 1976, The Impact of Earnings Announcements on the Share Price Behavior of Similar Type firms, The Economic Journal, 86, 296-306.

Foster George, 1981, Intra industry information transfer associated with earnings releases, Journal of Accounting and Economics, 3, 201-232.

Gonedes, N. (1972), "Efficient Capital Markets and External Accounting," THE ACCOUNTING REVIEW (January 1972), pp. 11-21.

Gonedes, N. and Dopuch, N. (1974), "Capital Market Equilibrium, Information-production and Selecting Accounting Techniques: Theoretical Framework and Review of Empirical Work," STUDIES ON FINANCIAL ACCOUNTING OBJECTIVES, SUPPLEMENT TO THE JOURNAL OF ACCOUNTING RESEARCH (1974), pp. 48-169.

Gonedes, N. (1978), "Corporate Signaling and External Accounting, and Capital Market Equilibrium: Evidence on Dividends, Income, and Extraordinary Items," JOURNAL OF ACCOUNTING RESEARCH (Spring 1978), pp. 26-79.

Hayeck, F.A. (1945), "The Use of Knowledge in Society," AMERICAN ECONOMIC REVIEW (September 1945), pp. 519-30.

Magee, R.P. (1974), "Industry Communalities in Earnings," JOURNAL OF ACCOUNTING RESEARCH (Fall 1974), pp. 270-287.

Morse, D.C. (1978), Asymmetrically Distributed Information in a Market Setting: Theoretical and Empirical Approaches (Unpublished Ph.D. Thesis, Stanford University, 1978).

Scholes, M. and J. Williams, 1977, Estimating Betas from Nonsynchronous Data, Journal of Financial Economics 5, 309-327.

Stigler, G.J. (1963), Capital and Rates of Return in Manufacturing Industries (Princeton University Press, 1963).

Stigler, G.J. (1968), The Organization of Industry (Richard Irwin, Inc., 1968).

Stiglitz, J.E. (1974), "Information and Economic Analysis," In Current Economic Problems (Parkin, M and Nobay, A.R., ed., Cambridge University Press, 1974).

Weiss, L. (1971), "Quantitative Studies of Industrial Organization," In Frontiers of Quantitative Economics (Intriligator, M.D., ed., North-Holland, Amsterdam, 1971), pp. 362-411.

CAAA 1982 Conference
The University of Ottawa

Howard M. Armitage
Anthony K.P. Wensley
Accounting Group
University of Waterloo
Waterloo, Ontario

# A Structured Approach to Choosing A Computer System for an Accounting Faculty

Graduates from programs in accounting today enter a business world where the technology associated with information capture, storage and retrieval is being dramatically altered. Exponential changes in computer developments are leading to the phenomena that virtually every business entity, irrespective of its mission, will soon have some part of its information system computerized.

Such developments have clear implications to accounting curricula and accounting faculty. For example, it is clear that no program oriented to producing accounting professionals can allow its students to graduate without providing solid training and experience in computer based systems. Since a major objective of teaching is to adequately prepare students for their future careers, and since these future careers will increasingly depend on the students' ability to work effectively in an automated environment, instruction and training geared to these needs is essential.

It is also clear that traditional accounting course offerings are being substantially altered by the shift from manual to computer based and computer aided analysis. Obvious examples of these courses include:

1) auditing, whose focus is switching from a peripheral treatment of E.D.P. auditing to one which focuses primarily on computer systems analysis and control.

2) managerial and cost accounting, where such subject matter as cost behaviour analysis, budgeting, simulation, cost allocation, decision support and financial modeling can all be more effectively demonstrated on the computer.

3) accounting information systems, whose content is being substantially altered by the developments in the field of data modeling and data base management systems.

4) introductory accounting courses, where the availability of software packages in applications from payroll to general ledger provide an alterntive to traditional manual teaching methods.

Such developments imply that accounting departments must continually adapt to provide the training requirements demanded by today's technology. Meeting the new realities of the market place, however, is a non trivial task. Prior to specific computer related program changes, consideration must be given to departmental strategy, quality of student input, new student and faculty requirements, level of faculty expertise, budgetary contraints and computer department support. Once these issues are resolved, the question of what type of computer configuration best meets teaching, training and research needs must then be carefully evaluated. In short, the accounting department should conduct a systematic analysis of that part of its delivery system which deals with the computer literacy of its faculty and students.

Recently our group completed such an analysis - an analysis which is currently being translated into specific actions. One of the outcomes of the analysis is the acquisition of a computer system dedicated to the needs of the group. We believe that the procedure our group pursued will be of interest to other accounting departments confronted with similar issues. Consequently, based on our experience, this article describes a methodology that begins with eliciting a strategy and culminates in the choice of a particular computer system.[1]

## Methodological Overview

An activity common to all accounting departments is the formulation of strategic plans with which to prepare for the future. Anthony (1972, p. 7) describes strategic planning as "the process having to do with the formulation of long range, strategic policy type plans that change the character of the organization... A strategic plan usually relates to some part of the organization rather than to the totality". For an accounting department formulating a computer strategy, this process involves gathering such information as market

---

[1]At the time of writing, we have completed all phases of our analysis and are now at the point of implementing the system.

demand for computer trained accounting graduates, trends in technological developments, departmental strengths and weaknesses and availability of financial support.

Once the strategy has been formulated and evaluated, analysis proceeds to the next stage where the new goals and objectives are combined with aspects of the existing delivery system to produce a new model of the accounting department mission. In this development, the analytical tool of Structured Analysis[2] (S.A.) plays a useful role. S.A. is a formal set of procedures which allow a designer to incorporate new requirements (which may result from either strategic, management or operational changes) into the current system in a logical manner. In contrast to traditional design techniques the procedure first concentrates on what the new system must accomplish and only when these requirements are identified are questions relating to system implementation addressed. Although S.A. utilizes specialized methodological tools, the philosophy of the approach can be maintained without conforming to its rigid documentation requirements.[3] From the viewpoint of the accounting department the S.A. approach involves these steps.

1. Evaluate and document the current computer literacy part of the program.
2. Identify additional requirements that the new system is expected to provide.
3. Incorporate the existing and new user requirements into an overall specification describing what the new system is to accomplish.
4. Obtain verification and acceptance of this specification from system users.
5. Evaluate the possible ways of meeting the system specifications.
6. Quantify the options.
7. Select an option and present results of the analysis to the accounting group.

---

[2]Several approaches to the analysis, design and implementation of systems have recently surfced. One such approach - Structured Analysis (as outlined by T. DeMarco, Structured Analysis and System Specification, Prentice-Hall 1979) provides the basis for this discussion.

[3]These requirements include data flow diagrams, data dictionaries and process descriptions, total specification of which is not necessary in this instance. It is the philosophy underlying the approach which most concerns us here.

8. Evaluate specific hardware and software possibilities.
9. Select an option.
10. Implement system.

The strategic considerations outlined in Anthony (1972) and the principles described in DeMarco (1979) provide the theoretical and methodological underpinnings of our analytical work. The next section describes these procedures in the context of our experience.

## Computers in Accounting Education, Research and Administration at the University of Waterloo

In view of the computer revolution which is taking place in virtually all aspects of business life, there is a natural desire for accounting departments to remain abreast of these developments. The alternatives facing most departments range from expanding existing mainframe computer support to acquiring a dedicated computer system. Prior to committing to a specific option however, considerable thought need be given to the particular objectives that the department is pursuing in the areas of teaching, research and administrative needs. This in turn depends on the department's particular view of (1) the challenges which must be met and (2) its comparative strength and weaknesses in reacting to these challenges.

In order to educate effectively we felt that our students must be given exposure to terminals, programs, data bases and computers in an accounting environment to a much greater extent than was currently taking place.

We also felt that with augmented computer support, research by accounting faculty and graduate students could make important contributions in such fields as accounting information system design, decision support, computer aided learning, software development, computer auditing as well as in those accounting research areas which require large data bases. Finally, we felt that a high proportion of our accounting department's typing, manuscript and administrative needs

could best be served by utilizing some of the recent developments in information and word processing.

We then matched our teaching, research and administrative convictions to what we regarded as our comparative strengths. These included a growing faculty committed to quality accounting education in a computerized environment, a Centre for Accounting Research and strong support for our expressed direction from both the administration and practitioning public. In addition, we felt particularly fortunate to be located on the same campus as a highly regarded Department of Computer Science, an Innovation Center devoted to the development of new technology, extensive computing facilities and a computer support staff that is highly amenable to new computing requests.

As a result of these deliberations, we concluded that our accounting department could strive to become one of the leaders in computer based education and research in accounting. To accomplish this however, required, among other things[4], a system to support both our current demands and the new requirements brought on by our teaching, research and administrative objectives. How this system choice was resolved is the focus of this next section.

## A Structured Approach to System Choice

As indicated earlier the principles of Structured Analysis provide a framework for analyzing present and future requirements. Central to the methodology is the proposition that such requirements be fully specified prior to choosing particular hardware and software components to implement the demands. In short the analyst must determine what the system is to accomplish before determining how it is to be done. The methodology passes through several stages which are outlined below.

1. Evaluate and Document The Current Computer Literacy

This stage of system development is fairly straight-forward. First, all users (faculty, staff and students) of computing facilities are interviewed to determine the nature and extent of their present

[4]Several other issues are germane here, including such items as recruitment policies, faculty training, liaison with other departments and curriculum revision. We will restrict the paper however, to those concerns relating to system choice.

demands on the system. Secondly, the analyst documents the hardware and software components of the present system. Finally, the analyst investigates and documents the non-automated parts of the department's information processing system.

It is very important that the above steps and the information obtained should be fully documented in a coherent and accessible form. Resulting from this step is a description of the current application packages in use, the individuals or classes which use them, the estimated usage time and the specific hardware components that are utilized.

2. Identify Additional Requirements That the New System is Expected To Provide

One of the central requirements of the S.A. methodology is detailed and frequent interaction between the analyst and the potential users of the system. At this stage it is useful to adopt a liberal interpretation of the term "user". In an academic department there is a tendency to consider only the information requirements of the faculty. This approach is dangerously short-sighted and may well result in under-utilized, inflexible and inefficient systems being recommended. In order to avoid this myopic tendency, faculty, staff and students should all be called upon to define their future requirements. In the context of our own analysis, we conducted extensive interviews with all the potential users of the future system. When it came to discussing new requirements with faculty in particular it was often necessary to explain the flexibility and power of the new information technologies before they were able to provide a detailed set of requirements. The result of this step, however, was a sufficiently rich set of teaching, research and administrative support requests that we were able to proceed to the specification phase.

3. Incorporate Existing and New Requirements into an Overall Specification

Having documented the current system and detailed new requirements that arose out of our overall objective, we proceeded to define the system that we would require. These specifications are deliberately general in nature since it is important not to 'lock-in' a particular

type of physical system until the information system has been adequately analyzed and documented.

In addition it is much easier to explain the system to users in terms of what it is to do rather than in terms of how it is to do it. A number of the specifications that were identified are listed below.

- The system must expose students to several levels of computers, including mainframes, mini and microcomputers.
- The system must give students a working exposure to distributed networks of computers, programs and data files.
- The system must be capable of supporting optimization, simulation, statistical, financial planning, accounting and auditing relating software.
- The system must support large research related data base information.
- The system must support comprehensive word processing and administrative (budgets, student records, mark maintenance, etc.) software.
- The system must provide access to both limited local storage facilities and large scale storage facilities.
- The system must provide for local printing facilities.
- The system must provide for the possibility of real time classroom use and laboratory facilities.

4. Obtain Verification and Acceptance from System Users

As noted earlier it is important to consult users during the course of the analysis. This both assists in the verification of the analysis itself and in the subsequent acceptance of the chosen system. In many cases this stage of the analysis will result in significant changes or additions to the users' information requirements specifications and hence also changes to the general system specification. We found that many of these arise from the users' increasing awareness of the technology.

5. Evaluate Ways of Meeting the System Specifications

Up to this stage the focus has been on the logical[5] structure of the system. At this point, however, analysis proceeds with an examination of how the system might be configured to meet our specific requirements.

---

[5]By logical, we refer to analyzing our requirements in an implementation independent context.

When considering our specifications we generated a number of alternative systems with the same specifications:

1. The existing mainframe with 'dumb' terminals.
2. A mini-computer with multi-terminal capability.
3. Micro-computers with stand-alone capability, network capability, and ability to communicate with the mainframe.
4. A mix of 1. and 3.

6. Quantify the Options

This stage involves the consideration of economic and social costs. In terms of economic cost an effort must be made to estimate the 'value' of flexibility. In our case alternative 3 was significantly more expensive than alternative 1 but would provide significantly greater flexibility in terms of growth and adaptability in the future. In terms of social costs, allowances must be made for the impact of different systems on the working environment, particularly for the staff. We found, for example, that the word processing packages associated with alternative 3 were far more user friendly than the comparative system used in 1.

7. Select an Option and Present Results to the Accounting Group

The option selection phase is concerned with picking the alternative which best matches the specifications within defined budgetary constraints. Our cost/benefit analysis led us to choose alternative 4. The system of networked micros not only supports many of our teaching requirements, it also provides us with high quality word processing and administrative capabilities. Furthermore, the ability to use the micros as terminals and to upload and download files to and from the main computer center greatly enhances their flexibility. At the same time, the continued use of low cost terminal access to the mainframe provides us access to many existing applications and data bases which are too large for the micros to handle.

Each of the options, their strengths and their weaknesses, and our recommendations were presented to the accounting group for discussion and ratification.

8. Evaluate Specific Hardware and Software Possibilities

The large number of hardware vendors make the task of selecting specific system components a difficult one. In our case, however, two of the factors which helped to reduce the complexity of the evalution process were:

1. The desire to have equipment that was already represented at Waterloo so that we could obtain a certain amount of in-house servicing.
2. The desire to have a CP/M machine which would give us access to a very large selection of applications software.

In addition some of the criteria used to evaluate different machines were as follows:

- Cost
- Reliability
- Service provision
- Expandability
- Software availability
- Ease of use
- Documentation provided
- Compatability with other hardware
- Training programs.

9. Select an Option

As a result of these deliberations we have recently acquired:

- A group of microcomputers with a CP/M operating system and networking capabilitites.
- A group of terminals which have received widespread acceptance throughout our university community.
- Several CP/M based software applications and data base management systems.

10. Implement System

We are now at the stage of fully implementing the system and preparations are currently underway to:

- o Provide staff and faculty training.
- o Designate faculty members with specific responsibilities to the computer support area.
- o Design new courses which will take advantage of the new machines and software.

As a final comment, it is worth noting that the procedure just described is an essentially continuous one. Technology is changing so rapidly that virtually any set of components are soon made obsolete by new developments. Nevertheless, we feel that the described procedure allowed us to systematically think through our requirements and based on these needs allowed us to choose that system alternative which most closely met our demands. Of course, no two accounting departments will likely arrive at the same set of objectives or have the identical set of requirements. However, the strength of the structured analysis philosophy is to ensure that the requirements associated with particular strategies and objectives are fully specified and accepted prior to the selection of physical components. In this way, the system is made to match the needs of the user rather than, as so often is the case, having to change the needs of the user to match the system.

## References

Anthony, R.N., J. Dearden and R.F. Vancil, Management Control Systems: Text, Case and Readings. Revised ed. Richard D. Irwin, Homewood, Ill., 1972.

DeMarco, T., Structured Analysis and System Specification, Prentice-Hall, Englewood Cliffs, N.J. 1978.

Gane, C. and Sarson, T., Structured Systems Analysis: Tools and Techniques, Prentice-Hall, Englewood Cliffs, N.J., 1979.

CAAA 1982 Conference
University of Ottawa

Francine Schlessinger
Alfred L. Kahl
University of Ottawa

# COMPUTERS AND AUDITING: A CANADIAN SURVEY*

## Abstract

This paper reports on a recent survey on the use of generalized audit software by chartered accountants in Canada. It was found that the use of such software is growing as more and more clients are using computers, especially in the larger metropolitan areas. It appears that there has been some duplication of effort in the development of these programs by the CA firms which has wasted both time and money. If there were more consensus among the CA firms, it might be easier for universities to provide students with the necessary computer audit knowledge.

## Résumé

Cet article présente les conclusions d'une récente étude concernant l'utilisation par les comptables agréés canadiens du logiciel de vérification généralisé. Elle a révélé que cette utilisation augmente à mesure que plus de clients utilisent l'ordinateur, particulièrement dans les grands centres urbains. Il semble que des travaux inutiles effectués dans certaines firmes de comptables agréés ont entraîné des pertes de temps et d'argent. Si la coopération entre ces firmes était meilleure, il serait plus facile pour les universités d'enseigner les méthodes de vérification par ordinateur.

## Introduction

Computer based accounting information systems have forced auditors to retrieve and analyze data stored in machine readable form. One of the tools used for verifying the results of computer processing is generalized audit software (GAS), which are special computer programs for audit use. This type of software was first developed by public accounting firms and specialized software houses in the early 1960's. Previous studies of such software were published in 1972 by Will [6] for Canada and by Adams and Mullarkey [1] for the United States. The literature on EDP auditing has been reviewed by Cash, Baily and Whinston [2] in 1977 and by Pound [4] in 1978.

---

* The opinions expressed in this paper are the author's own and do not represent the views of their employers.

Since, as pointed out by Dorricott, computer auditing is no longer optional because more than two thirds of all audited businesses in Canada have computerized accounting systems [3], the rationale behind using an audit software package is explained. In addition, the results of a survey and some implications are discussed.

## Computers and auditing

Initially, when the computer first became a part of the business world, the auditor's approach was to test the system as if the computer did not exist at all and audit around the computer. This method involved auditor tests of computer printouts as if they were prepared manually. As time passed, some audits were performed through the computer. In addition to regular reviews of internal control, tests of transactions and substantive tests of information produced through data processing functions were performed. Now this progression has gone one step further to auditing with the computer. Auditing with the computer usually focuses on the verification of accounting data stored on computer files (magnetic tapes or disks). The need to audit such files has inspired the development of generalized audit software, one method of auditing with the computer.

## Why Use the Computer?

The computer is a powerful tool that can be used for the auditing function. It can search large volumes of transaction files in a very short time, and unlike a human, it does not make errors (Most so-called computer errors are really human errors of data input or programming). Greater assurance of the reliability of the information presented in the financial statements can be obtained using a computer since it allows the auditor to extend the scope of the examination and increase the number of items tested. The computer's speed and accuracy is used to perform repetitive routine tasks both rapidly and effectively. The audit time saved this way can be used for the evaluation and judgemental activities of the audit which are the more enjoyable and challenging aspects of the audit function. This should result in a higher quality of professional service to the client.

The past decade has witnessed rapidly accelerating developments in computer technology which have resulted in smaller, faster, cheaper and more powerful computer systems. Even very small businesses are becoming computerized and the future promises an even greater expansion in the use of computers by businesses of all sizes. There is no doubt that the computer is here to stay: the auditor must learn how to live with it. For this purpose, the CICA has provided an auditing guideline: Auditing in an EDP Environment, CICA Handbook, August 1981.

## Basic Terminology

To begin with, three key terms must be clarified. These are hardware, operating system, and software. Hardware refers to the physical units that make up the computer system, such as the central processing unit, terminals, printers, and disk or tape drives. What is critical for the auditor to understand about hardware is the frequent incompatibility from one manufacturer to another. For example, a disk pack from one maker cannot be plugged into a computer system built by a different manufacturer, unless, like Amdahl, it is specifically designed to be plug-to-plug compatible with IBM computers. Likewise, a program running on one computer is not generally transferable to another computer without time consuming modification.

The operating system is the computer's internal manager. It is a special program that tells the computer how to perform its processing activities. It directs traffic within the system, keeping track of the location of programs and data as well as deciding what it will do next. Modern computers must do many things at the same time.

Standardized operating systems are available for many of the different microcomputers which are now on the market. These operating systems allow computers which are built by different manufacturers to use the same packaged programs. This is a very important development because it will greatly expand the market for computers in new and smaller businesses and this will have a significant impact on auditors.

Software includes applications programs designed to perform a certain sequence of steps to get a desired result. Because computers cannot think, the human programmer must give very detailed instructions which tell the machine absolutely everything in minute detail. Once developed, tested and ready for use, a program is applied to data supplied by a user, such as the data necessary for the preparation of the payroll, and the computer prepares the cheques and updates the files, etc.

## Three Types of Audit Software

Within the realm of auditing, efforts aimed at effectively using the computer as an audit tool have resulted in the development of three basic categories of software: custom tailored programs, commercial programs, and generalized audit software (GAS) packages.

The custom tailored programs have been developed for one particular audit engagement and are used on the same client, usually every year. While this is particularly appropriate for the specific engagement, the program generally cannot be used for any other client.

The commercial programs have been created by companies selling or leasing software as a business venture. This industry has grown rapidly along with the use of computers in business. These programs are general enough to be used by many users, although some firms may have to make minor modifications in order to use them.

Finally, GAS packages have been written by various public accounting firms for their own use in performing audits of their clients who have computerized systems. Their major advantages are flexibility, ease of use, and efficiency.

## Using a Software Package

Using a software package makes it easy for the auditor to reap the benefits of the computer's speed and accuracy. The user/auditor does not have to write a complete new program to do what is desired; all that is necessary is knowledge of how to communicate with the package. Writing a computer program requires more knowledge of computers than most auditors possess or should be expected to possess, and is quite time consuming in any case.

Packages are usually designed to be easy to use. The auditor communicates with the computer by completing preprinted specification forms. These forms are usually designed by the same people who developed the package. The auditor uses the forms to indicate what data are to be used, what operations to perform, and what the output report should look like (see Table 1). The training time required to use a package, for an auditor with little or no computer background, is very short--usually only one week is sufficient.

## What Can GAS Do?

The GAS can be used by the auditor to examine a client's records for quality, completeness, consistency and abnormal or unusual characteristics. A complete listing of the records can be generated, from which the auditor could evaluate the quality of the client's record keeping practices. A GAS can be used to determine how many records in a file are not complete. Consistency can be checked by generating a list of account balances which exceed a credit limit specified by the auditor. Because calculations can be performed quickly and accurately by a computer, all of the items within a file can be recalculated, rather than merely a selected sample. Extensions and footings can be checked as well.

The packages can prepare specific listings and perform various analyses for the auditor. Client data can be summarized and reported in many different ways, making examination a simpler task. Two very common uses are aging

accounts receivable and listing inventory items by date of purchase. Some other useful analyses include computation of operating ratios and comparisons of budgeted, standard, and previous year's data with that of the current year. Accounts to be confirmed can be selected and the confirmation letters can be prepared automatically by the GAS package, according to criteria supplied by the auditor. Samples can be easily generated, randomly or otherwise, by the package. Data maintained in separate files can be checked for consistency and correctness; for example, the credit term of a customer in the customer file can be compared with the same data in the transactions file, generated from payments on account. Data gathered during the audit can be entered and compared with company records. A typical example of this would be a comparison of a physical inventory count with the inventory records in the computer. The auditor need only enter the audit data; the package does the rest, as instructed.

## What GAS Cannot Do

The GAS software has its limits, of course, and an analysis of its capabilities without examining its limitations, would be incomplete. An auditor has several basic audit techniques which can be used to obtain sufficient, appropriate audit evidence. A software package on any computer can never be a substitute for the auditor who must decide what is reasonable in the circumstances and instruct the package accordingly. Professional judgement is something that must be acquired, it cannot be programmed into a computer. The GAS cannot physically count inventory or search documents for transactions which might not have been entered into the company's computer system. It can only do what the auditor tells it to do.

## The Survey

The past decade has brought with it considerable progress and changes in computer systems and applications. To determine the current state of the art in Canada, a survey was conducted in May of 1981. Senior managers of computer auditing in nine Canadian CA firms were surveyed by structured personal interviews. Table 2 lists the GAS packages and the CA firms who still continue to modify their packages to keep them up to date. Some key data on the packages are also presented.

## The Survey Results

The software packages listed in Table 2 have been developed by the various public accounting firms, with the first being available in the early 1960's while the last appeared as late as 1980. Most, although not all, were initially developed in the United States, and the development costs to date are in the seven figure range per package.

Generally, the CA firms use their internally developed GAS packages in performing audits of clients if their use is applicable and compatible. Given the constraints of a particular audit engagement, the most effective way to get the job done is evaluated and a decision is made as to whether or not to use any computer software or a GAS in particular, or neither. In some cases, where the client has other appropriate software, this may be used either exclusively or with the GAS.

In Canada, use of these GAS packages is concentrated in the larger metropolitan areas: Toronto, Montreal, Vancouver, Calgary and Edmonton. This is largely due to fact that the larger computerized clients have their computer centres in these locations. There has been significant growth in the use of GAS over the past decade. However, this growth has been slightly dampened in the last few years, mainly because of particular package features, such as certain statistical sampling procedures, which are not accepted by all CA firms.

All of the GAS have been designed to facilitate communication with the user/auditor and make them easy to use, according to the CA firms, who boast of the flexibility and ease-of-use nature of their packages. Each GAS can prepare confirmations and take a random sample. Differences exist in the statistical sampling procedures, reflecting the accounting firm's methodology. All of the packages run on IBM hardware, and some of them have been adapted for Burroughs, Honeywell and Univac machines. Most of them run on very large computers although some can run on smaller computers, even as small as a minicomputer. If a client's hardware is incompatible with the GAS, the client's data files can usually be converted to a format which will allow the package to be used. In most cases, although not all, there is no restriction on the type of input or output devices that are acceptable to the GAS. There is considerable variation between systems in the number of input and output files that the package can process in one run.

One outstanding weakness, which appears to be universal, is a limitation on file organization. The existing GAS cannot usually handle files resident in a data base management system (DBMS). Only one GAS can process against one particular DBMS, of the several packages in use today. Files in DBMS have complex data structure and organization, frequently a data element exists in only one location with pointers to the several records which use it, such as an employee's name which would be part of personnel, payroll, and production records. DBMS are becoming more and more popular and will present auditors with many problems in the future, according to the responding CA firms. For more information on this problem, see the article by Scott [5].

## The Future

It appears that there has been some duplication of effort in two respects; firstly, among the various packages, and secondly, between the accounting firm's GAS packages and those of the commercial software vendors, who claim to provide more versatile packages. Since there are apparently only minor differences between the various GAS packages, it is difficult to justify the expenditure of several millions of dollars and many years of effort for these non-unique software packages which all perform the same audit functions. Why did the accounting firms insist on continually re-inventing the wheel? If their efforts could have been coordinated by the CICA, for example, much money could have been saved.

## Conclusion

The future does not look very promising in this respect, since only one of the responding firms has dropped its package in favour of a commercially available product. This appears to be a rational business decision. Public accounting firms are in the auditing, not the software business, and have developed GAS only as a means to enhance their auditing capabilities. Computer knowledge and skill are in short supply, hence expensive, and the field is evolving rapidly. It is reasonable to believe that the commercial software vendors, in collaboration with CA firms and the Institute, would be in a better position to keep up with computer developments and provide efficient up-to-date audit software. Perhaps, such collaboration should be investigated further.

## References

1. D. Adams & J. Mullarkey; A Survey of Audit Software, JOURNAL OF ACCOUNTANCY, September 1972, 39-66.

2. J. Cash, A. Bailey & A. Whinston; A Survey of Techniques for Auditing EDP Based Accounting Information Systems, ACCOUNTING REVIEW, October 1977, 346-368.

3. K. Dorricott; Computer Auditing is No Longer Optional, CA MAGAZINE, March 1982, 66-69.

4. G. Pound; A Review of EDP Auditing, ACCOUNTING & BUSINESS RESEARCH, Spring 1978, 108-129.

5. G. Scott; Auditing the Data Base, CA MAGAZINE, October 1978, 52-59.

6. H. Will; Computer Based Auditing, CANADIAN CHARTERED ACCOUNTANT, February 1972, 29-34 and March 1972, 32-44.

# TABLE 1

## AUDITING IN AN EDP ENVIRONMENT

STRATA-09 360/370

RECEIVABLES AGING REPORT

04/09/79
REPORT 1-PAGE 1

| CUSTOMER NO. | CUSTOMER NAME | UNDER 30 | 30 TO 59 | 60 TO 89 | 90 AND OVER | CUSTOMER BAL |
|---|---|---|---|---|---|---|
| 2=040831 | NEW HAVEN STEEL | .00 | 120.96 | 42.75 | .00 | 163.70 |
| 2=610705 | AMERICAN STAMP | 125.00 | 5.50 | .00 | .00 | 130.50 |
| 2=511279 | PERON CASTING | 26.30 | 43.88 | .00 | .00 | 70.18 |
| 2=718=93 | SWIFT-CRAFT | 57.98 | 54.67 | .00 | 28.80 | 141.45 |
| 2=713396 | PERKINS & WHITE | 54.14 | 14.11 | .00 | .00 | 68.25 |
| 2=722577 | ACME PRODUCTS | .00 | .00 | .00 | 215.52 | 215.52 |
| 2=739=30 | SEEPO INC. | 15.99 | .00 | .00 | .00 | 15.99 |
| 2=763029 | NAICCO LEASING | .00 | 73.80 | .00 | .00 | 73.80 |
| 2=751=80 | ST. PAUL LABS | 124.45 | 46.80 | .00 | .00 | 171.25 |
| 2=791873 | GEO-TECH RESEARCH | 48.28 | 57.60 | .00 | .00 | 105.88 |
| 2=800368 | S & S TESTING | 6.70 | .00 | .00 | .00 | 6.70 |
| 2=737173 | WINSTON REED INC. | 71.00 | 129.04 | .00 | .00 | 200.04 |
| 2=849671 | BIC INDUSTRIES | 109.31 | 97.11 | .00 | .00 | 205.42 |
| 2=684263 | ALLEN PRODUCTS | 68.73 | 90.19 | 87.46 | .00 | 246.38 |

STRATA product aging report. (Note: Only top of first page is presented.)

| | WORK FIELD NUMBER | WORK FIELD NAME | STORAGE FORMAT ALPHANUMERIC LENGTH | NUMERIC |
|---|---|---|---|---|
| 2 | =.0.1 | CUSTOMER NO | 8 | 2 |
| 2 | =.0.2 | UNDER 30 | | 2 |
| 2 | =.0.3 | 30 TO 59 | | 2 |
| 2 | =.0.4 | 60 TO 89 | | 2 |
| 2 | =.0.5 | 90 AND OVER | | 2 |
| 2 | =.0.6 | CUSTOMER BAL | | 2 |
| 2 | =.0.7 | CUSTOMER NAME | 15 | |
| 2 | =.0.8 | | | |
| 2 | =.0.9 | | | |

Work record specification coding.

PRINT SPECIFICATIONS

REPORT NO. 01 — REPORT NAME: RECEIVABLES AGING REPORT

SORT CONTROL FIELDS FOR RECORDS SELECTED

LINES TO BE PRINTED — Grand Totals: Y

SPACING BETWEEN LINES AND PAGE BREAKS

CONTENTS OF COLUMNS

W01 15 | W01 30 | W02 45 | W05 60

W04 75 | W05 90 | W06 105

Aging report print specification coding.

TABLE 2

Generalized Audit Software

| Audit Package | CA Firm | Initial Development Date | Statistical Sampling Capability | Compatibility With Data Base Management Systems (DBMS) |
|---|---|---|---|---|
| AUDEX | Arthur Andersen & Co. | 1969 | Yes | None |
| AUDITAPE AUDITAPE II | Deloitte, Haskins & Sells | Early 1960's, 1980 | Yes | None |
| AUDITPAK II | Coopers & Lybrand | Early 1970's | Yes | Some special add-on programs written |
| AUDITRONIC 32 | Ernst & Whinney | 1966 | Yes | Some special add-on programs written |
| DUSPAK | Clarkson Gordon & Co. | 1972 | Yes | None |
| PWANALYZER | Price Waterhouse & Co. | Mid 1970's | Yes | None |
| S2190 | Peat Marwick Mitchell & Co. | Early 1970's | Yes | None. Planned for next release, 1983. |
| STRATA, TRSS | Touche Ross & Co. | Early 1970's, 1975 | Yes | Limited (Simple DBMS only). |

CAAA 1982 Conference
University of Ottawa

Michael Maingot
University of Ottawa

# THE INFORMATION CONTENT OF UK ANNUAL REPORTS

**The study examined whether UK annual reports possess information or not. The residual variance approach is used with a sample of UK companies adopting Beaver's (1968) methodology.**

---

## Introduction

The issue to be researched is whether or not UK annual reports possess information content. Information in this context has to be defined. One definition considers information as a change in expectations about the outcome of an event. However, using Beaver's (1968) definition, a firm's earnings report is said to have information content if its leads to a change in investors' assessments of the probability distribution of future returns or prices, such that there is a change in equilibrium value of the current market price. Although neither the direction nor the magnitude of the price change can be specified without knowing the expectations models of investors, the variability of price changes is likely to be greater when earnings are announced than at other times of the year.

## Background

A number of prior studies in accounting and finance has attempted to investigate information content of accounting earnings numbers. Ball and Brown (1968) attempted empirically to measure information content of annual earnings announcements. The basic purpose of their research was to determine whether there was an observable revision in stock prices associated with the release of the numbers. They concluded that the lack of timeliness in the annual earnings announcements was attributed to the multitude of information available from more prompt sources. Beaver (1968) employed two research methods to examine information content of earnings. The first was an analysis of the volume of securities traded in the periods surrounding the announcement of earnings. The second looked at the return variability in periods surrounding the announcement date. Beaver observed a larger market reaction in the week of the annual earnings announcement than in other weeks during the year. Like the Ball and Brown study, his sample of firms was selected from the New York Stock Exchange (NYSE) firms. However, whereas the former selected large blue-chip NYSE firms in their sample, the latter excluded the more widely followed NYSE firms. In fact, only those firms with the fewest number of news items appearing in the Wall Street Journal (WSJ) made up his sample. He defended the potential bias in his study in the following way: "the effect of large firms would tend to induce a bias against earnings reports because the larger firms are more generally associated with a greater flow of additional information than smaller firms." (Beaver, 1968, p. 71)

Other US studies including those of May (1971), Oppong (1976) and Grant (1980) tried to assess the information content of interim and annual reports. Most of these studies applied the residual variance approach to ascertain whether these reports possessed information content or not. However, most of these efforts used as their samples companies which were listed on the NYSE and the American Stock Ecchange (AMEX).

A literature search revealed that there were related research carried out in the UK. However, there were a few which were considered relevant to this study and are briefly discussed.

Firth (1974) examined scrip issues (stock dividends and stock splits) made by British companies over the period 1968 to 1970. He found that companies making scrip issues tended to be those which had performed well in the period leading up to the issue. Firth found that there was an insignificant one per cent mean abnormal return during the year after the scrip issue announcements. He concluded that "scrip issues in themselves do not affect share prices in any way, in either the short, medium or long term. Thus, there is no benefit to the company and its shareholders." However, he found that share prices did react to earnings and dividend announcements accompanying the news. The market reaction to the information was extremely rapid and appeared to be over by the end of the announcement date.

Firth (1976) also examined the effects of earnings announcements on the share price of similar firms. His sample consisted of 87 companies in four industries. He found that if on the date of the first announcement of the annual results the company experienced positive abnormal returns, then companies in the same industry experienced mean abnormal gains of 2.1 per cent. On the other hand, if the company reported a loss resulting in a disappointment to the market, companies in the same industry experienced abnormal losses of 3.7 per cent. Firth concluded that the market used earnings announcements to re-evaluate not only the companies in question, but also the prospects of other similar companies.

The study by Morris (1975) considered the impact of inflation accounting on share prices. He found that there was little information content in the publication of these figures. Marsh (1977) also examined the share price behaviour of companies making rights issues (options). He concluded that there did appear to be economically significant abnormal returns in the one and two year periods after the issue announcement. However, these were relatively small.

Market Efficiency

This paper assumes that the capital markets, particularly The London Stock Exchange (LSE), are efficient with respect to new publicly available information. In other words, it assumes that prices fully reflect available information. The semi-strong form of market efficiency is assumed since one is concerned with whether prices efficiently adjust to the announcement of the annual earnings as they become publicly available. In the UK there is some evidence of this in the works of Brealey (1970), Firth (1974), Firth (1976), Fitzgerald (1974) and Marsh (1977).

Sample Selection

The study covered the years 1976 through 1978. A random sample of 100 firms was selected from among all industrial firms whose ordinary shares were listed on the LSE. The companies in the sample were exclusively industrial companies as classified in the share price data section of The Times newspaper.

All firms had to satisfy the following selection criteria:

(1) Each company must have reported earnings on an annual basis for the duration of the years selected (1976 to 1978).

(2) Each company must have been continuously quoted on the LSE during the time that it reported annual data for its three fiscal years starting and ending during the study period. Additionally, annual earnings numbers for the years 1975 and 1979 should be available under the same proviso of continuous trading. In other words, it required two extra years' data to accomplish its mission.

(3) The company must not have more than one dividend announcement in the week of an annual earnings announcement.

(4) The company must not have announced any scrip or rights issues during the "report period".

Criterion (1) was meant to provide a relatively consistent pattern of observations among the sample firms. Also, it was considered important to reflect recent investor responses to annual announcements. Criterion (2) simply assured that adequate data on the companies were available to provide a measure of the information content of annual announcements. Criteria (3) and (4) were imposed because it was difficult to separate the information effect of the dividend announcement from that of the release of the earnings announcement when both were made publicly available simultaneously. Prior research by Fama et al (1969) and Pettit (1972) has shown that announcements of dividends may have information content.

Selection of Study Period

The selection of the study period tended to be governed by the availability and accessibility of data. Therefore, the selected period (1976 to 1978) depended on a number of factors, one of which was the researcher's perception of the importance of the period selected. The considerations which entered into the selection of the study period used were:

(1) That there be a variety of stocks represented in relatively few years.

(2) That the observations of share prices and market indices be recent enough to be relevant to the present and future.

(3) That data be available in readily accessible form. In other words, the data should be available from correspondence with the companies, company reports, newspapers, microfilms, etc.

The Market Index

The index chosen in this study was the Financial Times Index (FT Index) as opposed to the Financial Times Actuaries All Share Index (FT - Actuaries Index). This is the FT Index of industrial ordinary shares on the LSE. Daily, since 1935, the index has been compiled from the movement of 30 ordinary shares, each a leader in its own market. The 30 leading shares from which the index is calculated cover a wide range of British industry and together represent a large proportion of total equity capitalisation. Confining the index to 30 active stocks makes it possible to calculate it within minutes of the hourly price readings; yet the number of constituents is large enough to absorb any abnormal movement by an individual share.

A Pearson correlation test was run between the two indices and the correlation coefficient was 0.9654.

Selection of Price-Change Response Period

The period selected for measuring price changes, attributed to the annual report announcements, was the week in which the announcement was made (time 0). Although the selection of this duration is arbitrary, yet its choice has a few features to commend it.

(1) The week is sufficiently short that even for firms of substantial and newsworthy activity, one can frequently observe that the only new specific bit of information entering the market during the response period is the annual earnings announcement.

(2) Weekly price changes, observed without regard to the effects of specific bits of new information, have been found to behave in very nearly random fashion.

(3) Beaver (1968), May (1971) and Grant (1980) used the week to study the impact of earnings announcements on weekly stock price changes. Beaver, in evaluating his methodology, noted that although there was some unexplained above-normal price and volume activity in immediately adjacent weeks, the bulk of the price reaction did occur in the week of announcement.

Pinpointing the Moment of First Perception of Announced Earnings

As discussed earlier, the ability to attribute an observed price change to a bit of new information depends on recording price-change responses in periods immediately following the market's first perception of the annual financial data. For purposes of this study, the day of first perception was the date when a number was released in respect of any annual report included in the sample.

The companies were written for information with a view to ascertaining the first date of release of the appropriate data. An attempt was made to confirm these dates by examination, in details, of company news and reports on a daily basis for all years in The Times microfilm editions. The reason for this meticulous checking stemmed from the paramount importance of getting the first announcement dates correct. In choosing this method of dating the information, reliance was placed on general conformity with the "immediate

release" disclosure requirements of the LSE with respect to corporate news that might affect security values.

Information Content Measures

To isolate the effects on prices (and returns) of events specific to the companies from other economy-wide events, the Market Model as developed by Markowitz (1952) and Sharpe (1963) was employed.

$$P_{jt} = a_j + b_j M_t + u_{jt} \qquad (1)$$

where $P_{jt}$ is the difference between the logarithm (log) of the price of security j at the end of period t (adjusted for dividends) and the log of the price at the end of the period t-1.

$M_t$ is the difference in the logs of the levels of a market composite (FT Index) at the end of the period t and t-1.

$a_j$ and $b_j$ are estimates of the intercept and slope of a unique linear relationship between the price changes of firm j's shares (stock) and general market changes. The estimates are arrived at by regressing a sample of $P_{jt}$'s for each firm against the corresponding $M_t$'s.

The $u_{jt}$'s (residuals) represent a set of price change measurements for each firm that have been corrected for factors that affected all the stocks in general.

The estimates of $a_j$ and $b_j$ are computed from a time series, ordinary least squares (OLS) regression. If stock prices do change with the earnings announcement, then it is expected that the $u_{jt}$'s will be non-zero in the week of announcement (t=0). The "report period" ran for 8 weeks before and 8 weeks after the announcement week (total of 17 weeks). The "non-report period" consisted of 40 weeks. This was divided into two 20 week periods surrounding the report period.

The a and b parameters were estimated using $P_{jt}$'s and $M_t$'s for the 20 weeks immediately preceding and the 20 weeks following the report period. These estimates were then used to compute the residual $u_{jt}$'s during the 17 week report period.

$$u_{jt} = P_{jt} - (\hat{a}_j + \hat{b}_j M_t) \qquad t = -8 \ldots + 8 \qquad (2)$$

Residual return in weeks t of the report period is defined in equation (2). The 17 week report period is selected on an arbitrary basis but is consistent with other studies which employed the 17 week period (Beaver, 1968, Grant, 1980).

It must be made clear at the outset that the research question implied nothing about the direction of the residual returns, only their magnitude. Direction would imply that one knew the expectations model of investors and that one could predict the signs of the change.

Since no earnings expectations model was specified, the sign of the $u_{jt}$'s could not be predicted, and thus had to be abstracted out. Following Beaver's

(1968) methodology, this was accomplished by squaring the residual ($u_{jt}^2$). But the computed $u_{jt}$'s had to be related to the variability of the residuals in the non-report period so as to indicate unusual or abnormal price variability during the report period. If earnings possess information content, $u_{jt}^2$ should be greater during week 0 than during the non-report period. The mean of $u_{jt}^2$ during the non-report period is simply the variance of that variable ($s_j^2$). Beaver proposed a ratio which is adopted here. The mean residual was squared and divided by the variance of the residuals during the non-report period as follows.

$$U_{jt} = \frac{(u_{jt}^2)}{s_j^2}$$

This ratio ($U_{jt}$) is the measure of information content. If it is greater than 1.0 during time 0, the residual price change is larger than normal, and conversely for a ratio of less than one. The prediction is the mean of U (averaging across announcements) will be greater than one during time 0, if earnings report possess information content.

Data and Results

Three sets of results are reported: (1) data on distributions, time lapse and announcement dates of annual reports, (2) the OLS regression estimates of the parameters of the market model, (3) the information content analysis.

Data on Distributions, Time Lapse and Announcement Dates

The effects of the selection of the sample are given in Table 1

Table 1

Final Number of Companies Used in Study

| | | |
|---|---|---|
| Sample Selected | | 100 |
| Less: | | |
| Companies not in microfilm editions of The Times | 12 | |
| Refusal to send information on grounds of inconvenience | 4 | |
| Acquired by Private Company | 4 | |
| Acquired by Public Company | 3 | |
| Back copies of reports not available | 2 | |
| No replies | 25 | |
| | | 50 |
| | | 50 |

The types of companies in the sample are analysed in Table 2. The classification in The Times is used here.

Table 2

Industry Profile of Sample Companies

| | Number | Percentage |
|---|---|---|
| Breweries | 2 | 4.0 |
| Building and Timber | 7 | 14.0 |
| Chemicals | 2 | 4.0 |
| Drapery | 3 | 6.0 |
| Electrical | 1 | 2.0 |
| Food | 2 | 4.0 |
| Shoes | 1 | 2.0 |
| Textile | 3 | 6.0 |
| Industrials | 29 | 58.0 |
| | 50 | 100.0 |

The distributions of financial statement dates, announcement dates and the duration before annual reports announcements are given in Tables 3, 4 and 5.

Table 3

Distribution of Annual Accounting Periods

| Month | 1976 Percentage | 1977 Percentage | 1978 Percentage |
|---|---|---|---|
| January | 2.0 | 2.0 | 2.0 |
| February | 2.0 | 2.0 | 2.0 |
| March | 16.0 | 14.0 | 14.0 |
| April | 4.0 | 6.0 | 6.0 |
| May | 2.0 | 2.0 | 0.0 |
| June | 8.0 | 6.0 | 8.0 |
| July | 2.0 | 4.0 | 2.0 |
| August | 4.0 | 4.0 | 4.0 |
| September | 14.0 | 14.0 | 16.0 |
| October | 0.0 | 0.0 | 0.0 |
| November | 0.0 | 0.0 | 0.0 |
| December | 46.0 | 46.0 | 46.0 |
| | 100.0 | 100.0 | 100.0 |

Table 4

Distribution of Annual Earnings Announcement Dates

| Month | 1976 Percentage | 1977 Percentage | 1978 Percentage |
|---|---|---|---|
| January | 6.0 | 6.0 | 8.0 |
| February | 2.0 | 2.0 | 2.0 |
| March | 14.0 | 10.0 | 10.0 |
| April | 16.0 | 22.0 | 24.0 |
| May | 18.0 | 18.0 | 16.0 |
| June | 18.0 | 16.0 | 16.0 |
| July | 6.0 | 6.0 | 6.0 |
| August | 2.0 | 2.0 | 2.0 |
| September | 2.0 | 2.0 | 2.0 |
| October | 0.0 | 2.0 | 0.0 |
| November | 8.0 | 6.0 | 6.0 |
| December | 8.0 | 8.0 | 8.0 |
| | 100.0 | 100.0 | 100.0 |

Table 5

Number of weeks Elapsing between Annual Accounting Date and Annual Announcement

| No. of Weeks | 1976 Percentage | 1977 Percentage | 1978 Percentage |
|---|---|---|---|
| Less than 8 | 0.0 | 0.0 | 0.0 |
| 8 | 0.0 | 0.0 | 2.0 |
| 9 | 6.0 | 6.0 | 4.0 |
| 10 | 6.0 | 6.0 | 8.0 |
| 11 | 12.0 | 12.0 | 8.0 |
| 12 | 8.0 | 2.0 | 6.0 |
| 13 | 8.0 | 16.0 | 12.0 |
| 14 | 8.0 | 10.0 | 14.0 |
| 15 | 8.0 | 8.0 | 6.0 |
| 16 | 10.0 | 10.0 | 8.0 |
| 17 | 8.0 | 2.0 | 4.0 |
| 18 | 4.0 | 8.0 | 4.0 |
| 19 | 8.0 | 8.0 | 6.0 |
| 20 | 4.0 | 6.0 | 12.0 |
| More than 20 | 10.0 | 6.0 | 6.0 |
| | 100.0 | 100.0 | 100.0 |

The annual reports were concentrated in March, September and December, with the last contributing 46 per cent. The majority of announcements preferred March, April, May and June. However, no annual report was released

before 8 weeks. In general, there appeared to be an even flow of the reports, although by week 20, over 90 per cent of all reports were made available.

OLS Regression Estimates

The data set for each OLS regression consisted of 20 consecutive returns data immediately preceding the first week of the 17 week report period and 20 consecutive weekly returns data following the last week of the report period. For the sample companies a total of 300 regressions was run. A summary of the regression statistics is reported in Table 6.

An inspection of the $R^2$ revealed that the explanatory power of the market model equation was considerably lower than in previous studies using monthly returns [e.g. King (1966) and Oppong (1976)], but was consistent with other studies in both the UK and the US. For example, Fitzgerald (1974) showed an $R^2$ value of 10.8 percent, while Beaver (1968), Kaplan and Roll (1972) and Nichols and Tsay (1979) found values of 26.0 per cent, 14.8 percent and 16.0 per cent respectively.

Table 6

Non-Report Statistics

| | |
|---|---|
| $R^2$ | 0.089 |
| Constant (a) | 0.002 |
| Beta | 1.115 |
| F Ratio | 4.603 |

The distribution of beta (b), the measure of a security's riskness in relation to the market-wide factors, indicated in general that the companies included in the sample had average risk. (The risk of the market portfolio is estimated to be 1.0).

Information Content Analysis

Based on the OLS regression estimates $\hat{a}_j$ and $\hat{b}_j$, both residuals ($u_jt$'s) and information content measures or ratios were computed over the 17 week report period. Tables 7 and 8 and Figure 1 present these statistics.

Table 7

Mean, Median, Standard Error and t-Values of the Residual Statistics by Weeks

| Week | Mean | Median | Standard Error | t-Values |
|---|---|---|---|---|
| -8 | 0.053 | -0.038 | 0.064 | 0.8691 |
| -7 | -0.077 | -0.050 | 0.076 | 1.0682 |
| -6 | 0.002 | 0.024 | 0.064 | 0.0329 |
| -5 | 0.003 | 0.004 | 0.085 | 0.0372 |
| -4 | 0.048 | 0.020 | 0.081 | 0.6202 |
| -3 | 0.035 | -0.016 | 0.070 | 0.5222 |
| -2 | -0.030 | -0.053 | 0.078 | 0.4065 |
| -1 | -0.090 | -0.100 | 0.083 | 1.1342 |
| 0 | 0.110 | 0.068 | 0.075 | 1.5452 |
| +1 | 0.050 | -0.045 | 0.081 | 0.6460 |
| +2 | 0.022 | -0.082 | 0.082 | 0.2801 |
| +3 | -0.023 | -0.078 | 0.082 | 0.2947 |
| +4 | 0.026 | -0.016 | 0.074 | 0.3631 |
| +5 | 0.002 | 0.003 | 0.063 | 0.0326 |
| +6 | 0.002 | -0.050 | 0.070 | 0.0295 |
| +7 | -0.001 | 0.021 | 0.079 | 0.0135 |
| +8 | -0.058 | -0.095 | 0.077 | 0.7842 |

The behaviour of the mean residual, $u_t$ indicates greater price activity in week 0 (see Table 7). The mean in week 0 is 0.110 which is the largest value observed during the 17 weeks. Almost all the t-values are less than 1.0 and are therefore not significant at the .05 level.

Table 8

Summary Statistics on Information Content Measures

Week in Report Period

| -8 | -7 | -6 | -5 | -4 | -3 | -2 | -1 | 0 | +1 | +2 | +3 | +4 | +5 | +6 | +7 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| .096 | 1.976 | 0.001 | 0.003 | 0.768 | 0.408 | 0.300 | 2.700 | 4.033 | 0.833 | 0.161 | 0.176 | 0.225 | 0.001 | 0.001 | 0.000 | 1.12 |

The $U_jt$'s were computed for each of the 17 weeks of the report period and the results appear in Table 8. Although, the price activity is highest in week 0, the next largest value occurs in the week immediately preceding week 0. Weeks -7 and +8 demonstrate values above 1.0, while the other weeks show values below 1.0.

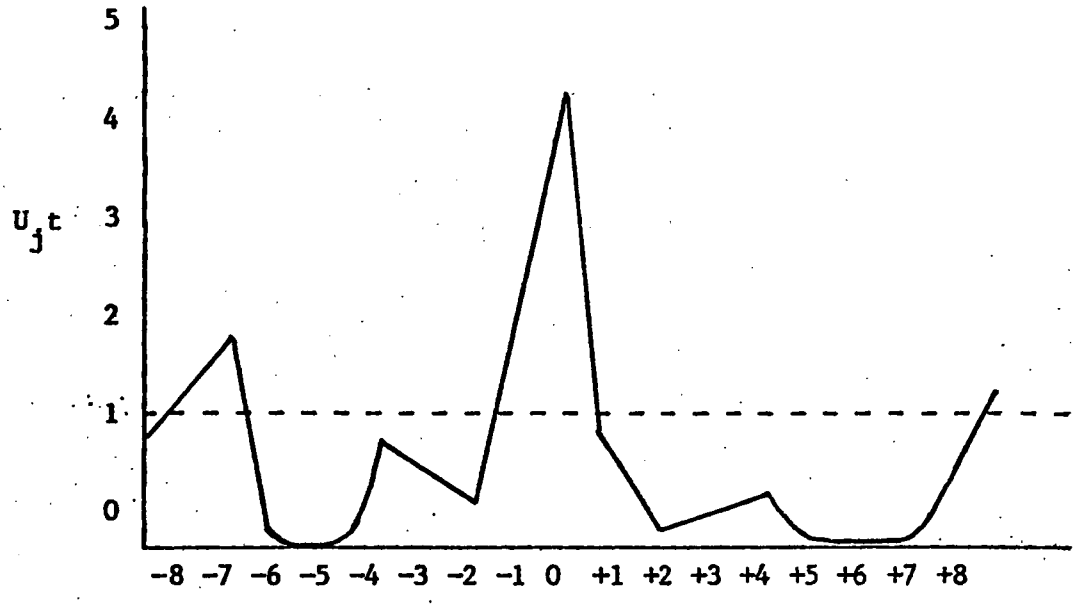



Fig. 1 - Information Content Measures

Figure 1 graphically represents the information content measures $U_j t$ for the period. Analysis of tables 7 and 8 and figure 1 suggests that the rection in the week of the annual earnings announcement is considerably greater than other weeks. The mean information content measures for the sample companies is 4.033 at week 0.

## Conclusions

It would appear that the reactions of investors to the annual earnings announcements did manifest themselves at time 0 (see Beaver 1968, Grant 1980). This would imply that the numbers released by UK companies do possess information. However, while the maximum response did take place at time 0, there did appear to be some anticipatory reaction in the week preceding (week -1) the announcement week.

## References

Ball, Ray, and Brown, Philip, "An Empirical Evaluation of Accounting Income Numbers," Journal of Accounting Research, (Autumn 1968), 159-177.

Beaver, William H., "The Information Content of Annual Earnings Announcements," Empirical Research in Accounting - Selected Studies, (1968), 67-100.

Brealey, R.A., "The Distribution and Independence of the Successive Rates of Return from the British Equity Market," Journal of Business Finance, 2 (Summer 1970), 29-40.

Fama, E., Jensen, M.E. and Roll, R., "The Adjustment of Stock Prices to New Information," International Economic Review, (February 1969), 1-21.

Firth, M.A., The Incidence and Impact of Capitalisation Isues, Occasional Paper No. 3, The Institute of Chartered Accountants in England and Wales, 1974.

Firth, M.A., "The Impact of Earnings Announcements on Share Price Behaviour of Similar Type Firms," The Economic Journal, (June 1976), 296-306.

Fitzgerald, M.D., An Investigation into the Relationship between Information Flows and Stock Market Prices. Unpublished Ph.D., Thesis, Manchester Business School, 1974.

Grant, Edward B., "Market Implications of Differential Amounts of Interim Information," Journal of Accounting Research, (Spring 1980), 255-268.

Kaplan, R. and Roll, R., "Investor Evaluation of Accounting Information: Some Empirical Evidence," Journal of Business, (April 1972), 225-257.

King, B., "Market and Industry Factors in Stock Price Behaviours," Journal of Business, (January 1966), 139-190.

Markowitz, Harry, "Portfolio Selection," Journal of Finance, (March 1952), 77-91.

Marsh, P.R., An Analysis of Equity Rights Issues on the London Stock Exchange, Unpublished Ph.D. Thesis, London Business School, April 1977.

May, Robert G., The Influence of Quarterly Earnings Announcements on Investor Decision as Reflected in Common Stock Price Changes, Unpublished Ph.D. Thesis, Michigan State University, 1970.

May, Robert G., "The Influence of Quarterly Earnings Announcements on Investor Decision as Reflected in Common Stock Price Changes," Empirical Research in Accounting - Selected Studies, (1971), 119-163

Morris, R.C., "Evidence of the Impact of Inflation Accounting on Share Prices," Accounting and Business Research, (Spring 1975), 82-90.

Nichols, Donald R. and Tsay, Jeffrey J., "Security Price Reactions to Long Range Executive Earnings Forecasts," Journal of Accounting Research, (Spring 1979), 140-155.

Oppong, A., Cross-Sectional Differences in the Information Content of Annual Earnings Announcement, Unpublished Ph.D. Thesis, University of Iowa, 1976.

Oppong, A., "Information Content of Annual Earnings Announcements - Revisited," Journal of Accounting Research, (Autumn 1980), 574-584.

Pettit, R., "Dividend Announcements, Security Performance and Capital Market Efficiency," Journal of Finance, (December 1972), 993-1007.

Sharpe, William F., "A Simplified Model for Portfolio Analysis," Management Science, 9 (January 1963), 277-293.

CAAA 1982 Conference
University of Ottawa

James T. Mackey
School of Business
University of Wisconsin-Madison
Madison, Wisconsin, U. S. A.

# A DEPARTMENTAL OVERHEAD ALGORITHM CONSISTENT WITH OPPORTUNITY COSTS

## An Introduction - The Problem

In a recent joint N.A.A.-S.I.A. study on the pricing decision, Gordon et al. (Gordon et al., 1975.) found considerable support for the use of full cost pricing in industry. Of the forty-four firms examined in the United States and Canada, only three did not use full cost data in their pricing decisions. Twenty-seven (seventy-five percent) of the firms used only full cost for pricing, while the remaining firms used some combination of both full and variable costing. The breakdown for the four industry classifications is shown in the Exhibit from Gordon et al.

Academics, however, are less comfortable with this use of full costs for pricing purposes. Kaplan expresses the concern that full cost pricing is "not sensitive to capacity bottlenecks within production departments. Products may differ in their requirements for equipment, skilled labor supervision, or other resources that might be in short supply. A sensible pricing scheme would generate higher markups or cost-recovery percentages for products that use more of a departments' scarce resources and lower markups for products that are using otherwise available or surplus resources. Applying uniform percentages for overhead and (general sales and administration) cost recovery and for profit contribution does not distinguish among the scarce-resource demands of alternative products. The mechanical pricing rule may cause the firm to reach capacity too soon because of a few critical bottlenecks in its production process while other forms of productive capacity are far from fully utilized. In principle, as planned use of a resource approaches capacity, the products making heavy use of this resource should be priced higher than normal to reflect the opportunity cost of filling the (bottleneck) resource to capacity (Kaplan, p.229, 1982.).

This problem is much more likely to occur in a job costing environment than a process costing environment because of the flexible nature of job costing environments. The two equipment industries examined by Gordon et al. are classified by Taylor et al. (Taylor et al., 1981.) as typical job costing type production processes. The algorithm presented in this paper offers an alternative allocation procedure for job costing situations where linear programming is used. The algorithm in this paper provides a full costing solution that reflects the changes in the opportunity cost of bottleneck resources as they reach capacity.

> "The ideal criterion for choosing an allocation base is a cause-and-effect relationship. In other words, the existence of the cost objective should be the dominant factor in causing the incurrence of the costs in question." (Horngren, p.477, 1982.)

From a decision making perspective, the activities necessarily following from a decision are the relevant costing objective for that decision. Following this rationale, the costs attributable to a particular decision choice should be costed in such a way as to reflect this choice of alternatives. This paper suggests an alternative allocation method for overhead costs that is consistent with this position.

## Fixed Overhead Pools and Economic Costs

The opportunity cost of productive capacity depends upon the situation. For a group of factory departments, the optimal production mix is established by the opportunity cost of productive capacity. The cost of production capacity for accounting purposes in each department is the pooled (by department) fixed overhead cost. The position put forth in this paper is that the usual allocation methods of absorption costing by pools can apply costs to production units, in a manner that contradicts their economic opportunity value. A linear programming model will be used as a mechanism to provide a superior allocation model. Linear programming models are used in capacity planning for production systems. Linear programming models can be used to establish both optimal production mixes and estimations of opportunity costs.

Now consider the fixed overhead portion of an application rate derived from a departmental cost pool. If the volume of production is reduced for the fiscal period, the application rate will be increased. However, because there is no alternative use for this capacity the opportunity cost of this additional capacity is zero. The only productive capacity that has a positive opportunity cost is the fully utilized, constraining department(s). But it is precisely in this situation, at full capacity, that the lowest application rate is applied to the work-in-progress inventory.

The implications for book values are most interesting. In cases where capacity constraints occur, the valuations on the balance sheet fail to reflect opportunity costs. In fact, the full cost book values tend to change in the opposite direction of the change in opportunity costs. Inventory book values increase when opportunity costs are zero and decrease when opportunity costs are positive. The solution to this problem does not attempt to reflect the current opportunity costs, since they will never be realized in fact, and therefore present very difficult measurement problems. However, this algorithm improves the economic representation of book values, by insuring that changes in inventory values do reflect changes in opportunity costs due to capacity utilization.

## The Current Method

The allocation of fixed overhead costs has been a particularly trying problem for the accounting profession. The debate between direct versus absorption costing allocation methods has been particularly long and devisive. The general solution has been to use full or absorption costing. Under this method, the expected overhead or capacity costs are estimated ex ante. A projected production plan is adopted that specifies the expected utilization of

the available production capacity. This may vary from department to department within the firm as a function of the particular production mix chosen. Indeed, given the nature of physical plant capacity, it may not be possible to purchase capacity in small increments. Consequently, fixed capacity costs for individual departments will most likely resemble a step cost function. Therefore, the full capacity for a production plant using an optimal production mix, may occur when several of the individual production departments within the plant are operating, in fact, at less than full capacity.

In a production environment where individual production department capacities may be isolated, departmental overhead cost pools are the preferred treatment. (Horngren, 1982.) Overhead costs, common to all departments, can be applied to a factory-wide overhead cost pool. The traditional approach budgets (ex ante) the expected overhead costs for each pool and then chooses some input factor as an application base for the budgeted costs. At the end of the period, adjustments for any variances will be made. Thus, the full costs of production (fixed and variable) will be absorbed by the period's production via the application rate.

Causation Criteria and Opportunity Cost

When the overall production for a plant is at full capacity, it is usually the case that many of the individual production departments may not be operating at full capacity. This will be the result of a failure to match the production capacities with a product mix that precisely fits the available capacity. This may be expected to occur with some regularity when large inventory stocks are not maintained because of short-term fluctuations in consumer demand. Thus, any unutilized capacity is caused by the particular choice of product mix. Another choice would result in a different set of underutilized departmental capacities.

Under the current method, the departmental overhead costs are applied entirely to the jobs processed in each department. This is based upon a cause and effect criteria that applies the capacity costs to the production directly generated by that capacity. This is a misinterpretation of the costing objective. The cost objective in this case is product costing, not partial product costing. The costing issue is to apply the cost of the activities necessary to produce an end product. The activities necessary to produce an end product require the productive capacities of many departments, not disaggregated single departments. The argument presented in this paper, is that current practice fails to match the work activities correctly to the cost objective because of the relationship between a global optimizing decision to departmental production volumes. The decision related to the cost objective (product costing) is not to produce a certain number of X, but rather to produce a mix of products. The total production activities of all the departments are consequently interdependent and should be costed that way. This argument doesn't hold when there are no constraining (full capacity) departments, because the production volume alternatives of each department are not limited by other departments.[1]

[1]This is true, at least, over the planning period. Bottlenecks may occur in the very short-term due to machine breakdown etc. The differences between short-term coordination and short-term planning should be clearly kept in mind.

The algorithm presented in this paper reflects the interdependence of the production decision by applying all overhead costs assuming full departmental capacity. This will be the minimum overhead application assuming the most efficient use of capacity. Departments not fully utilizing their capacity (assuming efficient production), will have budgeted underapplied overhead charges. All budgeted underapplied overhead, should be added to the overhead cost pool of the constraining departments (i.e., the departments whose limited capacity caused the underutilization - see Figure One).

---

Figure 1

Traditional Overhead Application Rate

$$\frac{\text{Departmental Overhead Cost Pool}}{\text{Budgeted Input Factor Level}} = \text{Application Rate}$$

Revised Application Rate

a) Non-constraining department.

$$\frac{\text{Departmental Overhead Costs}}{\text{Practical Capacity Input Factor Level}} = \text{Application Rate}$$

b) Constrained (full capacity) department.

$$\frac{\text{Departmental Overhead Cost Pool + Budgeted Unapplied Overhead}}{\text{Practical Capacity Input Factor Level}} = \text{Application Rate.}$$

---

Consequently, in the revised model, the denominator of the overhead application rate calculation always uses a full capacity activity basis. The numerator for all departments operating at less than full capacity, consists of the budgeted departmental overhead costs. For undercapacity departments using this application rate, the overhead cost pool will always be underapplied. The adjustment occurs in the numerator of full capacity constraining departments. The departmental cost pool is increased by the underapplied overhead cost of the less than full capacity departments.[2]

---

[2]Kaplan and Thompson (1971) used an allocation model that applied the underapplied departmental cost pool to factory-wide cost pool, and then reapplied these costs based upon the relative contribution margin of each product. This is a legitimate application for common plant-wide overhead costs.

Figure 2

Badger Company Capacity Planning Model

Objective Function.

$$400X + 350X_2 + 500X_3 + 400X_4$$

Production Constraints (in direct labor hours)

| | | |
|---|---|---|
| Department A | $X_1 + 3X_2 + 2X_3 + 4X_4 \leq$ | 1500 Activity Units |
| Department B | $3X_1 + 2X_2 + X_3 + 2X_4 \leq$ | 1500 Activity Units |
| Department C | $2X_1 + X_2 + 4X_3 + 2X_4 \leq$ | 1300 Activity Units |
| Department D | $2X_1 + X_2 + 2X_3 + 2X_4 \leq$ | 1200 Activity Units |
| Department E | $X_1 + 4X_2 + X_3 + X_4 \leq$ | 1100 Activity Units |

Policy Constraints (in Units)

| | | | | | |
|---|---|---|---|---|---|
| $X_1$ | | | | $>$ | 100 Units |
| | $X_2$ | | | $>$ | 100 Units |
| | | $X_3$ | | $>$ | 100 Units |
| | | | $X_4$ | $>$ | 100 Units |

Subject to:

$$X_1, X_2, X_3, X_4 \geq 0$$

## Application with Multiple Departments

Consider the budgeting problem for Badger Company in Figure 2. Four products must be produced with certain sales constraints as provided.[3] The optimal solution is shown in Figure 3. Thus, in this case, further production is constrained by two departments. Then, following the algorithm, the underapplied overhead from the other three departments is applied in proportion to their shadow prices to the two constraining departments. With this new full cost information management may wish to revise their prices. After which, subsequent additional iterations may be made by management to arrive at a satisfactory solution. Figure 4 compares the traditional and revised application rates assuming no subsequent iterations were necessary to arrive at an optimal solution.

Figure 3

Rough Cut Capacity Plan

(All figures are rounded off)

| Products | Quantity |
|---|---|
| $X_1$ | 271 |
| $X_2$ | 157 |
| $X_3$ | 100 |
| $X_4$ | 100 |

Capacity Usage

| Department | Idle Capacity | Budgeted Capacity | Practical Capacity |
|---|---|---|---|
| A | 158 | 1342 | 1500 |
| B | 72 | 1428 | 1500 |
| C | -0- | 1300 | 1300 |
| D | 100 | 1100 | 1200 |
| E | -0- | 1100 | 1100 |

[3]This method of budgeting is referred to as Rough Cut Capacity Planning. Examples of its use in industry may be found in Master Production Scheduling: Principles and Practice. (Berry et al., 1979.)

Figure 4

Calculation of the Traditional and Revised Application Rates

(Continued)

Step II - Revised Cost Pools.

| Department | Revised Cost Pool | | Revised Cost Pool |
|---|---|---|---|
| | Budgeted overhead cost ± Budgeted underapplied* | | |
| A | 10,000 - (158 X 6.667) | = | $ 8,947 |
| B | 10,000 - ( 72 X 6.667) | = | 9,520 |
| C | 10,000 + .806(1053 + 480 + 833) | = | 11,908 |
| D | 10,000 - (100 X 8.333) | = | 9,167 |
| E | 10,000 + .194(1053 + 480 + 833) | = | $10,458 |
| | 50,000 | | $50,000 |

* See Figure 3

Step III - Revised Application Rates.

| Department | Revised Cost Pool | ÷ | Budgeted Activity Level | = | Revised Application Rate |
|---|---|---|---|---|---|
| A | $ 8,947 | | 1342 | | $ 6.667 |
| B | 9,520 | | 1428 | | 6.667 |
| C | 11,908 | | 1300 | | 9.160 |
| D | 9,167 | | 1100 | | 8.333 |
| E | 10,458 | | 1100 | | 9.510 |

Finally, common overhead costs not applicable to departmental overhead cost pools, should be applied to products based upon their relative contribution margins. (Kaplan and Thompson, 1971.) This is a reasonable method if the incurrence of the common costs at full capacity are independent of alternative product mixes.[4] Figure 5 reapplies the common overhead costs, based on the relative contribution margin of each product.

---

Figure 5

Application of Common Overhead Cost Pool

| Products | Contribution Margin per Unit | Budgeted Volume | Contribution Margin per Product |
|---|---|---|---|
| $X_1$ | $400 | 271 | $108,400 |
| $X_2$ | 350 | 157 | 54,950 |
| $X_3$ | 500 | 100 | 50,000 |
| $X_4$ | 400 | 100 | 40,000 |
| | | | $253,350 |

Allocation of Common Costs to Products - Traditional Method

| Product | Percentage Contribution Margin | Common Overhead Cost | Applied in Total | Applied per Unit |
|---|---|---|---|---|
| $X_1$ | 42.787 | $30,000 | $12,836 | $47.365 |
| $X_2$ | 21.689 | 30,000 | 6,507 | 41.446 |
| $X_3$ | 19.736 | 30,000 | 5,921 | 59.210 |
| $X_4$ | 15.788 | 30,000 | 4,736 | 47.360 |
| | | | $30,000 | |

Allocation of Common Costs to Products - Traditional Method

| Product | Budgeted Volume | Activity Units per Unit | Total Activity Units | Applied in Total | Applied per Unit |
|---|---|---|---|---|---|
| $X_1$ | 271 | 9 | 2439 | $11,676 | $43.092 |
| $X_2$ | 157 | 11 | 1727 | 8,269 | 52.668 |
| $X_3$ | 100 | 10 | 1000 | 4,788 | 47.882 |
| $X_4$ | 100 | 11 | 1100 | 5,267 | 52.668 |
| | | | 6266 | 30,000 | |

Traditional Application Rate for Common Overhead Costs = $4.788

## Summary and Conclusions

When opportunity cost is the value of the opportunity foregone, due to an alternative short-term decision a particular product mix decision at full capacity causes a non-zero opportunity cost. Departmental capacity that cannot be utilized represents an opportunity for profits foregone.

Numerous studies have demonstrated that a large number of managers do not make pricing decisions based on short-term optimization, but rather on full costing information. Since opportunity costs are not acceptible for financial reporting, this cost is not measured directly for full costing purposes. Application of the costs as presented in this paper, do reflect the opportunity cost of the production mix decision, while not contradicting current absorption costing regulations. This algorithm then allows management to make decisions based upon full costs that reflect the opportunity cost of using scarce production resources.

---

[4]If the common overhead costs are insensitive to alternative product mixes at full capacity then the cost application problem is similar to a joint costing problem. Therefore, the Kaplan and Thompson allocation using relative contribution margin, is justified by the same rational used to justify the use of the net realizable value method for joint cost allocations.

## BIBLIOGRAPHY

Berry, W. L., Vollman, T. E., and Whybark, D. C., Master Production Scheduling: Principles and Practice, (American Production and Inventory Control Society, Inc., 1979).

Gordon, L. A., Cooper, R., Falk, H., and Miller, D., The Pricing Decision, (The Society of Management Accountants of Canada and the National Association of Accountants, 1980).

Horngren, C. T., Cost Accounting: A Managerial Emphasis (Prentice-Hall, Inc., 1982).

Kaplan, R. S., and Thompson, G. L., "Overhead Allocation via Mathematical Programming Models." The Accounting Review, (April, 1971) 352-364.

Kaplan, R. S., Advanced Management Accounting, Prentice-Hall, Inc., Englewood Cliffs, N. J., 1982.

Taylor, S. G., Seward, S. M., and Bolander, S. F., "Why the Process Industries are Different." Production and Inventory Management, Fourth Quarter, 1981.

CAAA 1982 Conference
University of Ottawa

Chris Robinson
Faculty of Management Studies
University of Toronto
Toronto, Ontario

# A RECONSIDERATION OF HUMAN RESOURCE ACCOUNTING[1]

Many writers have argued that human resource accounting is desirable, but simple economic analysis and an examination of its uses and measurement problems raise serious doubts about its value.

## Introduction

The literature on human resource accounting (HRA) has largely relied upon a simple matching argument (eg. Elias (1972) pg. 215). It is observed that expenditures made to improve employee productivity can have benefits to the company lasting beyond the current period, but GAAP require that such expenditures be treated as period costs. This practice understates 'real' income in the current period and overstates it in future periods. Once this argument is accepted, the entire focus of most of the research has been on measurement problems (eg. Flamholtz (1972, 1972a), Ogan(1976)).

A more logical procedure, I maintain, is to answer three questions in order:
1. Is there a net asset created?
2. Is there an unsatisfied demand for HRA?
3. How should HRA be done and what will it cost?

This paper considers each of these three questions in assessing the potential value of HRA.

## Net Asset Creation

### The Legal Ownership Question

Before we can consider the value of the alleged asset, we have to consider whether it is an asset at all. The most obvious difference between human assets and any other kind is that slavery is illegal, and hence the firm cannot own human assets the same way it owns any other item. This raises the question of whether accounting can properly take notice of something to which the firm cannot enforce any claim. Some light can be shed on this by definitions of asset:

> An asset is any future service...the beneficial interest in which is legally or equitably secured to some person or set of persons.
>
> - Canning (1929) pg. 22

> Assets consist of money or monetary equivalents or the expectations of future benefits arising from events and transactions prior to the accounting date...or the earned portion of future claims....
>
> - Skinner (1972) pg. 56

[1] I am grateful to Dan Thornton for an exhaustive review of a draft of this paper. Remaining errors are my own responsibility.

There are two differences between the two definitions. There is no mention of ownership in Skinner's, and he speaks of expectations of future revenues and costs, not of certainties. This is in tune with the modern interest in the economics of the firm rather than just the assets and liabilities, legally defined. Jaggi (1976) argues for this approach when he points out that most assets are really only valued at some expected worth. The difference between a machine and a person is that there are different causes of the uncertainty surrounding the realization of the values, but this is a difference of degree rather than fundamental definition.

The lack of ownership is therefore not a sufficient argument to reject HRA. Many types of leases are capitalized on the balance sheet because it is felt that they have many of the characteristics of ownership and the information thus presented is of significant interest to statement users.

Economic Theory of HRA

The economic theory which applies to the capitalization of other assets is quite simple. There is a cash outflow for which an asset is acquired. The value of the asset persists for more than one period and so it is allocated between periods by some arbitrary depreciation rate. The depreciation can be regarded as being the capital part of the rental charge for physical capital. The HRA literature has largely failed to consider whether there is a similar economic justification for a human asset.

Perfectly competitive Markets Under Certainty

As a starting point, assume:
1. Homogeneous supply of labour
2. Homogeneous demand for labour
3. Labour is perfectly mobile
4. All participants have perfect certainty about the future.

Becker(1964) defines two types of training: general, which improves the worker's productivity and value in many different firms; and, specific, which improves his productivity and value in only one firm. Dittman et al.(1976) use this definition to develop the equilibrium conditions under certainty for training and the existence of the human asset:

$$MRP_o + \sum_{t=1}^{n} (MRP_t)(1 + i)^{-t} = W_o + G + S + \sum_{t=1}^{n} W_t(1 + i)^{-t} \qquad (1)$$

where:
$MRP_t$ = marginal revenue product in period t
$i$ = interest rate
$W_t$ = wage rate in period t, including non-cash benefits and deferred wages
$G$ = firm's cash outlay on general training
$S$ = firm's cash outlay on specific training
$t=0$ = the training period.

In competitive markets, productive factors are paid the value of their marginal products. The price of labour is the wage rate, and it will rise as labour becomes more productive. The firm cannot create an asset for itself by training or other means of improving worker productivity, because in a competitive market the higher wage rate will exactly equal the higher marginal productivity. Under the simple pure competitive case with homogeneous labour

markets, there is no incentive for either general or specific training. Every worker can fill every job and all the jobs are the same. Therefore, G=S=0.

Heterogeneous Labour Supply

Now general training will take place because labourers can improve their future marketability and the firm cannot get the necessary number of generally skilled workers from the market. Given worker mobility, this implies that there aren't enough workers with these skills anywhere. In (1) the firm pays $W_t$ and hires until $W_t=MRP_t$, while S=0. When it has to hire workers who are not trained to the level it requires it will pay training costs of G and reduce the initial wages such that $W_o=MRP_o - G$. The firm pays the cost of training, but the worker bears the cost in the form of reduced wages. After t=0 the wage returns to $W_t$ because the worker can take his skills to other firms. There is no asset created because the initial training cost is offset by lower marginal productivity and the firm must pay full wages after training is completed. Dittman et al.(1976) cite various empirical studies showing that this does happen.

There are two special cases they consider:
1. Firm i's training is a superior good. Then $W_o^i < W_o$ and an asset is created.
2. Firm i has economies of scale in training. $G^i < G$ and an asset is created.

However, the asset will only be created in the initial period, since the wage must still be competitive thereafter, and no very long-lived asset can be formed. In the usual case of training that lasts less than a year, only training courses spanning a year-end would create an asset for financial accounting purposes. These conditions do not seem to be very common, though there is little empirical evidence available. In any case they would be very instable, since other companies would have an incentive to enter the training market and compete away the advantage.

Heterogeneous Demand for Labour

Now the workers are not perfect substitutes in the firm's production function, and there may exist a demand for firm-specific training. The worker cannot transfer these skills to other firms, and he will refuse to accept a lower wage in the training period to compensate the employer. Therefore, the firm will pay S and engage in specific training as long as:

$$S \leq \sum_{t=1}^{n} (MRP_t - W_t)(1 + i)^{-t}. \qquad (2)$$

Now an asset is created because there are future benefits to be received: the reduction in future wages below the marginal product. Since the training is specific, $W_t$ can held below $MRP_t$ because the employee cannot take it elsewhere and receive anything more than his untrained wage. The authors again cite empirical evidence consistent with this behaviour.

There are some problems with this situation. The maintenance of the asset may lead to its destruction in the long-run. Employers will keep skilled workers on the payroll during downturns to avoid losing the asset, but this payment for non-productive time expends the benefits of the asset. Moreover, there is strong evidence that specific training which cannot be successfully transferred is rare. Dittman et al.(1980) argue that the most likely place to find fuman asset creation is in service firms. They surveyed the 'big eight' US public accounting firms' national training directors to find what proportion

of their training was considered to be specific or general. There are differences between firms, but it is clear that most of the training they do is perceived to be general. Returning to the equilibrium condition (1), we can see that if the firm is in equilibrium and S is small, then the unrecorded asset must be small too. Only in the case where the firm has substantially underinvested in specific training, making the difference in (2) very large, can there be a significant unrecorded asset. The authors cannot cite any evidence regarding this situation, but it does not seem very likely.

A more realistic definition of most training would place it somewhere on a spectrum from general to specific. To the extent that it is general, the employee will accept lower wages for it, and no asset is created. To the extent that it is specific, there may be an asset created, but it will be less than that assumed by most of the literature.

Restrictions on Perfect Mobility

If there are structured labour markets, whether created by labour unions or other factors, then worker mobility may be reduced. For example, pension vesting rules, seniority rules and higher wages obtained by unions all inhibit movement of the employee. The costs of moving if the workplace is in an isolated area are another form of mobility restriction. These restrictions reduce the ability of the worker to take his training elsewhere and lead to asset creation. However, the higher wages gained by unions will be eroded in times of tight labour markets as those employees not bound by contracts will tend to bid up their wages relative to union wages, removing the barrier to changing jobs. At the same time, unions are a violation of the assumption of a competitive labour market and may be able to capture the added productivity, destroying the asset.

Relaxation of the Certainty Assumption

Nowhere in the HRA literature is there any consideration of the effects of uncertainty on asset creation. It is quite reasonable to assume that G, S, $MRP_o$ and $W_o$ are all known. However, the length of employment, t, the wage stream, $W_t$ and the marginal product stream $MRP_t$ are all uncertain. The rate of interest is also uncertain, but that problem is beyond this paper's scope.

In the initial model of perfect markets, uncertainty has no effect. Likewise, there is no change in the conclusion concerning general training. In both of these cases the future wages will adjust as the marginal product changes, and there will be no asset created.

In the case of specific training, there may be an effect. $W_t$ must be less than $MRP_t$ for there to be any asset created. However, S is certain. If the participants in the market (individuals directly or through firms) are risk averse, as is generally assumed in the literature on valuation under uncertainty (eg. see Mossin(1973)), then the value of the net asset to the firm may be decreased. As long as returns on it are positively correlated with the returns on the rest of the market portfolio, we would expect its value to be decreased.[2] Part of the decrease may be shared by the workers, since they will face a risky stream. On the other hand, the workers may refuse to pay any part of the cost (through lower wages) of any specific training, since the returns are risky.

[2] Mayers(1973) derives a valuation model that includes non-traded assets such as human capital within the framework of the Capital Asset Pricing Model.

The actual result will depend on the comparative risk aversion of the shareholders and workers, and the exact nature of labour market imperfections.

## Application of Economic Results

The preceeding analysis strongly suggests that unrecorded human assets will arise much less frequently than is generally argued in the HRA literature, and will also be smaller. In general, the literature has ignored these economic problems. Flamholtz(1972) develops a sophisticated behavioural model, but he falls into the same trap.[3] His definition boils down to a net asset model:

$$\sum_{t=0}^{n}(MRP_t - W_t)(1 + i)^{-t} = HC. \qquad (3)$$

What he doesn't recognize is that his asset arises only under certain limited conditions. Until they arise, the accounting problem doesn't exist.

Lev and Schwartz(1971) recognize the problem and do not require a net asset to be created at all(pg. 110). They propose a model which records the gross asset on both sides of the balance sheet, in the notation used here:

$$\sum_{t=0}^{n}MRP_t(1 + i)^{-t} = \sum_{t=0}^{n}W(1 + i)^{-t} = HC \qquad (4)$$

This definition is only additional disclosure since it has no affect on income or net assets and it need be assessed only on the basis of measurement validity and cost, to be considered in the next section.

## The Uses of HRA

Grove et al.(1977) put a framework around the measurement aspect of HRA and set up some taxonomy. They postulated that the value of measurement information with respect to some theory could be viewed on two interrelated levels:

> The factual or first level considers whether the attribute measurements are representative, primarily in terms of validity and reliability. The purposive or second level considers the ultimate usefulness.... (pg. 221)

The purposive level is the subject is the subject of this section and the factual level the subject of the next one.

Much of the HRA literature is very vague as to the uses of HRA or simply assumes that it is useful. One distinction not made is between managerial and financial uses. If the basi theories of microeconomics are true, managers will already be using their internal MIS to assess such things as turnover rates and absenteeism, and taking actions to improve them, up to the marginal conditions. Research into the behavioural variables themselves is valuable, but attempts to define a system of HRA that performs certain manipulations of the data will be valuable only if they are using the objectives of a given company. If it is profitable to use more sophisticated HRA for managerial purposes, the demand will exist in the marketplace, but we do not observe it.

There may be more justification for HRA on the external reporting side. If a net asset is created and it can be measured, the information is useful. Changes in the value of the human assets over time may be important to assess performance. Friedman and Lev(1974) suggest:

---

[3] Flamholtz is cited for this weakness out of the many examples available because, aside from this error, his work is thorough and well-reasoned, not a straw man.

> Present accounting procedures obviously ignore (and conceal) long-term effects of current changes in personnel policies, particularly changes affecting the quality of the work force. The proposed measurement and recording system would reveal the effects of such actions since these will change the discounted value of future cost savings (or dissavings). (pg. 240-1)

Lev and Schwartz(1971) suggested some uses for the gross asset value. The total human capital as a ratio of total fixed assets would give an estimate of capital-labour intensity, an important economic variable. If the total HC were subdivided by type of employees, such ratios as scientific to total HC or production to total HC could be derived. These would give the investor a better indication of the nature of the firm's production function.

Elias(1972) and Hendricks(1976) reported the results of experiments to test whether the presence of HRA information affects common stock investment decisions. In each experiment business students were given financial statements both with and without HRA data included and were asked to make an investment decision. The results were analyzed and each author concluded that the HRA data made a statistically significant difference in the decision. Both authors acknowledged that there are serious weaknesses with the external validity of such experiments, expecially since students were used as surrogates.

None of these suggestions or experiments reveals any evidence of market demand for HRA, merely ideas as to how it might be used. This is a major weakness in the argument for HRA. Other difficult and costly types of disclosure such as current cost accounting and lease capitalization came into being because there was some demand for them from financial statement users. Financial accounting principles have many of the characteristics of a public good; so demand for changes in them cannot be observed as a quantity purchased at a market price. However, various regulatory agencies such as securities commissions and professional accounting standard-setting groups are at least partly designed to respond to user needs for accounting rules, and HRA is conspicuous by its abscence from their priority lists.

## The Measurement Problem

The first problem is that human assets cannot be owned, and therefore there is no market value observable. Under the present historic cost system the price actually paid for an asset is recorded as the value. Under other measurement bases one may observe current replacement cost, current selling price or historic cost adjusted for inflation, and use that value on the balance sheet. Even the non-historic cost measurement systems are still based on observable market transactions, even though they may not be the transactions actually made by the firm. By contrast, there is no market value to be placed on human assets. As a result, the measurement systems proposed have to use surrogates which are intended to represent the actual value to the firm of the human resources. As previously defined in equations (3) and (4), they are trying to measure either the net asset or the gross asset, assuming no wage saving. The measurement proposals to capture one or the other value can by grouped under four types.

The first one is a very simple extension of historic cost recording of observed transactions. Costs believed to be associated with the human assets -- training, hiring, etc. -- are capitalized and expensed over several periods.

The R. G. Barry Corporation in the US was a pioneer in this form of HRA. The shortcomings of this model are numerous. All it does is to substitute one arbitrary allocation -- depreciation over x years -- for another -- 100% depreciation in the first year. An asset will be shown on the balance sheet regardless of whether one has been created. Even if an asset does exist, this cost-based measurement will only coincidentally reflect the value of the wage savings, which are not directly related to the costs incurred.

A more sophisticated model that tries to parallel the economic picture is advocated by Friedman and Lev(1974). They recommend that the wages of employees be compared with those of similarly qualified employees in comparable positions in other firms in the same industry and location. It is known that there are considerable differences to be observed in such salary comparisons, and for these to persist, they must reflect differences in personnel policies. The authors classify them as either training or indirect compensation. They propose the use of the present value of the expected future savings as a surrogate for HC.

There are three serious problems with this approach. First, they assume that the average wage rate in a homogeneous industry is equal to the marginal revenue product of the specific firm being examined. If all markets are perfectly competitive and production functions are identical, we would get this result, since the firms would be distinguishable only by their training and indirect compensation policies. These are very strong assumptions, however, and they do not propose any way of separating the effects of any imperfections from the desired effects. The second problem is a practical one. For the wage rates to be comparable, the individuals must have the same ages and life expectancies and the firms must employ homogeneous technology. The physical capital must be identically efficient or else there is the impossible task of measuring the individual's contribution to a joint product. Finally, there is no way to distinguish between wage differences caused by general and specific training. Recall that $W_o$ is less than W for general training but afterwards the wages must move to market level. For specific training, $W_o$=W, but $W_t$ thereafter is less. If we observe differing wage streams, which effect are we seeing?

No-one seems to have taken a further look at the gross asset model proposed by Lev and Schwartz(1971).[4] Its problems are common to all discounted cash flow models.[5] It needs estimates of the wage streams of all employees until termination, probabilities of their continued employment, including survival, and a discount rate. One particular problem will be determining the wage rate embedded in the welter of benefits available in today's markets.

The final type of measurement is a more complex version of the net asset approach that tries to combine behavioural determinants with observable wage and cost data. Flamholtz(1972a) presents the model that has been a major source of following works. The firm values a person for three attributes: productivity in the current job, promotability to a higher-ranked (ie. higher MRP) job and transferability to a different job. The individual's skill and activiation level and the organizational role and rewards will interact to produce the

[4] Friedman and Lev(1974) examined a net asset model, even though Lev had previously recognized that there wasn't a net asset!

[5] These problems also apply to the other models discussed, with the exception of the modified historic cost model.

quality of these attributes in an employee. The employee's satisfaction will determine the probability of his continued membership in the organization. This allows us to calculate an expected realizeable value to the firm.

Flamholtz(1972b) is a field study of the validity of the behavioural relationships modelled in this way. The rankings of the worth of 39 accountants in a public accounting firm by two managers are analyzed to see if the determinants used agree with the model. He shows that some amendments improve the model, but the changes are not significant.

In essence, the elements of conditional value have to end up as equation (3) if they are to be quantified. The other behavioural factors refine this by adding the probability of realization. Ogan(1976) is a field study that operationalizes a similar model, also using a public accounting firm. In it the determinants of conditional value and satisfaction become marginal revenues and costs and simple probabilities, with many of the values provided by management estimates.

Both Flamholtz and Ogan avoid the crucial problem of separating the marginal revenue product of a single factor in a joint process by using a service industry whose revenue is the individual service charge of each employee. To my knowledge, no empirical work has been done to apply this model to a manufacturing concern. Indeed, very few enterprises exist where the joint revenue problem would not be nearly insurmountable.

A second comment is that most of the information is management estimates. Estimates play an important role in other areas of accounting, but not in such a funadamental way. For example, bad debts expense will be some function of past experience, credit ratings, amounts past due, etc. These are observable values, and they can be combined to provide an estimate which will be closely correlated with the future realization. We cannot observe the variables going into the human asset model, because they are all estimates in themselves. More importantly, we cannot determine even ex post if the estimates were correct, because we can never observe the realized value of the human asset. We cannot calculate the variance of the error, which makes this model unreliable beyond the level of any other accounting estimate.

Ronen(1972) discussed Flamholtz(1972b) and made a comment relevant to any behavioural HRA model:

> ...the field experiment described was only an attempt to identify the determinants of the <u>perceived</u> worth of 39 accountants by listening to the discussions of two personnel managers. In this paper it was neither hypothesized nor shown that the perceived worth of an individual as reflected through ranking is predictably related to his <u>actual</u> worth to the organization. (pg. 267)

Dermer and Siegel(1974) test the validity of the behavioural relationships included in these HRA models. They did not find that expenditures on human resources were necessarily related to improvements in performance. In fact, there was some indication that better performance increased satisfaction, rather than the other way around.

There is one alternative which involves no measurement issues. This is the increased disclosure of raw data which bears on human resources issues -- wages by job class, turnover ratios, training expenditures, etc. Such

disclosures are already common in some European countries (see Lafferty and Cairns(1980)). There is apparently a demand for this type of information, since the disclosure is not always mandated, but it is generally in a social responsibility context.

The issue of cost is also one which advocates of HRA have ignored. The simple disclosure of raw data would be virtually costless. The extension of historic cost should be only a little more expensive, but the value of the information is very low due to its conceptual flaws. The discounted net and gross wage models require detailed information about each employee's age, wages, likely career path and probability of staying. The net wage model also needs a comparable average wage rate for the industry. The behavioural models then require all of this plus psychological data and marginal revenue product. These are clearly all quite expensive, as well as involving serious difficulties with the validity of the measurements achieved.

## Conclusion

This paper has shown that the existence of an unrecorded net human asset is much less likely than generally assumed in the HRA literature. Even where it does exist it will probably be smaller than others have stated, and the conditions allowing it to exist are unstable. The measurement of it is very difficult, far more so than for any other item currently included in practice. All of the measurements proposed are only surrogates for the human asset, and the variance between the value of the surrogate and the true value can never be known. The measurements are known to be very imprecise; so the HRA systems proposed are both unverifiable and unrealiable.

There does not seem to be much demonstrated demand for HRA, except perhaps for the simplest form of added disclosure of raw data. Moreover, only this alternative involves no measurement problems and insignificant costs. It is the only form of HRA which is not invalidated by the answers to one or more of the three questions posed in the introduction, and the only research still required is determination of what items to disclose. Accordingly, I must conclude that HRA should receive a low priority in future accounting research.

## References

Becker, Gary S., Human Capital, New York:Columbia University Press, 1964.

Canning, John B., The Economics of Accountancy, New York: Ronald Press Co., 1929.

Dermer, Jerry and Jacob P. Siegel, "Behavioural Measures in Accounting for Human Resources", The Accounting Review, (Jan. 1974), 88-97.

Dittman, David, Hervey Jruis and Lawrence Revsine, "On the Existence of Unrecorded Human Assets: An Economic Perspective," Journal Of Accounting Research, (Spring 1976), 49-65.

_____, "Unrecorded Human Assets: A Survey of Accounting Firms' Training Programs," The Accounting Review, (Oct. 1980), 640-48.

Elias, Nabil, "The Effects of Human Asset Statements on the Investment Decision: An Experiment," Journal of Accounting Research Supplement, (1972), 215-33.

Flamholtz, Eric, "Toward a Theory of Human Resource Value in Formal Organizations," The Accounting Review, (Oct. 1972a), 666-78.

_____, "Assessing the Validity of a Theory of Human Resource Value: A Field Study," Journal of Accounting Research Supplement, (1972b), 241-66.

Friedman, Abraham and Baruch Lev, "A Surrogate Measure for the Firm's Investment in Human Resources," Journal of Accounting Research, (Autumn 1974), 235-50.

Grove, Hugh, Theodore Mock and Keith Ehrenreich, "A Review of Human Resource Accounting Measurement Systems from a Measurement Theory Perspective," Accounting, Organizations and Society, 2, (3, 1977), 219-36.

Hendricks, James A., "The Impact of Human Resource Accounting Information on Stock INvestment Decisions: An Empirical Study," The Accounting Review, (Apr. 1976), 292-304.

Jaggi, Bikki, "Human Resources are Assets," Management Accounting, (Feb. 1976), 41-2.

Lafferty, Michael and David Cairns, Financial Times World Survey of Annual Reports, London, Eng.: Financial Times of London, 1980.

Lev, Baruch and Aba Schwartz, "On the Use of the Economic Concept of Human Capital in Financial Statements," The Accounting Review, (Jan. 1971), 103-12.

Mayers, David, "Non-marketable Assets and the Capital Market Equilibrium under Uncertainty" in M. C. Jensen, ed., Studies in the Theory of Capital Markets, New York: Praeger, 1972, 223-48.

Mossin, Jan, Theory of Financial Markets, Englewood Cliffs, NJ: Prentice-Hall, 1973.

Ogan, Pekin, "Application of a Human Resource Value Model:A Field Study," Accounting, Organizations and Society, Vol 1, No. 2-3 (1976), 195-217.

Ronen, Joshua, "Discussion of Assessing the Validity of a Theory of Human Resource Value: A Field Study," Journal of Accounting Research Supplement, (1972), 267-76.

Skinner, Ross M., Accounting Principles: A Canadian Viewpoint, Toronto: Canadian Institute of Chartered Accountants, 1972.

CAAA 1982 Conference
University of Ottawa

Roger Y.W. Tang
University of Calgary
C. Alan Holt
Calgary, Alberta

# FASB STATEMENT 52 AND ITS IMPLICATIONS FOR THE CANADIAN ACCOUNTING PROFESSION

The new Statement 52, "Foreign Currency Translation", was issued by the U.S. Financial Accounting Standards Board (FASB, 1981a) in December, 1981. This Statement replaces the controversial FASB Statement 8 (FASB, 1975) and supersedes Statement 20 (FASB, 1977). Public companies in the U.S. must apply the new rules in Statement 52 for their fiscal years beginning on or after December 15, 1982, and early adoption is encouraged.

For many companies, this new Statement is expected to reduce the volatility of reported earnings caused by changes in foreign exchange rates. The new rules in the Statement may also have far-reaching implications for foreign exchange risk management and other business practices.

From a Canadian point of view, Statement 52 provides new alternatives to resolve similar accounting issues in Canada. From a global point of view, future standards to be issued by the Canadian Institute of Chartered Accountants (CICA) in this area may represent a step either towards or away from harmonization of international accounting standards. World standards are presently not harmonious with several different translation methods in use both worldwide and in Canada alone. The importance of finding an acceptable standard for foreign currency translation is underscored by the number one ranking occupied by translation category problems in a recent study of international accounting problems sponsored by the American Accounting Association (Scott and Troberg, 1980).

Statement 52 is the product of a painstaking process in which there was extensive participation by the FASB's constituency over a three-year period. Two exposure drafts were issued by the FASB for public comment, one in August 1980, the second in June 1981. Observers representing the International Accounting Standards Committee, the Accounting Standards Committee of the U.K. and Ireland, and the CICA also participated in the activities sponsored by a special advisory task force. After some modifications, the second exposure draft was issued as Statement 52. Application of the statement was adopted by a four to three vote of the seven-member Board.

The purpose of this paper is twofold. First, the new rules in Statement 52 and their implications for financial management will be discussed. Second, these new rules will be examined from a Canadian perspective to determine whether they are adequate to serve as Canadian accounting standards. Possible changes in these rules to accomodate the Canadian environment will be explored and future actions to be taken by the accounting profession will be suggested.

## New Rules in FASB Statement 52

### The Functional Currency Approach

An important element of Statement 52 is the determination of the foreign entity's functional currency. This is the currency of the primary economic environment in which the entity operates. In other words, it is the currency of the economic environment in which its assets, liabilities and operations exist and generate or consume cash. The translation method and the disposition of translation adjustments for each foreign entity depend on the functional currency used.

If the functional currency of a foreign entity is the U.S. dollar, the translated financial results would be substantially the same as under FASB statement 8, including the requirement to record translation adjustments in income. The exceptions are that a foreign entity's deferred income taxes and the unamortized policy acquisition costs of a stock life insurance company must now be translated at the current exchange rate.

If the functional currency of the entity is a foreign currency, the rules in Statement 52 become distinctly different from those in Statement 8. All of the entity's assets and liabilities must be translated using the current exchange rate at the balance sheet date. Revenues and expenses, including cost of goods sold and depreciation are generally to be translated using a weighted average exchange rate for the accounting period. Translation adjustments are to be recorded in a separate component of stockholders' equity, rather than in income. However, gains and losses from transactions that are receivable or payable in a currency other than the functional currency are included in income.

Upon sale or upon complete or substantially complete liquidation of an investment in a foreign entity, the amounts accumulated in the translation adjustment component of equity are to be removed and included as a gain or loss in determining net income.

### Rules for Remeasurement of Accounts into the Functional Currency

One possible complication for applying the functional currency approach is that an entity may keep its books and records in a currency other than its functional currency. In such a case, the statement requires remeasurement into the functional currency prior to the translation process. The remeasurement process should produce the same result as if the entity's books of record had been initially recorded in the functional currency. To achieve that result, nonmonetary balance sheet items carried at cost and related revenue, expenses, gain, and loss accounts have to be remeasured into the functional currency using historical rates. The current rate is to be used for all other accounts.

The following are some common accounts that must be remeasured using historical exchange rates:

- marketable securities and inventories carried at cost,
- prepaid expenses,
- property, plant, and equipment,
- accumulated depreciation on property, plant, and equipment,
- patents, trademarks, goodwill and other intangible assets,
- deferred income,
- common stock, and
- preferred stock carried at issuance price.

Examples of revenues and expenses related to these nonmonetary items are cost of goods sold, depreciation of property, plant, and equipment and amortization of intangible assets.

## Translation of Operations in Highly Inflationary Economies

Translation of operations in highly inflationary economies is often cited as a problem if all assets and liabilities are translated using current exchange rates because the currency units of those economies are not useful measures of performance or investment, and a more stable unit of measure is needed. A special rule was therefore provided in Statement 52 to deal with this problem. If a foreign entity's functional currency has been subject to a cumulative inflation rate of about 100 percent or more over a three-year period, the Statement requires that the U.S. dollar be used as if it were the functional currency. Therefore, for entities operating in countries like Argentina and Brazil, the U.S. dollar would be the functional currency, and the results would be essentially the same as under Statement 8.

On December 22, 1981, the FASB issued an exposure draft (FASB, 1981b) which would amend FASB statement 33 (FASB, 1979) to accommodate the changes in the method of accounting for foreign currency translation set out in Statement 52. The exposure draft, if adopted, would require that, for purposes of preparing supplementary information on the effects of changing prices, an enterprise measuring part of its operations in a functional currency other than the U.S. dollar shall use a functional currency general price level index to restate the functional currency amounts into constant foreign functional currency and then translate those amounts into U.S. dollar equivalent amounts.

## Foreign Currency Transactions

Foreign currency transactions are defined as those denominated in a currency other than an entity's functional currency. These transactions may produce foreign currency receivables, payables, and cash. Gains and losses on settled foreign currency transactions are increases or decreases in functional currency cash flows and must be included in determining net income with the following exceptions:

a. Gain and losses attributable to a foreign currency transaction that is an economic hedge of net investment in a foreign entity are to be reported in equity.

b. Gains or losses attributable to intercompany foreign currency transactions and balances that are of a long-term financing or capital nature are also to be reported in the equity section. However, adjustments to intercompany balances arising from normal trading activities would still be included in income.

c. Gains or losses on transactions that are intended to hedge an identifiable foreign currency commitment should be deferred and reported as an adjustment of the future transaction that results from the commitment. Losses are not to be deferred, however, if it is expected that deferral would lead to recognizing losses in later periods.

A foreign currency transaction will be considered as a hedge of an identifiable foreign currency commitment if both of the following conditions are met:

- The foreign currency transaction is designated as, and is effective as, a hedge of foreign currency commitment.

- The foreign currency commitment is firm.

These conditions represent a relaxation of some rules in Statement 8 and Statement 20 which limit hedge accounting to forward exchange contracts.

Implications for Financial Management

As discussed above, there are major differences between FASB Statement 8 and Statement 52. While the premise underlying Statement 8 is a U.S. dollar perspective, the proposition adopted in Statement 52 is clearly a multiple functional currency one. In other words, under statement 8, the U.S. dollar was designated as the functional currency for all foreign operations. Under Statement 52, however, the functional currency of a foreign entity can be a local currency if its operations are relatively self-contained and integrated within a particular country or economic environment.

Some of the new rules in Statement 52 and certain decisions required in applying these rules may have significant implications for financial management in a multinational company. Also, under the new Statement a company could report earnings that are unchanged, better or worse than those under Statement 8. As discussed earlier, if the functional currency of a foreign entity is the U.S. dollar, or if the entity operates in highly inflationary economies, the reporting results related to that entity would be substantially the same as those under Statement 8. If a foreign entity's functional currency is the local currency, and the entity has U.S. dollar denominated balances, translation under the functional currency approach could give rise to gains or losses that would not result under Statement 8. According to the new rules, the entity must first translate the U.S. dollar denominated balances to its foreign functional currency. This may result in adjustments to its income unless the balances qualify

under the exceptions discussed earlier.

In short, the decision management has to make on functional currencies of foreign entities is critical to the calculation and disposition of translation adjustments. Since the new rules do not have to be applied until calendar year 1983, management may want to introduce changes in foreign operations to take advantage of certain rules. One example would be to change the functional currency of a foreign entity to (or from) the U.S. dollar. Of course, a cost-benefit analyses of each potential alternatives should be done before any action of this kind is taken.

The new Statement also has important implications for foreign exchange risk management. Under Statement 8 using the temporal method, only assets or liabilities carried at current prices are exposed to foreign exchange risk in the accounting sense. The net accounting exposure is the difference between assets and liabilities carried at current prices because those items have to be translated at the current rate. Under Statement 52, however, all assets and liabilities of the entity are exposed to foreign exchange risk if the functional currency is not the U.S. dollar. In other words, an effective accounting exposure hedge under Statement 8 may not be effective under Statement 52 and vice versa.

## Adequacy of Statement 52 as a Canadian Standard

Increased volatility in foreign currency exchange rates has posed complex problems to many financial executives in Canada. Some companies have altered certain corporate practices in order to reduce foreign exchange risk (Carmichael, 1980, p.32).

Accounting and reporting practices in foreign currency translation in Canada are not standardized and are applied inconsistently. According to the 1979 edition of Financial Reporting in Canada, out of the 220 companies surveyed, 92 used the current noncurrent method, 29 current rate, 26 temporal, five historical, five monetary-nonmonetary, and the remaining 63 used a variety of other methods (CICA, 1979).

In September 1978, the CICA issued its Handbook Section 1650, "Translation of Foreign Currency Transactions and Foreign currency Financial Statements." For a detailed discussion of that Section, see Wiley (1979). Standards in Section 1650 were similar to those of FASB Statement 8 with a notable exception relating to the treatment of foreign currency long-term debt. Section 1650 was suspended, however, in February 1979 in the wake of several studies of its impact prompted by the concerns expressed by a number of Canadian companies (Denman, 1979). Currently, a special task force, made up of representatives from a number of concerned industries, is working with the Accounting Research Committee (ARC) of CICA to develop standards on foreign currency translation. The ARC continues to monitor developments in the U.S. and U.K., and is expected to release an exposure draft soon.

With the formal issuance of FASB Statement 52, it is appropriate to examine the adequacy of the Statement to serve as a Canadian standard.

Before doing this, however, we should review two opposing views on the propriety of adopting U.S. accounting standards as Canadian standards.

In recent years, we have witnessed continuing debates on the appropriateness of adopting U.S. standards as Canadian standards. On the one hand, some writers maintained that there are enough differences between Canadian and U.S. environments to justify a significantly different set of accounting principles and reporting standards for Canada (Stamp, 1980; Skinner, 1981). In a paper, Stamp maintained that Canada is a unique nation, quite different in its background, character and outlook from the United States (Stamp, 1980). He also noted that the U.S. approach to standard setting depends too much on normative, axiomatic and even authoritarian prescriptions as well as being directed largely towards the needs of investors. This approach is inappropriate, in Stamp's opinion, for the much wider group of financial statement users in Canada. Another major concern of this group of writers is that the importation of detailed standards from the U.S. may place a heavy burden on purely Canadian companies and increase the pressure to differentiate between the standards required for small and large companies (Skinner, 1981).

Another group of writers, however, holds that a distinctive Canadian national identity does not require an independent set of accounting principles (Sands, 1980, Boersema, 1981). A case was made by Boersema (1981, p.30) for not straying far from the U.S. practices:

> Canadian financial markets are, to a significant extent, intertwined with those in the U.S. The securities of many Canadian companies are listed on U.S. exchanges; and companies raise large amounts of debt in the U.S. Furthermore, many Canadians buy shares of U.S. companies. It seems indisputable that this interrelationship of our financial markets requires that differences in accounting practices between the two countries be held to a minimum.

One way to utilize FASB's efforts, as Boersema suggested, is to publish each FASB statement in Canada as an exposure draft with comments solicited in the usual manner. Based on these responses and a possible public hearing, the ARC could decide to adopt the statement or issue a further exposure draft for a Canadian amendment.

Each of the above two opposing views has some merits as well as weaknesses. In the area of foreign currency transactions, while we disapprove of the blanket acceptance of FASB Statement 52, we also reject the idea of formulating Canadian standards which are completely different from those in the U.S. FASB Statement 52 cannot be accepted without modifications because the environmental factors confronting many Canadian firms may not be the same as those facing U.S. firms. On the other hand, to formulate a Canadian standard completely different from FASB Statement 52 would not be cost effective. It is recommended that the following be done in Canada:

- Examine Statement 52 thoroughly and explore its implications to the preparers and users of financial statements.

- Revise Statement 52 to take into account some unique environmental factors facing Canadian businesses.

- Issue an exposure draft for public comments. The exposure draft should be based on a revised version of Statement 52 and not the Statement itself.

The authors realize that some of the above have been done to some extent by the ARC and the special task force. To serve as an input into the standard-setting process, we will first point out two major differences between the environmental factors facing U.S. corporations and those confronting Canadian firms and then recommend what changes to Statement 52 are needed.

From our experience and by reading relevant literature, we observed two significant differences between situations faced by the U.S. and Canadian firms:

1. While many foreign subsidiaries of U.S. corporations are using the U.S. dollar as their functional currencies, a majority of Canadian foreign subsidiaries may be using currencies other than the Canadian dollar (mainly the U.S. dollar) as their functional currencies.

2. Many U.S. multinationals have considerable amounts of investment in highly inflationary economies including Brazil, Argentina and some developing countries. For example, as of the end of 1979, the U.S. direct investment position abroad was $192.6 billion, of which, $47.8 billion (25 percent) was invested in Latin America and other developing regions (Whichard 1981). Most Canadian multinationals invest thier capital in the U.S. and other industrial nations that are not highly inflationary economies as defined by Statement 52. According to Litvak and Maule (1981), by the end of 1977, most of the C$13.4 billion Canadian direct investment abroad (CDIA) was located in the developed world. For example, the United States accounted for 52.3 percent of total CDIA, the European Economic Community 16.7 percent, and Australasia 3.6 percent. Only about 14 percent (or C$1.9 billion) was located in developing countries. In addition, CDIA is highly concentrated in a few large enterprises. Data published by Statistics Canada in 1968 revealed tht twelve large Canadian enterprises accounted for about 69 percent of total CDIA. Based on other data collected by Litvak and Maule (1981, p. 338), this percentage may in fact understate the current high level of concentration of CDIA in a handful of Canadian firms.

For simplicity and because of the above differences, it is suggested that the ARC adopt the current rate method in any forthcoming exposure draft on foreign currency translation. More specifically, all assets and liabilities of foreign entities should be translated using the current exchange rate at the balance sheet date. Revenue and expenses would be translated at a weighted average exchange rate. This is consistent with

the rules in Statement 52 that must be applied when the functional currency of the foreign entity is a local currency. A comprehensive study by Parkinson (1972, pp. 34-48) also concluded that the current rate method was more logical than the monetary-nonmonetary method. The current rate method has also been used in several countries including the U.K. for a number of years without many serious problems.

The requirement of using the temporal method for entities in highly inflationary economies should not be considered at this stage because few Canadian multinationals invest in highly inflationary economies. Another reason for dropping this requirement is because the CICA has just issued a new exposure draft on accounting for inflation on December 21, 1981. Adopting the Statement 52 rule for highly inflationary economics at this time may create unnecessary complications for setting standards in inflation accounting.

Those changes discussed above are by no means the only changes that need to be made to Statement 52. Other amendments should be included in the Canadian exposure draft as they are deemed necessary and reasonable.

## Policy Implications for the ARC

Following the above discussion, it seems that the ARC should take the following actions to develop Canadian standards in foreign currency translation:

1. Continue to monitor reactions to Statement 52 including those responses by Canadian companies registered with the U.S. Securities Exchange Commission. In fact, the Statement is supported by only four of the seven FASB board members. The three dissenting members, one of whom is the Chairman, do not believe that the Statement improves financial reporting partly because it "adopts objectives and methods that are at variance with fundamental concepts that underlie present financial reporting." (FASB, 1981a).

2. Continue to monitor developments in the U.K. and those in the International Accounting Standards Committee.

3. Issue an exposure draft by revising Statement 52 and taking into account special environmental factors confronting Canadian enterprises.

4. Sponsor or support empirical studies to test the validity of assumptions and reasonableness of proposed standards in the new exposure draft. Another research study similar to that by Parkinson (1972) may be long overdue. This type of study could be done in cooperation with other professional accounting associations and the Canadian Academic Accounting Association.

## Summary and Conclusions

The paper has attempted to review Statement 52 from a Canadian perspective. It has been shown that the Statement introduced some fundamental changes in philosophy and methodology from Statement 8. Our examination of Statement 52 in a Canadian context has led us to conclude that some changes are required before the Statement can be adopted as a Canadian standard. Several examples of such changes have been discussed in the paper. It is our view that the current rate method should be adopted in any future exposure draft issued by the ARC. We have also recommended other actions which need to be taken by the ARC in the near future.

Foreign currency translation is a controversial and yet important area of corporate financial reporting. Whatever set of standards adopted in Canada will have significant implications for financial reporting and for foreign exchange risk management by Canadian enterprises. A new and workable Canadian standard in this area will go a long way towards rectifying the apparent lack of standards and inconsistent accounting and reporting practices in foreign currency translation.

## REFERENCES


Boersema, John, "Corporate Reporting in Canada and the U.S.," CA Magazine (July 1981), pp. 30-35.

Canadian Institute fo Chartered Accountants, Financial Reporting in Canada, Toronto: CICA, 1979.

Carmichael, Edward A., Foreign Exchange Risk Management in Canadian Companies, Ottawa: The Conference Board of Canada, 1980.

Denman, John, "New insights into financial reporting in Canada," CA Magazine (May 1980), pp. 71, 72, 74, 75.

Financial Accounting Standards Board, "Accounting for the Translation of Foreign Currency Transactions and Foreign Currency Financial Statements," Statement of Financial Accounting Standard No. 8 (FASB, October 1975).

_____, "Accounting for Forward Exchange Contracts," Statement of Financial Accounting Standards No. 20 (FASB, December 1977).

_____, "Financial Reporting and Changing Prices" Statement of Financial Accounting Standards No. 33 (FASB, September 1979).

_____, "Foreign Currency Translation," Statement of Financial Accounting Standards No. 52 (FASB, December 1981a).

_____, "Financial Reporting and Changing Prices: Foreign Currency Translation," Exposure draft (FASB, December 1981b).

Litvak, Isaiah A. and Christopher J. Maule, "The Emerging Challenge of Canadian Direct Investment abroad," in K.C. Dhawan, Hamid Etemad and Richard W. Wright, eds., International Business: A Canadian Perspective, Don Mills, Ontario: Addison - Wesely, 1981, pp. 336-357.

Parkinson, MacDonald, Translation of Foreign Currencies, Toronto: CICA, 1972.

Sands, J.E., "Millions Wasted?" Letters, CA Magazine (November 1980), p. 6.

Scott, George M. and Pontus Troberg, Eighty-Eight International Accounting Problems in Rank Order of Importance - A DELPHI Evaluation, Sarasota, Florida: American Accounting Association, 1980.

Skinner, Ross M., "A declaration of independence," Letters, CA Magazine (February 1981), pp. 6, 8.

Stamp, Edward, "Accounting Standard Setting-A New Beginning," CA Magazine (September 1980), pp. 38-42.

Whichard, Obie G., "Trends in the U.S. Direct Investment Position Abroad, 1950-79," Survey of Current Business (February 1981), pp. 39-56.

Willey, Russell W., "Foreign Currency Translation on the Shelf," CA Magazine (April 1979), pp. 26-31.