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A Note on Accounting and Economic Theory: Past, Present, and Future

Martin Shubik

Abstract

This paper deals with the changing relationship between economic theory and accounting practice and theory. It argues that many of the basic problems encountered in practice cannot be avoided in any attempt to construct an economic theory adequate to handle dynamics. In particular problems of timing become critical. Furthermore, there are several critical problems concerning profit maximization, the nature of the rate of interest, agency problems within the firm and the payment of dividends which cannot be dealt with unless there is an adequate reconciliation of accounting and economic theory. Summary includes: history of accounting and economic theory; types and purpose of accounting; information, valuation and control; open problems in economic theory and accounting; a brief glance at the crystal ball; accounting, economics and organization.

JEL Classification Codes: M40, A10, A12

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“The owl was the wisest animal in the forest. One day a centipede in great pain with 99 sore feet asked his friends what he should do. He was told to go to see the owl who was the wisest animal in the forest. He did so. The owl listened attentively as the centipede described his agony. The owl thought and gave his verdict. “For the next two months you should walk one inch above the ground, this will permit the air to circulate under your feet and will relieve them of all pressure. By the end of two months you will be cured.”. “Wonderful” cried the centipede. “You are indeed the wisest animal in the forest. However there is one minor item which bothers me. How am I going to walk one inch above the ground?” “I have solved your major conceptual problem” replied the owl, “do not bother me with technical details”

A tale of theory and practice

1. The stepchildren of economic theory

The stepchildren of economic theory are bookkeeping, auditing and accounting together with the various legal codes such as the commercial code, the bankruptcy laws and the laws of contract which establish the rules of the game. The comments here are primarily restricted to accounting with a note on the commercial code.

The great work of Schumpeter in the English edition (1912, 1934) on the capitalist process contains no references to accounting although the definition of short term profit is key to the argument. However, as noted by Biondi (2008) references to accounting and law were made in the German editions.

One could argue that the dominating English microeconomic textbook from 1890-1940, Marshall’s Principles of Economics (eighth edition 1964) has some oblique references to accounting in Chapter IV; but accounting per se does not merit a reference.

Schumpeter (1954. P.156-157, 944-945, 872) in his Herculean task in writing a comprehensive history of economic thought has three references to accounting. The first two notes are disclaimers, as to why he does not cover accounting and the third is the observation that Fisher (1906) in his *Nature of Capital and Income* presented “the first economic theory of accounting” and ‘the basis of modern income analysis’.

For example, the excellent microeconomic textbook of Baumol and Binder (1979 1st ed., 315-330) discusses national income accounting, but does not note the problems of accounting in microeconomic analysis. The same applies to the fine macroeconomics text of Barro (1990, 3rd ed.). At one level of exposition such

an omission can be excused on the grounds that first the overview of macro- or micro-economic theory must be presented before getting lost in detail. Yet much confusion and muddled ideology in political economy can be attributed to the failure to face up to the conceptual accounting and measurement problems in oversimplified uses of concepts such as profit and depreciation.

Turning to modern mathematical economics with increasing degrees of abstraction and sophistication, institutions, time and accounting vanish. Thus for example there are no direct references to accounting in Hicks' (1957, 2nd edition) masterful work *Value and Capital*¹ and in Debreu's (1959) exposition of general equilibrium. The implicit assumption is that all problems involving the complexity of ownership claims, money, interest, capital and income flows can be abstracted away in illustrating the broad principles of a price system. This is true if the only question is to establish necessary and sufficient conditions for the existence of one price equilibrium.

The major exception, as already noted by Schumpeter, was Fisher (1906, p. vii and p.140), as two direct quotes indicates:

“This book is an attempt to put on a rational foundation the concepts and fundamental theorems of capital and income. It therefore forms a sort of philosophy of economic accounting, and, it is hoped, may supply a link long missing between the ideas and usages underlying practical business transactions and the theories of abstract economics.” (p. Vii).

“Our present object, however is to show, not the methods of practical bookkeeping, but merely the application of economic principles to such bookkeeping. The chief object is to find the philosophical basis of accounting. Careful examination shows that accounting is at the bottom not a mere makeshift but a complete, consistent, and logical system. When thus conceived and understood it will be seen to be of importance, not alone to the accountant but also to the economist” (p. 140).

The economic theorist may yawn. So what? We cannot cover all topics. Economics is hard enough. Why not claim that we did not cover physics or engineering? Accounting provides much of the measurement language of economics. Any attempt to build even the simplest of experimental economic games will force the builder to pay full attention to the accounting conventions. This holds clearly for macroeconomics and national accounts. The latter are

¹ But see the first two paragraphs of Chapter 14 and also an interview with Professor Hicks by Klammer (1989).

derived by micro-accounting raw data with statistical procedures that require proper accounting and economic foundations.

It is difficult for a physicist to obtain a PhD degree without understanding the nature of measurement; yet it is still feasible for an economist to obtain an advanced degree with little or no exposure to micro-economic accounting. Measurement is at the basis of every science. Both macroeconomic or governmental accounting and microeconomic or business accounting are the measurement sources for economic information. Unlike in physics, accounting measurement takes place within a social context thus posing difficulties beyond usual scientific measurement.

If accounting is regarded as too close an ad hoc application to business to merit the attention of the economic theorist, as it is the fundamental source for so much of economic information it should be of central interest to economic theorists concerned with data utilization to develop economic accounting theory. At least one might expect attention to be paid by both economic and accounting theorists to the formal theory of measurement and dimensional analysis which is required for physics or for any scientific study concerned with measurement. With a few exceptions such as the excellent but little read or recognized book of De Jong (1967) this topic is more or less ignored in the development of economic theory.

The key feature of accounting is that it is process oriented. Time is an essential ingredient. Accounting attempts to provides the measurements needed to understand the economic structure of the firm and other institutions not merely in equilibrium (or statics) but in the disequilibrium dynamics of a society's economic processes. Much of the work of Ijiri (1967, 1989, 1995) has been devoted to emphasizing the causal structure of accounting in describing the dynamics of the firm. Unfortunately reconciling the general logic of economic dynamics with the specifics of socio-economic process is both an intellectual challenge and evolutionary process.

1.1 Why is accounting a stepchild of economics?

"Drive for show putt for dough."

Old golfing saying

"The broad print giveth, and the fine print taketh away."

On understanding sales contracts

The day to day usage of accounting involves practice rather than theory. It is an essay in micro-micro-economics. It is essentially concerned with process rather than equilibrium. It deals with deep practical problems in timing, incentives and ownership. In the last thirty years many students in the United States of both

economic and accounting theory have recognized the need for theory to catch up with practice. This has been recognized in Europe possibly even earlier.²

Until the development and acceptance of the language of game theory and decision theory, the formal means to deal with models of agency and asymmetric information did not exist. At the level of practice, accountants have wrestled with difficulties in describing the levels of imperfect information, the problems of common knowledge about the rules of the game, and the full definition of the rules of the game. Their approach has been one of evolution rather than analysis. In the United States, for example, Generally Accepted Accounting Principles are an evolutionary product of a profession facing up to the practical problems of economic measurement in an ongoing society.

Most economic theorists are aware implicitly or explicitly that accounting provides the filter through which much of the information critical to economic understanding and measurement is gathered. Yet, for the most part, accounting has been taken for granted as though deep conceptual problems in recording and measuring economic activity could be dealt without concern for the activities of the accountants.

1.2 The best of all possible worlds

In historical perspective this separation between the work of many of the economists and accountants initially was reasonable; but implied paying the high cost of ignoring institutions, time, and complexity. Basic micro-economic theory needed to be developed and many economic principles could be derived on the assumption that the measurements were good enough and did not contain deep logical problems. For example it is easy to define one period profits in equilibrium. What constitutes profits over several periods with lags in production and payments raises other problems. The overall structure of microeconomic theory was initially sufficiently undeveloped that it was not ready to tackle the details of the dynamic micro- micro-economic reality faced by accountants. This is no longer true and a viable theory of the firm must be accompanied with an adequate economic theory of accounting. For example accountants have had to face up to the realities of ongoing enterprise valuation versus liquidation valuation. This highly practical problem raises many basic conceptual problems in the theory of bankruptcy.

² The change in the approach to accounting theory has been considerable in the last thirty years. A nice summary is provided by Sunder (1997).

2. The history of accounting and accounting theory

2.1 Many purposes and institutional forms

The earliest accounting was probably the accounts kept for taxation, storage and disbursements in the Babylonian and Egyptian empires. Far later with the development of individual proprietorships commercial accounting needs for records and bookkeeping grew considerably. The partnership brings the need for not only a body of law of contracts; but poses a host of difficulties concerning agency and the measurement of entitlements, as well as problems concerning the assumptions of common knowledge. As the size of the partnership grew so did the needs for both ownership accounting and cost accounting.

The public corporation has proliferated the problems of both the legal and accounting structure. The incentive system design must cope with the reality of the design of contracts and bargains with a lack of common knowledge, specialized knowledge by some agents and joint claims on operationally indivisible assets by many parties.

2.2 On Bookkeeping, Auditing and Accounting

“Frequent accounting makes for lasting friendship.”

Proverb quoted by Paciolo, Chapter 29

“Double-entry bookkeeping is borne of the same spirit as the system of Galileo and Newton”

Sombart (1928), p. 118

The economist studying the broad conditions of equilibrium may find that the mechanisms of trade are of little importance. Furthermore the changes in the nature and volume of trade since the industrial and financial revolution, say since the start of the 18th century have been so profound that one could argue that history is hardly relevant to economic life. The growth of trade has come through a complex intertwining of developments and changes in population, law, society, technology and communications.

The taxation and warehousing systems of both Egypt and Babylon at the least required bookkeeping and auditing. The Code of Hammurabi (circa 2250 B.C.) provides information on accounts as do the tablets with the trading records of the Egebi of Babylon and Marashu of Nippur.

Brown (1905) notes the importance of the scribe in the keeping of the imperial treasury and storehouses in Egypt. The Old Testament provides references on temple receipts and disbursements (Leviticus 25:50, Kings 22:7, Job

33:13). The Athenians appear to have had a reasonably well developed system of accounts. The Parthenon built in 438 B.C. served as a storehouse of treasure. Logistae kept extensive records for both public and private accounts (Mitchell, 1957, Finley, 1984). Brown lists three stages of financial administration of the Romans, the beginning under the kings and the Republic, then the early and the late Empire. Much of the evolution of accounts in Rome involved government administration of the public treasury, taxes, and military procurement and expenditures. A central accounting office known as the *Tabularum* was developed and by the reign of Septimus Severus a separation between the fisc and the *Res Privata* of the Emperor was made clearly.

Modern accounting with double entry bookkeeping as a recognized discipline is dated from the publication of the *Summa de Arithmetica, Geometria, Proportioni et Proportionalita* of Luca Paciolo in 1494. But although he set forth the ideas of double entry accounting with great clarity, including the need for three sets of books, the Memorandum, Journal and Ledger, he did not claim the invention of double entry bookkeeping, but noted (Chapter 1) “The system employed in Venice will be employed here, for it is certainly recommended above all others” (Brown, Johnston translation). Brown (1905, p. 99) notes records from 1340 in Genoa and Izutani (1980) examines the Tuscan ledgers of Rinieri Fini (1296-1305) and observes that the daily transactions of business were recorded by the double entry method.

It is also important to note that it was during the 14th to 16th centuries that the gradual switch over to Arabic numerals was made in Europe. “As late as 1520 the municipality of Freiburg refused to accept entries as legal proof of debt unless they were made in Roman figures or written out” (Brown, 1905, p. 107). The importance of the switch to Arabic numerals for the development of commerce cannot be underestimated.

Littleton (1933, p. 27) suggests “the essential criterion of double entry bookkeeping, as the term is now understood, is commercial proprietorship.” Earlier bookkeeping concentrated on records of receipts and disbursements primarily for government accounts or for keeping track of debts. But by the 13th century, *commenda* or silent partnerships required a high level of accounting by the active partners. As the nature of trading partnerships evolved from joint ventures on single journeys to lengthier commitments the accounting evolved with the change of purpose. The change can best be described as a change in emphasis from agency reporting to proprietorship reporting. This distinction and evolution appears to relate to that distinction between dynamic and static accounting that is typical of continental European accounting theory in the XX century. “Agency reporting” relates to the point noted in §2.1 about an inter-individual and evolutionary enterprise context fraught by ignorance and uncertainty. This leads to a dynamic perspective. “Proprietorship reporting”

relates to accounting for patrimony (net worth) from the owner's viewpoint. This leads to a static perspective. Both kinds are present in modern corporate accounting and its evolution, and there is no easy path from the first to the latter.

The interplay among law, economics and technology has intensified in the last 200 years and the relatively straightforward needs for bookkeeping as a short term recording device have been increased and made more complex by the accumulation of large amounts of capital in the corporate enterprise. The constituency for whom the accounts are prepared has changed. Stockholders, creditors, managers, suppliers and customers constitute a far larger set of interested parties than the merchants and agents for whom the accounts were originally drawn up. Topics such as depreciation, the treatment of uncertain debts, limited liability and the need for regular audit have had to be dealt with as size and complexity has increased.

The book of Previts and Merino (1979) provides a historical-cultural sketch of the development of accounting in the United States from 1492 to 1978. It covers the capital markets, early public stock ventures and merchant capitalism of colonial times; the development of the national economy 1776-1826; the beginnings of the industrial age in the United States 1827-1865 with observations on steamboats, stagecoaches and railroad accounts and reports. The prelude to the modern age 1866-1896 marks the growth of capital markets, accounting reports and financial disclosure and the concern for regulation. The American Association of Public Accountants filed its certificate of incorporation on September 20, 1887. The first CPA certificates were awarded in 1896. The period up to World War I saw the rise of finance capitalism, the needs to protect investors in increasingly anonymous markets and the development of professional standards in accounting.

In the United States after World War I the 1933 and 1934 Federal Securities Acts together with an evolving role for the SEC completely changed the nature of business information disclosure and the accountant's role and responsibility in financial reporting. In other jurisdictions the speed of change concerning the requirements and enforcement of disclosure has been considerably different.

With the growth in size and complexity of firms as institutions as well as the growth in complexity of both production and taxation, the private institution of any size faces many different accounting needs. In essence the raw data must be both gathered and aggregated in different operational ways for different operational purposes. The problems faced in the design of good accounting procedures involve both agency and data reduction, where the reduction is based on the semantics of use. The accountant is an encoder and the user is a decoder of raw data turned into operational information in the context of the society. As organizations become more complex the difficulties and needs for information processing increase.

Since World War II the breakthrough in computational and communication devices have revolutionized data processing. Unfortunately, as is often the case, causality can go in both directions. A new supply can create a new demand or vice-versa. The breakthrough in the ease and speed of data processing and communication has made it easier to analyze the smaller firms, but has helped to create bigger firms with far more complex and opaque organizational problems. The warnings of Berle and Means (1933) of many years ago are now even more important in a world where there is now even an extra layer between ownership and management and opaqueness (in part due to overload by too much or too varied disclosure) has grown. In the world of Enron, not only were the stockholders passive and ill-informed, but many of them were second order owners whose equity was derived from a pool formed by a mutual fund or pension fund. The problems of massive fraud and disastrous bubbles in the economy are in part the recent creation of highly complex and opaque financial instruments abetted by “creative accounting” and finance; but they are also indicative of the lack of a generally accepted good theory of the firm combined with an ad hoc patchwork of laws evolved in a politicized process.

2.3 The Commercial Code

The approach toward finance, trade and production adopted here is game theoretic. The stress is on rules of the game. In most texts on economic theory the commercial code is not mentioned, but it is implicit in the assumptions made. Successful trade with strangers has always required the protection of the law. In medieval Europe such protection was provided by the church and notaries. The Italian commercial statutes appear to have been the source for many of the commercial rules for Europe (Holdsworth, 1956).

The evolutionary creation of a uniform mechanism of exchange started at least in Babylonian times and grew with the introduction of coinage, then the emergence of money changers. The growth of fairs, the need for protection of merchants at the fairs, the need to carry over business from one fair to the next all provided the motivation needed for the gradual emergence of “the rules of the game”. The Magna Carta provided that “all merchants shall have safety and security in coming into England ...” (see Schmitthoff, 1981). As early as the 14th century a common body of mercantile law was used in the settlement of piracy claims.

The impetus of the industrial revolution and the increase in commerce in the 18th and 19th centuries provided the conditions for the emergence of the first uniform commercial code which can be attributed to Lord Mansfield (Holdsworth, 1956, p. 568).

By the end of the 19th century along with the growth in complexity of industry and commerce special codifications were called for. Thus in England four acts were introduced. The Bills of Exchange Act (1882), The Sale of Goods Act (1893), The Marine Insurance Act (1906) and the Partnership Act (1890).

In the United States in 1896 the Negotiable Instruments Law was promulgated, it was followed by the Uniform Warehouse Receipts Act and the Uniform Sales Act in 1906. Then in 1909 the Uniform Bills of Lading Act and the Uniform Stock Transfer Act followed.

Starting in 1940, in the United States a Uniform Commercial Code was suggested to replace the many special codes which each served a special set of circumstances but were often in conflict with each other on the boundaries. By the 1960s a uniform code had been adopted (see Schnader, 1967) by most jurisdictions. Since that time there have been many amendments and revisions and the process continues today.

A basic theme of this article is that of the “games within the game”. To the specialized player, be he a merchant or a manufacturer or a longshoreman or distributor he is an agent in a more or less well defined game which requires rules against kicking and gouging, thus a set of *ad hoc* rules covering the many local “games” emerge. Each in itself is reasonably sufficient to guide local optimization in the relatively short run. In the broader context and in the longer run the rules do not cover many problems which lie in the intersection of two or more sets of interests. The political, societal and legal interests enter to provide resolution to problems which are presented by the local optimizers as though they have only economic content, but in fact from the point of view of an evolving society, considered as a whole, have far broader context.

No attempt is made in these brief comments on the emergence of the uniform commercial code to pretend to present original scholarship. This brief sketch is motivated to stress need for the emergence of formal “rules of the game” in virtually every form of economic activity and the evolution of these rules from societal processes which are not the same as, but provide the context for the more or less conscious economic optimization attributed to competitive economic behavior.

Although in the United States the commercial code is more a part of law than of accounting,³ it provides another example of an apparently minor practical set of considerations that are critical to process, but are of little concern to economic theory. Yet when attempting to understand economic dynamics it is precisely apparently minor details such as when ownership passes from A to B

³ in Continental Europe, commercial code and accounting have mutual reference and recognition: commercial code refers to accounting principles and procedures, whilst accounting considers – among others – some legal terms and conditions as preconditions to account for transactions, operations or events

that enable us to define what is meant by a completed transaction and when an asset or a liability can be fully removed from the books.

3. The types and purpose of accounting

The historical sketch has already indicated the nature of the evolution of accounting. This interacts with the changes in the nature of the firm. To this day we still do not offer a fully satisfactory microeconomic theory of the firm because the basic economic texts in the United States and England in particular have still not fully escaped from the Marshallian picture of the individual proprietorship. *It is a handy device for teaching elementary economic principles and accounting but is misleading given current institutional reality.* In keeping with the concepts of the development of a mathematical institutional economics, institutions and methods are matched.

3.1 The individual proprietorship

Bookkeeping was needed for the individual proprietorship even with one location and few employees. This institutional form, at a relatively simple level also required the first glimmerings of contracts with customers, suppliers, guilds and employees. Even earlier than the individual proprietorship, the warehouses of the pharaohs required warehouse receipts and the attendant bookkeeping to track the inventory.

3.2 The partnership

With the development of the partnership the need for better cost accounting and contractual clarification of the rights and duties of partners was called for. The first glimmerings of the separation of ownership and control came in the development of sleeping partners and limited liability.

3.3 The corporation and the corporate group (of corporations)

The constituency of a major corporation is so large and varied that at least four levels of accounting are called for. They can be called micro-economic or operations research cost accounting; managerial or incentive cost accounting; stockholder relations accounting and tax accounting. The first has a high physical and measurement component. It can help answer operations research style questions such as what are my variable costs of production? The last may be regarded as close to a two-person zero sum game between the tax collector and

the firm (as a fiscal entity, that is, the business firm is defined and made accountable for fiscal purposes) where the rules of the game are formalized in the legal codes and fiscal accounting systems which may or may not reflect economic logic. It is here that the accounting skills of tax avoidance are at the highest. This includes bundling liabilities into watertight compartments that can be flooded (going bankrupt) without sinking the ship. This leads to a multi-layered group of multiple companies/corporations. Such enterprise group is a logical step above the single corporation.

The other two sets of accounts contain a high mixture of hard to measure and socially influenced components such as the importance (or lack of importance) of the roles of honesty, loyalty and custom in a corporate enterprise. As stockholders may form a heterogeneous and to some extent unskilled constituency new problems in data presentation are encountered. At what level should an annual report be aimed?

A valuable broad discussion of the many accounting problems facing the business firm is given by Biondi, Canziani, and Kirat (2007).

3.4 Government

It is easy to forget that some of the great advances in economic theory have come into being together with fundamental developments in accounting. Theory and measurement reinforced each other. One of the major impacts of the work of Keynes was to call forth macroeconomic accounting; one of the major impacts of the work of Leontief on input-output analysis was to revolutionize the economic accounting for production.

3.5 An aside on other Not-for-profit entities

In all the forms of accounting noted above the prime form of measurement has been in money. Yet in spite of the biases of economists and accountants to measure as much as possible in monetary terms, the social and political scientists and the man on the street remind us that there are many aspects of human behavior and desires which do not fit with comfort into the monetary measure. Power, fame, academic prestige, scientific recognition, respect, religious faith, love and friendship do not have simple prices attached to them. Money may enter as a factor, but there is no simple measure linking money to these phenomena. In recent years there has been a growth in attempts to perform social audits and produce social indicators (see for example *Toward a Social Report*, 1969). Indices to measure happiness or cultural levels in a society have been contemplated; but even more than with the pursuit of profit and economic control the problems of measurement and agency are manifest. In particular those who control the

manufacture of new indices have considerable power in their ability to bias the measures.

The quality of life, the level of democratization of a society, the importance of museums, the competence of medical assistance are all important aspects of existence, but only one side of the balance sheet is amenable to economic measurement. We can measure the costs of economic inputs and assets, but not the social outputs and capital.

4. Information, valuation and control

One can argue whether “science is measurement” is or is not an overstatement. It is hard to argue that measurement is not needed in the development of science. In economic life although micro and macro accounting supply measurement and aggregation they are used for much more. They provide a flexible control device for the management of all organizations. Five functions have been suggested for accounting: (1) valuation, (2) the measurement of inputs, (3) the specification of entitlements (4) the measurement of contract performance and (5) the provision of common knowledge (Sunder 1997). All of these functions must be provided in the context of serving a constituency with agents with differing goals, perceptions and expertise.

4.1 In praise of GAAP and disclosure

Generally accepted accounting principles in the United States are the product of a social process requiring a tradeoff among many parties with differing goals and perceptions. They may be regarded as providing a Rosetta stone for the professionals. The corporate annual reports and the SEC filings such as the 10K forms cannot be usefully designed for the lowest common denominator. Although improvements in education and financial literacy can be made, ownership of shares requires some form of responsibility on behalf of the owners. Good public financial data are not for the illiterate nor should they be only for the arcane. The key to its optimal usage is consistency and common knowledge for the users so that responsible users can apply their own adjustments, expertise, insights and knowledge to a commonly accepted and understood synthesis of the raw data.

4.2 The black boxes in micro and macro-economics

The black boxes in both micro- and macro-economics are the individual, the firm and the government. Thus many texts still consider the utility maximizing

individual, the profit maximizing firm and a government with some form of public welfare optimization goals.

Agency theory looks into the black boxes often used to represent the firm and government. Behavioral economics offers alternative models to *homo oeconomicus*. It is however important to remember that good theories are not overthrown by mere facts, they are overthrown by a better theory. However when there are many competing theories, then in essence, there is really no satisfactory explanation. At this time we know that the model of *homo oeconomicus* is not completely adequate in face of the facts, but with what to replace it is not yet clear.

5. Open problems in economic theory and accounting

5.1 Accounting, networks and the economics of organization

The clean lines which apparently delimited the nation state and the corporation are becoming more and more blurred. The off-balance sheet items are becoming more and more important. A firm in the biotechnology industry looks more and more like a web (Powell and Smith-Doerr, 1994). The agency and contract accounting aspects of the new “net-firm” are still to be worked out.

5.2 Production and cost accounting

Many aspects of factory and floor level production and internal control accounting are the form of accounting most closely related to operations research. Physical reality must be faced and the system is designed primarily to provide information for a single professional constituency. Incentive problems appear when multi-plant and multi-product firms have an internal allocation and reward system based more on bureaucracy than market.

5.3 Agency

Steven Ross’s (1973) early article on agency was followed by Jensen and Meckling (1976) who wrote a basic article in agency theory for the firm. Stiglitz (1987) has provided a useful summary up to the mid Eighties of this burgeoning literature. I first considered the non-symmetric information problem in a bureaucracy in the 1960s based on some earlier operations research work I had done on the Naval Supply System. The key feature was that several operating supply centers would apply to Washington for their budgets. The centers more or less knew what each of them wanted, but Washington was far less well informed

and knew it. Thus the problem was for Washington to select an inspection strategy (inspection being expensive) and the bases each to try to select a strategy which traded off size of the demand versus the possible losses and inconvenience if they were inspected. I wrote a brief paper entitled “How to lie optimally when applying for one’s budget” which I submitted for publication as a Rand RM. It was promptly rejected and in retrospect it probably deserved to be suppressed. It served as an example of a researcher oblivious to the institutional reality faced by the reasonably sane bureaucracy of a government contractor. I finally renamed the paper using an appropriately antiseptic and more scholarly title: “Budgets in a decentralized organization with incomplete information” (Shubik, 1970) but I sulked somewhat and never went beyond the preliminary paper. This illustrates a cautionary tale in several dimensions. The selection of an appropriate title is a duty of good scholarship. But even more important is to stand by one’s perceptions of the importance of an insight and push it through, instead of abandoning it after a context justified bureaucratic rebuff. New ideas, whether they are in accounting or economics or elsewhere, are relatively cheap. Fully understanding their implications and pushing them through is expensive.

5.4 Assignment of joint costs

The assignment of joint costs is an old chestnut in both economic theory and accounting. At one level the answer is simple: do not try to break up the overhead costs. At another level the question of the assignment of overhead costs can be regarded as an essay in incentive design. Some years ago I proposed an approach based on a useful construct from side-payment cooperative game theory (Shubik, 1962). The basic idea (which can become computationally difficult for firms with more than, say 10 divisions) was to consider the structure of the firm in terms of the characteristic function of an n -person game. This function has 2^n values. It represents the pro forma earnings of all combinations of the departments of the firm taking into account the level of strategic freedom each department possesses. Were I to rewrite this article today I would dwell more on the difficulties in calculating the characteristic function and in limiting the strategic freedom of the individual departments in an optimal manner.

For some problems such as the assignment of landing right costs to aircrafts of different sizes the characteristic function can be defined with ease and an incentive argument can be made out for utilizing the Shapley value (1953) for the cost assignment.

5.5 Profit optimization of the corporation, bankruptcy and Games of Economic survival

There is no generally accepted theory for corporate optimization. Furthermore there is no unique encompassing theory concerning the payment of dividends. Agency theory alone applied in an ad hoc manner is probably as close as we can get. A way in which economic theory can approach the relationship between the firm and its stockholders is to consider these two compound constituencies as composed of two agents whose objectives do not necessarily coincide. This enables us to form a class of two person non-constant sum stochastic games called Games of Economic Survival, with two separate payoff structures which may be formulated in many different plausible ways where each structure reflects somewhat different goals for the corporation and the stockholders. Shubik (1959) and Shubik and Thompson (1959) formulated some highly simplified examples and worked them through.

Without going into mathematical detail here, the basic idea was that there is a corporate account which accounts for the state of the corporation, and a stockholder account which keeps track of the value received by the stockholder.⁴ The work of the financial accounting theorist R.N. Anthony (1983) actually suggested applying this distinction to corporate accounting. If for example the stockholder has managerial control of the corporation his optimal strategy could possibly run the corporation into the ground. As long as his payoffs and solvency are sufficiently legally separate from the firm, milking it may be rational. In contrast, if the management is firmly entrenched, it may be in a position to maximize growth (with its own pay and emoluments being tied to growth) while regarding the stockholders as a boundary condition such that as long as an expected payout (in terms of dividend and stock price) is above a given level there will be no stockholder revolt. In such a structure, control, bankruptcy and default play an important role and the Modigliani-Miller condition on corporate financial structure does not hold. There are many other models which can be formulated with this structure where each model reflects a different empirically relevant abstraction of the level of linkage or lack of linkage between the firm and its stockholders. Depending on the size, bureaucratic structure and specific markets of the firm, different dividend policies and long and short term investment policies are to be expected. The micro-micro-economic realities make the search for a “one-dividend policy to fit all” equivalent to the search for the Philosopher’s Stone.

⁴ This distinction is critical to the mathematization of the idea of two steps of nooks and goals, but the enlargement of this requires a separate article.

When the question concerning failure to survive and bankruptcy is rephrased in terms of how the firm's demise hits the different constituencies with stakes in the firm, the need for liquidation accounting or debtor-in-possession accounting as contrasted with simple ongoing enterprise accounting becomes a necessity. Both kinds of accounting can be considered as alternative accounting regimes that have an influence on and can be chosen in the underlying strategic game.

5.6 What is the appropriate discount rate and why is there a money rate of interest?

In virtually all financial analysis, valuation involves summing some form of discounted income stream. A reasonable approach is to perform a sensitivity analysis using a bandwidth of interest rates centered around the rate at which the firm has recently borrowed. But the selection of the discount rate is more an art form involving crystal-ball gazing than it is a science. Practical accounting tells us that we should look up the array of interest rates around the economy and select the one closest to the economic realities of the firm. Much of macroeconomic analysis is devoted to considering the influence of government policy on the interest rates and how they influence the money supply, inflation and unemployment. In spite of the great body of ad hoc theorizing there is no clear theory of the formation of interest rates in an economy with the large corporation as the dominant institutional form. Virtually any attempt to construct a theory of the sole proprietorship firm ends up with the rate of interest merely controlling a tradeoff between the growth rate and inflation. The introduction of transactions costs is manifested as an extra cost and lag in production.

When firms are individually owned then the owner optimization is based on utility or real welfare and not on monetary profits in any form. This allows reducing the firm to his owner, logically speaking. It is undoubtedly true that the rate of interest influences the adjustment path to any equilibrium but there is no indication that it does more. It is my belief along with Berle and Means, Knight and Schumpeter that this observation changes with the introduction of the stockholder held corporation. In one form or the other there is some common recognition of some part of the goals of the corporation as being a function of real or nominal profit. Precisely what that function is involves an understanding of the agency and control structure of the firm.

Basic economic theory offers many partial explanations for any rate of interest. These involve the classical Fisher condition on the non-inflationary rate as being related to the inverse of individual time discount. There is the inflation correction. There are the risk adjustment and default corrections. There is the economic growth adjustment. Recent work of Karatzas, Shubik, Sudderth and

Geanakoplos (2001) has indicated that in a stochastic economy without complete markets, which utilizes fiat money there is an intrinsic inflationary bias if the government sets the interest rate at the Fisher rate.⁵

Accounting is the handmaiden of enterprise. It has to solve empirical problems daily. It cannot wait until economic theorists find out what the causal factors of a rate of interest “really” are. But as the rate of interest plays such a critical role in valuation, as the theoretical foundations of accounting are being developed it behooves us to know that in spite of the enormous stress that much of economic practice places on the various rates of interest and on profit seeking, once there is any uncertainty in the economy, this combined with the structure of the corporation leaves our theories on shaky ground.

6. A Brief glance at the crystal ball

6.1 On money

The ability to obtain a one dimensional measure invariably offers considerable assistance to our understanding. Unfortunately as powerful as the monetary measure is in economic life, unlike the measure of distance in Newtonian physics that is good enough for most measurements on Earth, the monetary scale when connected to virtually any form of the worth that it is meant to represent is an elastic scale. The elasticity comes in the form of inflation or deflation. From a practical point of view this calls for inflation or deflation accounting adjustments. Practically speaking, the feasibility of “real” corporate accounting is at issue. Furthermore, such accounting may imply feedback effects that could reinforce the inflationary or deflationary paths at the systemic level. In sum, accounting lies at the articulation of real and monetary dimensions, productive and financial returns, realized and unrealized profits. But the articulation is probably not straightforward.

Even more important than inflation is the concern in the economy about interpreting the safety of the firm indicated by its balance sheets. Should accounting provide some form of early warning? If it should, then at the very least this calls for a clearer understanding of the increasingly sophisticated “off-balance sheet items” in the derivatives markets measured in trillions of risk weighted virtual money.

In a cash-only economy using gold or some other commodity money, the amount of money in the system is a meaningful physical number. In a credit economy where the central banks and commercial banks can create money the

⁵ An interest-free economy may provide another interesting case study.

concept of quantity becomes elusive. Possibly some measure of the amount of virtual money or “money-in-being” is called for. This calls for a clarification of the meaning of central bank reserves and powers. When an agent can create money by fiat, how does one describe its reserves? Reserves used to be (understood as) gold stocked in some vaults, or deposited by agents at a central house. A strategic approach to this problem is that reserves are not a number, but a strategy set much in the spirit of the distinction between ownership and “rights to use” accounting.

The complexity of biological systems has often been contrasted with human economic systems. What form of accounting do the biologists use? Perhaps the closest analogy is energy flows as contrasted with money flows.

6.2 The Web economy and accounting

With the ascendancy of the computer and the Web there has been and will be an increasing number of problems involving payment systems and the rules of trade for Web trading.

6.3 Complex accounting and computer science

A fundamental problem in economics, game theory, computer science and accounting is the characterization of the decentralizability of an organization (see Halpern, 2007 and note 5.4 above). In essence an organization can be described as fully decentralizable if the accounts of a composite entity created from several individual entities equal the sum of the accounts of the individual entities. That is, no coordination occurs between them. This can be true only if the costs of the central administration are zero. If administrative costs are significant what are the incentive compatible ways they can be allocated to the divisions of the firm? This is an old problem in accounting, but as organizational structures become more complex the mathematics and computation of the assignment of the costs of fully or partially shared facilities to different parties is going to call forth a need for both mathematical analysis and computation on a scale not contemplated until recently.

6.4 Game theory, gaming and accounting

The relationship between the disciplines of economics and game theory and accounting is a two way street. In recent years, it has been recognized that in monetary theory and in strategic analysis that money and accounting are the prime sources of economic memory. Thus, in the game theory based study of industrial

organization, the accounting description of the firm plays an important role. The prime purpose of accounting for the firm has not been strategic. But a future development in competitive analysis of groupings of firms may call for this development.

Prior to formal accounting the role of record keeping serves as a link between theory and practice. The interests of theorists and practitioners are intertwined. Raw data is not necessarily information. It is turned into information when its value is realized and questions are posed that it can answer. Once a practical need for data is perceived, the guidance to improve the quality of the data may be provided from the insights gleaned by theory. This is central to the development of accounting.

Accounting is far more than measurement. It is a social process devoted to the obtaining and improving measurement of relevant information in a complex process. As such it has both qualitative and quantitative aspects.

Much of accounting and essentially all of the mathematical methods associated with it, such as actuarial science, are context free. Fortunately footnotes and qualifications exist. They serve to signal the limitations and qualifications of low dimensional numerical display. In a way, accounting principles and standards can be understood as ways to qualify and attribute sense to accounting numbers. They provide the guidelines for applying accounting technologies that produce accounting numbers. The formal analysis of the role of verbal additions to numerical portrayals of competitive situations in pure game theory, in economic and military strategic analysis and in accounting has barely been explored formally, yet is critical in adding context and in contrasting the measurable and as yet immeasurable in each of these disciplines.

In the past 50 to 60 years there has been an explosion in the development of both experimental and operational gaming in the social sciences, as indicated in the work of Charles Plott and several others. This development as yet has hardly influenced accounting; but it is technically (though probably not currently politically) feasible to run both experimental and operational games to estimate the effect of changes in procedures and laws. Currently in our society, any major change is followed by an intense scrutiny to find the loopholes in the first few years after the change. Prior gaming, even offering substantial prizes to the teams who found substantial flaws could yield substantial improvements in the drafting of new rules. The technology is essentially here. We can build games to test for loopholes in any legislation ahead of time, but the climate for such an activity is not strong. Probably because in the political arena it may be expedient to pass legislation with a populist flavor, knowing at the same time that one's less popular constituencies are taken care of by the loopholes in the system. Thus the open discovery of the loopholes might be self defeating.

7. Accounting, economics and organization

The future will see a great coming together of understanding of the role of the economic theory of organization together with many problems in agency. Both economic theory and accounting have progressed to the stage where accounting will no longer be the stepchild of economic theory. Many of the basic operational problems in accounting now clearly pose deep problems in economic accounting theory and have to be answered if progress is to be made in the development of an economic dynamics. Agency theory and non-symmetric information, as important as they are, are by no means the whole story. The future optimal design of the business entity is not obvious. Will the corporate form that survives the coming changes in the structure of the nation state be much as it is today? The odds are against it. Will we have universal accounting standards the world over? My guess is probably yes, along with several layers of international central banks, regulatory agencies and a world commercial code. There is no point in trying to guess whether this will take 10 or 50 years, there are too many imponderables. If the modern world is not destroyed, these changes will evolve. Along with these structures an understanding is evolving. There is no longer a viable separation between the understanding accounting and economics. Accounting theory is the necessary economic theory to handle dynamic reality and the two are coming together fulfilling Fisher's original intent in understanding and blending the income statement and the capital account. In a way, the whole economic theory of the firm refers to such blending. Furthermore as pointed out by Ijiri whether it is triple entry bookkeeping or keeping momentum accounts the reconciliation of accounting and economic theory is in a fruitful stage of development.

References

- Anthony, R.N. (1983), *Tell it like it was: a conceptual framework for financial accounting*, USA: Richard D. Irwin Inc.
- Barro, R.J. 1990. *macroeconomics* 3rd ed. New York : Wiley.
- Baumol, W.J. and A.S. Binder 1979 *Economics: Principles and Policy*. New York: Harcourt, Brace and Jovanovitch.
- Berle, A.A. and G.C. Means. 1933. *The Modern Corporation and Private Property*. New York: Mac Millan.
- Biondi, Y., A. Canziani, and T. Kirat (eds). 2007. *The Firm as an Entity. Implications for Economics, Accounting and Law*. New York and London: Routledge.

- Biondi, Y. A. 2008. "Schumpeter's economic theory and the dynamic accounting view of the firm: neglected pages from the *Theory of Economic Development*", *Economy and Society*, Vol. 27: pp 525-547.
- Brown, R., 1905. *A History of Accounting and Accountants*, Edinburgh: T.C. & E.C. Jack.
- Debreu, G., 1959. *Theory of value*, New York: Wiley, 1959.
- De Jong, F.J. 1967. *Dimensional Analysis for Economists*. Amsterdam: North-Holland Publishing.
- Finley, M. I., 1981, *Economy and Society in Ancient Greece*, New York: Viking press.
- Fisher, I. 1906. *The nature of Capital and Income* London: MacMillan.
- Halpern, J. Y. 2007. "Computer Science and Game Theory: A Brief Survey". <http://www.cs.cornell.edu/home/halpern/papers/csgt.pdf>
- Holdsworth, Sir W. 1956. *A history of English law*.
- Ijiri Y. 1967. *The Foundations of Accounting Measurement*. Englewood Cliffs, N.J.: Prentice-Hall.
- Ijiri, Y. 1989. *Momentum Accounting and Triple-Entry Bookkeeping*. Studies in Accounting Research No. 31, American Accounting Association, Sarasota FL.
- Ijiri. Y. 1995. "The Beauty of Double-Entry Bookkeeping and its Impact", in Martin Shubik, (ed.) *Proceedings the Conference: Accounting and Economics in Honor of the 500th Anniversary of the publication of Luca Pacioli's Summa de Arithmetica, Geometria, Proportioni et Proportionalita*. New York and London. Garland Publishing.
- Izutani, K., 1980, "The Origin of Double Entry Bookkeeping", *Osaka Keidai Ronshu*, 136: 1-34.
- Jensen, W.H. and W.H. Meckling. 1976. "Theory of the Firm, Managerial Behavior, Agency Costs and Ownership Structure", *Journal of Financial Economics*, 3: 305-360.
- Karatzas, I., M. Shubik, W. Sudderth and J. Geanakoplos. 2001. *Inflationary bias in a simple stochastic economy* CFDP 1333 Yale University, New Haven.
- Klamer, A. 1989. "An accountant among economists: Conversation with Sir John R. Hicks", *Journal of Economic Perspectives* 3, Fall 1989, pp. 167-180.
- Littleton, A.C., 1933, *Accounting Evolution to 1900*, New York: American Institute Publishing Company.

- Mitchell, 1957, *The Economics of Ancient Greece*, New York: Barnes & Noble.
- Powell, Walter W. and Smith-Doerr Laurel 1994: "Networks and Economic Life", in Neil J. Smesler and Richard Swedberg (eds) *The Handbook of Economic Sociology*, pp. 368-402. Princeton, NJ: Princeton University Press.
- Previts, G.J. and B.D. Merino, 1979, *A History of Accounting in America*, New York: Ronald, Wiley.
- Ross, Steven, (1973). "The economic theory of agency: The principal's problem", *American Economic Review*, 63(2): 134-139.
- Schmitthoff, C. 1981 (2nd ed.) *Commercial law in a changing economic climate*.
- Schnader, W.A., 1967. "A short history of the preparation and enactment of the Uniform Commercial Code", *22 University of Miami Law Review* 1, 2.
- Schumpeter, J.A. 1934. *Theory of Economic Development*. (German Original 1912) Cambridge: Harvard University Press. Translated by Redvers Opie.
- Schumpeter, J. 1954. *History of Economic Analysis*: New York: Oxford U Press.
- Shapley, L. S., 1953. "A value for n-person games", in *Annals of Mathematical Studies*, R. D. Luce and A. W. Tucker, eds. Princeton, NJ: Princeton University Press, pp. 307-317.
- Shubik, M., 1959. *Strategy and market structure*. New York: Wiley.
- Shubik, M., and G. L. Thompson, 1959. "Games of economic survival". *Naval Logistics Research Quarterly* 6(2): 111-123.
- Shubik, M. 1970. *Budgets in a decentralized organization with incomplete information*, D-18888-PR RAND Santa Monica, April 27, 1970.
- Shubik, M. 1993, "Accounting and its relationship to general equilibrium theory," chapter 5 in Y. Biondi et al. (2007), *The firm as an Entity*, quoted: pp. 73-81.
- Sombart, W. 1928. *Der Modern Kapitalismus*. Munich and Leipzig: Dunker and Humbolt.
- Stiglitz, Joseph. 1987. "Principal and agent". In John Eatwell, Murray Milgate, and Peter Newman, eds., *The new Palgrave: A dictionary of economics*. London: The Macmillan Press Limited.
- Sunder, S. 1997, *Theory of Accounting and Control* Cincinnati Oh. : Southwestern.

Toward a Social Report, 1969. US Department of Health, Education and Welfare.
Washington: U.S. Government Printing Office.

Wicksell, K. 1961. *Lectures on Political Economy, Vol 1. General Theory.*
London: Routledge and Keegan Paul 7th printing , first English edition
1934 Swedish ed. 1901.