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Information Economics and Management Accounting: A Brief Personal Perspective

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PREAMBLE

In November I turned 66, and in December, June and I celebrated our 44th wedding anniversary. We were married in 1960, just after I had completed five years of study and work to become a Chartered Accountant, and just before I began my academic career by teaching financial accounting at the University of Alberta. Our first daughter Tracy was born before I began my Ph.D. studies at Berkeley in 1963, while daughters Shari and Sandra were born before I completed my Ph.D. in 1967. During the past four years we have celebrated three marriages and the birth of our granddaughter Kaila.

In addition to these blessings in our family, the last 18 months has been a time of much blessing in my academic life. These blessings include induction into the Royal Society of Canada and parties honoring me as I reached the mandatory retirement age of 65 in 2003, a Lifetime Achievement Award from the Institute of Chartered Accountants of British Columbia and Induction at the AAA Annual Meeting into Ohio State University's Accounting Hall of Fame in 2004, and the Lifetime Contribution to Management Accounting Award from you, my academic colleagues in management accounting, in 2005.[1]

I thank God for those blessings, and I thank all those who have contributed to them. This includes my parents and grandparents, June and our three daughters, professors and fellow students at the Universities of Saskatchewan and Berkeley, colleagues and students at the University of Alberta, Stanford, and the University of British Columbia, co-authors and numerous friends inside and outside the academic community.

Most of those individuals will go unnamed today. However, in the next few minutes I will mention a few as I describe some highlights of my life that relate to my involvement in the application of information economic analysis to management accounting research.

MANAGEMENT ACCOUNTING RESEARCH MEETS INFORMATION ECONOMICS

1963 was a time of great change in society and in accounting research. Berkeley was a highly stimulating and creative place, and it was here I became interested in management

[1] Since the conference I learned that I am included in the set of 17 accounting authors selected in Colasse (2005) as one of the *Grand Auteurs en Comptabilité.* The first author in the international list is Luca Pacioli, the 15th century monk and mathematician who first wrote about double-entry bookkeeping.

These remarks are a slightly expanded version of the notes I used in making my remarks in response to receiving the Lifetime Contribution to Management Accounting Award from the Management Accounting Section of the American Accounting Association at the Midyear Meeting in Scottsdale, Arizona, on January 7, 2005.

accounting. We were required to write comprehensive examinations in economics and organization theory, plus two fields of our choosing. I chose accounting and management science.

- Interestingly, the year long Ph.D. course covering micro- and macro-economic theory did not consider information or even models involving uncertainty.
- However, in the year long ***organization theory*** course I was exposed to a variety of new research on decision making under uncertainty (e.g., von Neumann and Morgenstern 1947), decision making in organizations (e.g., March and Simon 1958 and Cyert and March 1963), and drafts of chapters of Marshak and Radner's *Theory of Teams* (1972) which explored the economics of information within organizations.
- In my ***management science*** courses I studied a variety of mathematical decision models, including dynamic stochastic inventory models.
- In my two ***accounting theory*** courses, Hector Anton challenged us to think deeply about the information role of accounting.

John Butterworth, Ted Mock, and I recognized that information economics, which was in its infancy, could be a useful tool in exploring the information role of accounting. We formed a study group with Bart McGuire (a management science faculty member) and proceeded to write dissertations that used these tools.[2] We had no idea that we were at the vanguard of a significant area of future accounting research. However, we were at the right place at the right time.

Management science had developed out of the use of scientists in dealing with logistical problems during the Second World War. Research in statistical decision theory had developed significantly during the 50s, including Blackwell's classic work on informativeness, and economics was beginning to pay attention to uncertainty and information. The following is one of my favorite quotes from that era. In 1961, Stigler (a Nobel Prize winner) wrote:

> One should hardly have to tell academicians that information is a valuable resource: knowledge *is* power. And yet *it occupies a slum dwelling in the town of economics.* Mostly it is ignored: ... There are a great many problems in economics for which this neglect ... is no doubt permissible or even desirable. But there are some for which this is not true, and I hope to show that some important aspects of economic organization take on new meaning when they are considered from the viewpoint of the search for information.

Classical accounting thought viewed financial accounting primarily as a measurement activity that provides descriptions of events that could be used by a variety of decision makers. In the research dealing with financial accounting reports there was little or no explicit exploration of the link between accounting reports, the decisions that are based on those reports, and the consequences of those decisions.

On the other hand, in the 20s, Clark had provided a very thoughtful decision oriented analysis of overhead costs in his book, *The Economics of Overhead Costs*. He believed that "the backbone of the science of economics is balancing of value against cost" (Clark 1923, 17) and he believed that the economist may well study the accountant's conception of cost, since it constitutes an economic force which affects the conduct of business and the laws

[2] John's dissertation, *Accounting Systems and Management Decision: An Analysis of the Role of Information in the Management Decision Process*, was a runner up for the 1967 McKinsey Foundation Post-Doctoral Dissertation Award, and was the basis for Butterworth (1972). Ted's dissertation, *The Evaluation of Alternative Information Structures*, served as the basis for Mock (1969, 1971).

of value and production. But he believed just as strongly that the accountant should know the meaning of cost from the standpoint of disinterested economic science, because it embodies, in a sense, the impossible goal to which his practical devices serve as approximations.

Clark recognized "that there are different kinds of problems for which we need information about costs, and that the particular information we need differs from one problem to another." He provides nearly 500 pages of discussion and analysis based on this user-oriented perspective. Clark's analysis differed significantly from the writings of accountants at the time, but his thoughts ultimately impacted the management accounting literature. For example, this perspective is reflected in an National Association of Cost Accountant's 1945 statement on "The Uses and Classification of Costs":

> Cost accounting is a means to an end, and not an end in itself. Accordingly, any study of the field of cost accounting should start with a study of the ends to be served—the uses to be made of cost data. Only by clearly describing and relating the various purposes for which costs are to be used is it possible to determine the types of cost data needed for each purpose and the principles and techniques which should govern their development.

Hence, this literature shifted the focus from cost determination for financial reporting to cost analysis for decision making.

Beginning in the 50s, several accounting authors called for more explicit analysis of the users of accounting reports. Perhaps the most influential exhortation came from *A Statement of Basic Accounting Theory* that was published in 1966 by a committee of the American Accounting Association (AAA). The Committee clearly stresses an information-for-decisions perspective throughout its statement. In the conclusion, the Committee provides a list of areas of basic research which might contribute to the development of accounting theory. The user perspective is illustrated by the following:

> The greatest accounting need both at present and in the future is the determination of the nature of information needs of users of accounting communications. *No one really knows what individuals or any organization wants, or what they should want, and there is a need for some fundamental research on this question.* ... Research here should ... involve investigating the interrelations of the decision models of the users with the nature and form of the information required and of the accounting model itself. (AAA 1966)

They considered both the external and internal uses of accounting information. Furthermore, within each category, while the discussion centered on the decision making and planning roles of accounting, they also discussed stewardship and control. Joel Demski and I would later refer to these as the *decision-facilitating* and *decision-influencing* roles of accounting information (Demski and Feltham 1976, Chapter 1).

My dissertation can be viewed as one of several in the mid-60s that picked up the challenge to give more attention to information for decision making perspective in accounting. My thesis was entitled *A Theoretical Framework for Evaluating Changes in Accounting Information for Managerial Decisions*. It developed a general dynamic model of uncertainty and information, and then used a series of inventory models to illustrate how the accuracy, timeliness, and relevance of information affects the decision maker's (or, more generally, the information evaluator's) payoff. I am thankful for the support of a Ph.D. Dissertation Fellowship from the Arthur Andersen Foundation, since it allowed me to stay an extra year at Berkeley (we now had three daughters) and more fully develop my thoughts on the

factors that affect the value of accounting information. I enjoyed the process, but did not view my dissertation as anything more than meeting Berkeley's Ph.D. requirements. The following anecdote illustrates that statement.

When I completed my dissertation, Hector Anton said I should submit it to the McKinsey Foundation for consideration for their Post-Doctoral Dissertation Award, which "is given for an outstanding doctoral dissertation that is concerned with the social or analytical processes of top management." With limited resources to support my wife and three daughters, I told Hector that it did not seem prudent for me to spend money on making several copies of my dissertation for the submission. However, Hector felt strongly about this and obtained a $250! grant to defray the costs of getting my dissertation typed by a very good technical typist and for making the necessary copies. Needless to say, I was greatly surprised when my dissertation was selected as the winner by a group of well-known professors from a variety of business schools (none of whom were in accounting). The prize was $4,000, which equaled one-third of my starting salary at Stanford.

The surprises kept coming when a paper from my dissertation was a co-winner of the 1968 AAA manuscript contest and was published in the *Accounting Review* (Feltham 1968). In addition, a revised version of my dissertation was accepted for publication in the AAA research monograph series under the much shorter title of *Information Evaluation* (Feltham 1972).

In 1967 I became an assistant professor at Stanford, and Joel Demski joined the Stanford faculty the following year. He had become interested in information economics as a result of reading John Butterworth's and my dissertations. Our initial collaboration was "The Use of Models in Information Evaluation," (Feltham and Demski 1970) which was published in *The Accounting Review* and received the AICPA Notable Contribution to Accounting Literature Award. This paper used an information economics framework (in which the information evaluator was not necessarily the decision maker) for classifying a broad range of accounting research (analytical, empirical, and experimental) with respect to the contribution each type made to the assessment of the value of alternative accounting information structures.

In 1968, the AICPA asked the Stanford accounting faculty to undertake a research study of basic cost concepts and their application in cost determination for a wide range of users, including cost-based government contracts.[3] They approached Stanford because Chuck Horngren and Bob Jaedicke were senior members of the group and they had written very successful cost accounting and management accounting text books. We initially employed the user decision model approach employed in their texts, and which followed from the previously mentioned work of J. M. Clark. However, Joel and I became uneasy with what we called the "conditional truth" approach. In its place we began to develop an information economics approach which focused on the cost/benefit tradeoffs of alternative information structures and decision rules. We were "wet-behind-the-ears" assistant professors at the time, but we convinced our senior colleagues our approach was more appropriate. A report of the group's work was made to the AICPA, but they chose not to publish it. However, Joel and I continued refine our thoughts and ultimately published it as *Cost Determination: A Conceptual Approach* (Demski and Feltham 1976). We asked Chuck and Bob to stay on as co-authors, but they felt that it was now very much our work and, as Chuck said, "If my name is on it, someone might ask me to come and explain it." This

[3] The AICPA initiated this project in response to discussions in government regarding the development of cost accounting standards, perhaps by the Government Accounting Office. The AICPA wanted to be able to demonstrate that their interest and expertise in accounting standards extended beyond financial accounting.

book has had limited circulation, but it had a profound effect on how I taught my advanced undergraduate and MBA cost analysis courses at the University of British Columbia (U.B.C.).

ACCOUNTING RESEARCH MEETS AGENCY THEORY

In 1971 I left Stanford to return to Canada, and rejoined my good friend John Butterworth, who was now at UBC.[4] John, Joel, and I continued to work on information economic analyses of decision-facilitating information until I went back to Stanford in 1975–76 on sabbatical leave. That year Joel and I sat in on a new sequence of economics courses by Stiglitz and Grossman that considered moral hazard and adverse selection problems that arose from differences in information between contracting parties. Stimulated by a paper on sharecropping by Stiglitz (1974) and a research monograph by Ijiri (1975), Joel and I realized that our information economic analyses had not paid attention to the decision-influencing role of accounting. This led us to write "Economic Incentives in Budgetary Control Systems," which was published in *The Accounting Review* (Demski and Feltham 1978). We did not receive any awards for that paper at that time. However, 16 years later, we received the 1994 AAA Seminal Contribution to Accounting Literature Award. I had again been in the right place at the right time, so that I was in at the start of another major area of accounting research. This time it was agency theory, which I view as a subcomponent of information economics.

Virtually all the early agency theory models represented the agent's actions as a single-dimensional effort variable.[5] I constantly updated my Ph.D. course on agency theory by bringing in material from new papers in accounting and economics. One year I introduced a Holmstrom and Milgrom (1991) paper that represented the agent's action as consisting of multiple tasks, each with its own performance measure. Jim Xie and I extended their model to consider a vector of performance measures, and recognized that a measure could be influenced by the effort in a variety of tasks. This allowed us to explore the impact of both performance measure noise and congruity on the value of alternative reporting systems. We also illustrated that market price is not likely to be an efficient aggregate performance measure. The resulting paper, "Performance Measure Congruity and Diversity in Multi-task Principal/Agent Relations," was published in the *Accounting Review* (Feltham and Xie 1994) and was awarded the 1999 Notable Contribution to Management Accounting Literature Award from the Management Accounting Section of the AAA.

In 2000, I teamed with Peter Christensen and Martin Wu (two former Ph.D. students) to publish a paper in the *Accounting Review* (Christensen et al. 2002) that resulted from what I consider to be an error in most management accounting texts. These texts discuss the use of residual income[6] as a divisional performance measure and, if they are explicit about the nature of the capital charge, they state that it should be risk-adjusted. However, if the manager is risk averse, then charging him a risk premium for the capital he uses will result in the manager "double counting" the effects of risk. Hence, we demonstrate that the appropriate charge is the riskless interest rate if residual income is used as the basis for a risky incentive contract for a risk averse manager. Recognition of this error came while I was teaching an advanced undergraduate course on performance evaluation, and

[4] John died of cancer in 1984, at the age of 58. In 1988, Amin Amershi, Bill Ziemba, and I edited a book published in honor of John. It contains papers on information economics by a number of leading accounting researchers.
[5] Gjesdal (1982) is an exception.
[6] I have not included any discussion of the residual income models I developed with Jim Ohlson since those models have limited relevance for management accounting.

stemmed from my understanding of the impact of market risk on optimal incentive contracts. That understanding came from teaching and doing theoretical research in both agency theory and the role of information in capital markets. This paper has not won any awards, but I think it is a neat contribution to the management accounting literature.

THE BOOK

In 1978, Tom Dyckman,[7] who was the Director of Research for the AAA, asked Joel and me to write a monograph on "the state of the art in information economics and its impact on accounting." We began work on it and I used some of the materials we wrote in my two Ph.D. seminars on analytical research in accounting. One course examined the impact of information in financial markets and the other examined the impact of information in organizations. Progress on the monograph went slowly. In part this was due to the fact that I was at UBC and Joel was at Stanford, and then he moved to Yale. However, a more significant reason was that as Joel and I worked on the book and taught our Ph.D. courses, we kept identifying "holes" in the existing literature and we always found it interesting to stop and "fill the holes." In the early 90s, Joel said that he did not think we would ever complete the monograph. I agreed, but I said I wanted to reserve the right to return to the monograph even though it was unlikely I would do so. I had over 250 pages of lecture notes for each of my two Ph.D. courses that could serve as the basis for the monograph. In 1999, Peter Christensen, a former Ph.D. student, asked me if I was going to complete the monograph. I said I was interested, but it was too much work to do alone. Peter volunteered to join me as a co-author, and I accepted. We had co-authored several papers, so that I knew he would be an excellent co-author for the book (it was now getting too long to be called a monograph).

When we started, Peter and I thought the book would be between 700 and 800 pages. However, it kept growing. Hence, we decided to divide it into two volumes. The first volume, *Economics of Accounting: Volume I—Information in Markets* (Christensen and Feltham 2003), is 600 pages and was published by Kluwer. They sold the first printing and Springer, who took over Kluwer, has just completed printing a soft cover version.

The second volume, *Economics of Accounting: Volume II—Performance Evaluation* (Christensen and Feltham 2005), is also over 600 pages. The second volume will be of more direct interest to management accounting Ph.D. students and faculty. These books are written at the technical level at which I teach my two courses, and each contains more material than can be covered in a course. However, we have sought to pull together a broad range of fundamental analytical research and make it more accessible than if one tries to read all the basic papers in the field. There are a total of 30 chapters. Chapter 1 is an introduction to the first volume and Chapter 16 is an introduction to the second volume. Chapters 2, 3, and 4 provide background material on decision making under uncertainty, decision facilitating information, and risk sharing that are relevant to both volumes. The analysis in the second volume ranges from optimal contracts in single-period, single-agent, single-task models with contractible outcomes, to optimal linear contracts in multi-period, multi-task, and multi-performance measure models. We also consider intra- and inter-period renegotiation of contracts, and contracting with multiple agents who may be able to collude.

Peter and I kept fairly well focused on the book, but we still succumbed from time to time to the lure of "filling holes." As a result we have written or are in the process of writing several agency theory papers involving multiple periods and multiple agents.

[7] Tom used to call us "Felski," since he said he could not tell us apart! Even though I have much more hair than Joel!!

ACCOUNTING RESEARCHERS: ENGINEERS OR SOCIAL SCIENTISTS?

The initial information economics research in accounting had an operations research orientation. It was an "engineering" approach, which focused on the optimal choice of accounting system characteristics. On the other hand, the capital markets research initiated at Chicago in the 60s had an empirical economics orientation. It was a "social science" approach, which focused on the association between accounting numbers and stock prices. One approach explicitly seeks to help design a better system, while the other seeks to help us understand the reasons for and consequences of differences or changes in existing systems.

Empirical capital market research in accounting has naturally continued with the social science approach, with occasional forays into making normative statements based on the evidence obtained. On the other hand, information economics research in accounting shifted in the late 70s from a purely engineering approach to a predominantly social science approach. We shifted from close ties with operations research, to close ties with mathematical economics, stimulated by the innovative work in information economics by such notables as Akerlof, Spence, Stiglitz, Grossman, Milgrom, and Holmstrom. Their social science approach became the hallmark of information economic research in accounting since the early 80s.

Of course, information economics models typically assume that all individuals are rational and identify optimal choices given the setting. Hence, one can give the models an engineering interpretation. I often adopted that perspective when using agency theory in my undergraduate and MBA courses on performance evaluation and incentives.

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