

ORGANIZATION THEORY AND METHODOLOGY

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Abstract

The foundations are being put in place for a revolution in the science of organizations. Some major analytical building blocks for the development of a theory of organizations are outlined and discussed in this paper. This development of organization theory will be hastened by increased understanding of the importance of the choice of definitions, tautologies, analytical techniques, and types of evidence. The two literatures of agency theory are briefly discussed in light of these issues. Because accounting is an integral part of the structure of every organization, the development of a theory of organizations will be closely associated with the development of a theory of accounting. This theory will explain why organizations take the form they do, why they behave as they do, and why accounting practices take the form they do. Because such positive theories as these are required for purposeful decision making, their development will provide a better scientific basis for the decisions of managers, standard-setting boards, and government regulatory bodies.

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I. Introduction

A major challenge facing social scientists is the development of a body of theory to explain why organizations take the form they do and why they behave as they do. My objective is to outline some aspects of this emerging line of research on organizations and to call attention to a number of related methodological issues that play an important role in this research: the relation between positive and normative theories, the importance to the research effort of the choice of tautologies and definitions, the nature of evidence, and the role of mathematics. I conclude with a brief discussion of the two literatures of agency theory.

I have two basic propositions that directly bear on accounting:

- Accounting is an integral part of the structure of every organization, and

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- a fundamental understanding of why accounting practices evolve as they do and how to improve them requires a deeper understanding about organizations than now exists in the social sciences.

By way of background, I shall digress briefly to discuss the relation between positive and normative research.

II. Positive and Normative Theory and Decision Making

In the period prior to the mid-1970s accounting theory was predominantly normative. It focused on policy prescriptions for management or public policy—questions involving the appropriate treatment of inflation, exchange rates, inventories, leases, and so on. These policy questions are, of course, both interesting and important, and they are best answered with knowledge of a wide range of positive theory—that is, knowledge about how the world behaves. For example, accountants have been justifiably concerned with the effects of General Price Level Adjusted accounting (GPLA) on accounting numbers. But a manager interested in maximizing the value of his firm also must estimate either explicitly or implicitly how such accounting procedures will affect firm value. And how GPLA affects firm value is a purely positive issue in the sense that the term is used in the social sciences.¹ Normative questions take the form: “How should price level changes be reflected in the accounting statements?” Positive questions take the form: “How does GPLA affect the value of the firm?” Answers to normative questions always depend on the choice of the criterion or objective function which is a matter of values. Therefore, normative propositions are never refutable by evidence. Answers to positive questions, on the other hand, involve discovery of some

¹ The use of the term “positive” in this context has had the unfortunate effect of linking accounting researchers who have been engaged in the effort to develop “positive” theories with “logical positivism,” a school of thought in philosophy which has been controversial. The proposal to focus on positive theories of accounting does not commit those who propose it to logical positivism.

aspect of how the world behaves and are always potentially refutable by contradictory evidence.

Considerable discussion and disagreement have occurred over methodological issues associated with the emerging literature on positive accounting theory, and my purpose here is to try to clarify some of these issues. In the end, of course, we are all interested in normative questions; a desire to understand how to accomplish goals motivates our interest in these methodological topics and in positive theories.

An interesting relationship between normative and positive issues often goes unrecognized. Consider the general structure of a decision problem:

$$\max V = V(Y_1, Y_2, \dots, Y_N; Z_1, Z_2, \dots, Z_L) \\ \{X_i\}$$

Subject to the following constraints:

$$\left[\begin{array}{l} \text{Accounting and other} \\ \text{identities (such as budget} \\ \text{constraints, time constraints,} \\ \text{etc.)} \end{array} \right] \\ \textit{Positive theories}$$

$$\left[\begin{array}{l} Y_1 = f_1(X_1, X_2, \dots, X_K; \\ \quad Y_2, Y_3, \dots, Y_N; \\ \quad Z_1, Z_2, \dots, Z_L) \\ Y_2 = f_2(X_1, X_2, \dots, X_K; \\ \quad Y_1, Y_3, \dots, Y_N; \\ \quad Z_1, Z_2, \dots, Z_L) \\ \cdot \\ \cdot \\ \cdot \\ Y_N = f_N(X_1, X_2, \dots, X_K; \\ \quad Y_1, Y_2, \dots, Y_{N-1}; \\ \quad Z_1, Z_2, \dots, Z_L) \end{array} \right]$$

where V is the objective function to be maximized, the X 's are the decision variables, the Y 's are the arguments of the objective function that are determined within the system (the

“endogenous” variables), and the Z 's are the variables determined outside the system (the “exogenous” variables).

The constraints of the problem are of great interest here, and we can break them into two general categories. The first category contains all accounting and other identities (such as budget constraints, time constraints (24 hours in a day) and so on). The second category of constraints given by the functions, f_i , determine how the decision variables, X , and the exogenous variables Z , affect the values of the endogenous variables, Y , in the objective function.

The second set of constraints is made up of positive theories about the way the world works:² for example, how decisions on accounting practices, organizational structure, advertising, pricing, and production policies combine with physical laws affecting production and the exogenous variables such as weather, interest rates, governmental regulatory policies, and human behavior to determine the endogenous variables, Y , that affect the value of the firm. Suppose the value of the firm is a function of expected net cash flows, their riskiness and the interest rate. To choose among alternative accounting policies, a manager desiring to maximize the value of the firm wants to know how those alternative choices affect the expected net cash flows and their riskiness. Answers to such questions require positive theories.

Positive theory enters the decision process in one more way. While the choice of the objective or maximand (firm value in our example) is a value judgment and therefore a normative issue, knowledge of the valuation function itself (that is, the function that relates the value of the maximand to the values of the endogenous and exogenous variables) is a positive issue and requires a theory.

It is obvious from the logical structure of decision making that purposeful decisions cannot be made without the implicit or explicit use of positive theories. You

² And often involve the result of other individuals' maximization process.

cannot decide what action to take and expect to meet your objective if you have no idea about how alternative actions affect the desired outcome—and that requires positive theory. Furthermore, using incorrect positive theories or ignoring important constraints leads to decisions that have unexpected and undesirable outcomes. This is equally true for the manager, the auditor, the FASB or the governmental regulatory body.

The history of operations research provides an interesting example of the importance of positive theories. I believe a major reason for the early successes of operations research and its later failure to live up to the promise offered by those successes can be traced to the nature of the theories given emphasis in those efforts. The operations research literature seems to evidence careful attention to the constraints that positive physical or engineering theories impose on decision making. When such physical phenomena are the dominant constraining force, ignoring other constraints given by market forces, information costs, and the peculiarities of human behavior can still lead to highly successful results. Witness the successes in using linear programming to help run oil refineries or to solve feed-mixture problems. In these problems prices could reasonably be taken as fixed because of the competitive nature of the markets involved. Furthermore, the fact that human beings do not always do what they are told or even do what they agree to do is less important in a highly mechanized process. In this sense refining and diet problems, where most of the important constraints involve chemical or other physical phenomena, are very special. The application of operations research to marketing and finance and to the management of people has been less successful. The paucity of successful applications in these areas stems not from deficiencies in the techniques or lack of technical expertise, but from the fact that researchers generally ignored the task of developing and incorporating as constraints in their problems robust positive theories of the market, organizational and human behavioral phenomena that

were important to the problems.³ This is also the reason why as scientists we cannot successfully use a straightforward operations research approach to choose accounting procedures or accounting standards; we do not know the necessary positive theories well enough to predict the effects of alternative choices.

All purposeful actions must (at least implicitly) involve positive theory, that is, a presumption that the chosen action will bring about the desired results. However, it is not necessary to presume that these positive theories are explicitly contemplated by the agents we study. In fact, as Alchian (1950) long ago pointed out, we need not even assume that agents are engaged in purposeful activity for our models to work. As an extreme case, suppose agents do not learn from observation and randomly choose strategies and actions. Suppose also that the environment rewards with survival those who happen to select strategies that are closer to optimal and grants extinction to those who are unlucky enough to choose dominated strategies or actions. In such an environment, observed behavior and institutions will tend toward the optimal because those far from it will continually tend toward extinction. In the less extreme and more realistic case where agents learn from empirical observation and engage in purposeful action, we can expect surviving institutions and practices to be an even better source of information to the scientist seeking to discover the relevant positive theories. Finally, science itself can affect the world. As our scientific understanding of the world is improved, our ability to relate actions to desired outcomes is improved. Pareto (1935, §1785) summarizes the point quite succinctly:

In the Middle Ages master-masons built marvelous edifices by rules of thumb, by empiricism, without the remotest knowledge of any theory as to the resistance capacities of building materials—merely by trying and trying again, rectifying mistakes as they went along. Now thanks to such theories, modern engineers not only eliminate the losses

³ This conjecture, of course, is a positive theory and capable of being tested.

incident to the old mistakes, but erect buildings that the master-masons and other artisans of the past centuries could not possibly have built. Practice had taught physicians certain remedies that were oftentimes better than those recommended by quacks or alchemists. Sometimes again they were altogether worthless. Nowadays chemical theories have eradicated not all, but a very large number, of those mistakes, and biology has made it possible to make better use of many substances that chemistry places at the disposal of medicine. Only a few years back, in making cast iron in a blast-furnace it was wiser to follow the directions of an empiricist than the prescriptions of theory. Today the iron industry is no longer carried on without consultant chemists and other theorists. The same may be said of the dyeing industry and of many others.

As a result of the subtle interactions of the continual striving by purposeful individuals and the natural selection properties of the environment, extremely complicated and sophisticated institutions and practices can arise. And, as Hayek (1979, pp. 153ff) emphasizes, most of the complex and sophisticated phenomena that make up human culture (markets and mores are examples) were never consciously invented by any individual. Indeed, much of human culture is still not well understood.

The general decision structure delineated above also clarifies the criteria for accepting or rejecting theories. Theories are not rejected in a vacuum. If a theory predicts poorly but still better than the best available alternative, it will not be abandoned by the decision maker because doing so will reduce his welfare. As the old saying goes, "you can only beat a theory with another theory." The choice among competing theories will be based on which is expected to yield the highest value of the objective function when used for decision making. Single observations inconsistent with a theory will not necessarily bring rejection, nor is there a "natural" significance level such as 5% that brings rejection. Thus, care must be taken in interpreting the significance tests often used by scientists who are not in a decision making capacity and therefore do not have a well-defined objective function to use for deciding among contending theories.

How does one go about developing a positive theory of accounting, one that will ultimately aid in normative choices? I start by focusing on the relationship between organizational form and accounting practice—to recognize formally that accounting is a basic part of the structure of every organization. I then discuss the emerging research on an economic theory of organization.

III. Accounting and Organizational Form

Accountants have long recognized the importance accounting has played in the stewardship or control of organizations, and this is consistent with the notion that accounting is a basic part of organizational structure and that accounting practice and organizational form are related. Accounting practices clearly differ across organizations—profit vs. nonprofit, for example. Frequently nonprofits do not record capital assets on their balance sheets and do not calculate depreciation. Fund accounting, of course, is very different from the usual for-profit system. Satisfactory explanations of these differences do not exist.⁴ But this is not surprising, considering that social scientists have not generated satisfactory explanations for why nonprofit organizations exist and why they seem to dominate some activities like education and religion and not others like manufacturing.⁵ Taxes are not sufficient to explain their existence, because nonprofits existed long before income taxes became important. Moreover, many other types of organizational forms exist and tend to be related to the type of production activities the organization undertakes. Publicly held or open corporations are dominant in large, complex, capital-intensive activities like manufacturing. Partnerships are dominant in sensitive service activities like law and public accounting, and nonprofits in religion, education, and classical music.

⁴ See Zimmerman (1977).

⁵ See Hansmann (1980, 1981) and Fama and Jensen (1983a, 1983b, 1985) for several recent attempts to understand where nonprofit organizations survive and why.

Moreover, within broad organizational categories, specific organizations differ along many dimensions such as performance evaluation, compensation, budgeting, costing, pricing, capital structure, distribution, and sales practices. There is little scientific understanding about why organizations of a given general type differ along these dimensions. And if accounting practices are significantly affected by an organization's structure, then without a fundamental understanding of why organizations differ we have no fundamental understanding about why accounting policies differ across organizations.⁶

Consider, for example, the use of profit centers vs. cost centers as the basis for defining divisions of an organization. Although economists and accountants have analyzed both of these organizational devices, no satisfactory theory exists that will predict when an activity within an organization will be organized as a cost center and when as a profit center.⁷ Though the accounting procedures employed for each type of organization are well known, the relation of the accounting procedures to the development of the firm's organization is worthy of research. In addition, there is evidence in Chandler's (1962, pp. 61, 145ff) work that the organizational innovations that led to the large, integrated, multi-divisional American firms in the early 1900's were accompanied by substantial innovations in accounting practices.

We are almost as ignorant regarding why financial reporting practices differ among organizations. Again, to the extent that little theory exists to explain why organizations differ in their financial reporting practices and what the effects of those different practices are, little scientific basis exists to advise management, the FASB, or the SEC on how to improve such practices through changes in accounting standards or

⁶ For a number of studies that address these issues see Watts (1977), Watts and Zimmerman (1978, 1979), Leftwich (1983), and Holthausen (1981).

⁷ This means, incidentally, that as scientists we have little advice to offer management regarding whether cost or profit centers would be best to use in any given activity.

regulation.⁸ This brings me back to my main topic, the emerging research in economics that is related to organizations.

IV. The Impending Revolution in Organization Theory

I believe a revolution will take place over the next decade or two in our knowledge about organizations. This process will involve accounting researchers as well as economists and other social scientists. Accounting theory has benefited greatly from advances in our knowledge of finance and financial markets over the last two decades—advances in which accounting researchers have played an important role. I foresee advances in organization theory which will have an even larger impact on accounting research, and the effects will extend beyond accounting to finance, economics, and management education and practice.

The last decade has been marked by a growing interest in organizations within the economics profession. The work of several dozen scholars comes to mind, and I am sure there is much work unknown to me.⁹ The science of organizations is still in its infancy, but the foundation for a powerful theory of organizations is being put into place. In a parallel development there is a growing body of accounting literature addressing related problems that generally goes under the label of positive research in accounting.¹⁰ The

⁸ Understanding why the FASB and the SEC behave as they do and their effects on accounting requires a positive theory of the political process—another difficult area which is experiencing great scientific progress. The research on financial reporting evidences an understanding of this and I shall ignore these political/regulatory issues here.

⁹ See, for example, Williamson (1964, 1975, 1979, 1981), Arrow (1963, 1974), Alchian (1950, 1969, 1981), Alchian and Demsetz (1972), Pejovich (1969), Furubotn and Pejovich (1973), Jensen and Meckling (1976, 1979), Lazear (1979), Lazear and Rosen (1981), Klein, Crawford and Alchian (1978), Harris and Raviv (1978), Harris, Kriebel, and Raviv (1981), Fama and Jensen (1982a, 1982b, 1983), Fama (1980), Smith and Warner (1979), Chandler (1962, 1977), Chandler and Daems (1980), Daems (1978), Hansmann (1980, 1981), Demsetz (1982), Reagan and Stulz (1982), Marvel (1982), Meckling (1976), and Mayers and Smith (1981, 1982a, 1982b).

¹⁰ See, for example, Benston (1963, 1975a, 1975b, 1979-1980), Watts (1977, 1981), Watts and Zimmerman (1978, 1979, 1982a), Hagerman and Zmijewski (1979), Leftwich, Watts, and Zimmerman (1981), DeAngelo (1981a, 1981b), Collins, Rozeff, and Dhaliwal (1981), Holthausen (1981), Zmijewski and Hagerman (1981), Dhaliwal (1980), Lilien and Pastena (1982), Bowen, Noreen, and Lacey (1981),

existence of empirical regularities between the choice of accounting procedures and organizational characteristics such as size and capital structure is beginning to be documented in that literature. A healthy and prospering journal, the *Journal of Accounting and Economics* has been founded by my colleagues Ross Watts and Jerold Zimmerman to further encourage the development of a positive accounting literature.

A. The Dimensions of Organizations

Bill Meckling, my colleague and Dean, and I have spent a half dozen years investigating the application of the principles of economics to the analysis of organizations and in the process have developed a new course entitled Coordination and Control in Organizations. One of the frustrating aspects of that effort has been the difficulty associated with developing an understanding and definition of the relevant dimensions to use in characterizing the structure of an organization. Organizations are complex systems. If we are to make progress in understanding them we must order that complexity. We must find and articulate a set of organizational characteristics which can explain why various organizations function as they do.

In developing our coordination and control course, we have arrived at a three-part taxonomy to characterize organizations:

- The performance measurement and evaluation system,
- the reward and punishment system,
- the system for partitioning and assigning decision rights among participants in the organization.

I do not have space here to discuss the importance of this classification scheme, but notice that the accounting and control system plays a major role in all three dimensions. Viewing the organization from this perspective helps provide structure to

Healy (1982), Dhaliwal, Salamon, and Smith (1982), Jarrell (1979), and Lys (1982). Useful reviews of this literature are provided by Holthausen and Leftwich (1982), Zimmerman (1980), and Watts and Zimmerman (1982b).

the notion of the stewardship role of accounting in the organization. Furthermore, differences in these three dimensions across organizations are highly likely to result in differences in accounting systems. This also indicates that accounting is an integral part of the structure of every organization and that a thorough understanding of organizational forces is important to a theory of accounting.

In addition to the requirement for a better understanding of the relevant dimensions of organizations, progress in the development of a theory of organizations will also be aided by understanding why economics have not already yielded such a theory.

B. Limitations of the Economic Theory of the Firm

Unfortunately, the vast literature of economics that falls under the label of “Theory of the Firm” is not a positive theory of the firm, but rather a theory of markets. The organization or firm in that theory is little more than a black box that behaves in a value- or profit-maximizing way. In most economic analyses, the firm is modeled as an entrepreneur who maximizes profits in an environment in which all contracts are perfectly and costlessly enforced. In this firm there are no “people” problems or information problems, and as a result the research based on this model has no implications for how organizations are structured or how they function internally. The firm is, in effect, assumed to be an elementary component of the analysis even though in fact it is an exceedingly complex subsystem. This is not necessarily wrong. When it is appropriate for a scientist to treat a complex subsystem as an elementary component is a subtle and difficult issue. Herb Simon’s article on “The Architecture of Complexity” contains an excellent analysis of the issue. As Simon (1962, p. 469) poses the problem:

. . . In most systems in nature, it is somewhat arbitrary as to where we leave off the partitioning, and what subsystems we take as elementary. Physics makes much of the concept of “elementary particle” although particles have a disconcerting tendency not to remain elementary very long. Only a couple of generations ago, the atoms themselves were

elementary particles; today, to the nuclear physicist they are complex systems. For certain purposes of astronomy, whole stars, or even galaxies, can be regarded as elementary subsystems. In one kind of biological research, a cell may be treated as an elementary subsystem; in another, a protein molecule; in still another, an amino acid residue.

Just as astronomers can usefully abstract from the complexities inside a star or a galaxy for certain purposes, the classical economic notion of the firm has usefully abstracted from the internal complexities of organizations. It has yielded a robust theory of markets that is of great value. However, precisely because the definition of the firm abstracts from most of the real problems and complexities of organizations, it provides no insights to the construction of a theory of organizations. The concepts of marginal analysis, competition, opportunity cost, and equilibrium that have been useful in the development of a theory of markets will also be valuable in the development of a theory of organizations. They are not, however, enough to accomplish the job. This raises the question of what we use to replace the black box view of the firm.

V. The Nexus of Contracts View of Organizations

I believe it is productive to define an organization as a legal entity that serves as a nexus¹¹ for a complex set of contracts (written and unwritten) among disparate individuals (see Jensen and Meckling, 1976, pp. 310ff). The multilateral contracts between agents that characterize market relations are supplanted within an organization by a system in which the relationships among the cooperating agents are largely effected through unilateral contracts with the legal entity that serves as the contracting nexus. These contracts specify the rules of the game within the organization, including the three critical dimensions outlined above: the performance evaluation system, the reward system, and the assignment of decision rights. This view of organizations focuses attention on the nature of the contractual relations among the agents who come together

¹¹ "A connection, tie, or link between individuals of a group, members of a series, etc." *Webster's* (1978).

in an organization—including suppliers of labor, capital, raw materials, risk-bearing services, and customers.

The nexus of contracts view helps us to see organizations in a way that can provide useful insights. It leads to inquiry about why certain contractual relations arise and how those relations respond to changes in the environment. For example, it leads us to see the shopping center as an organizational form that is an interesting alternative to a collection of independently-owned stores grouped together in a shopping district or as an alternative to a large department store where there is no independent ownership of individual departments. The department store is an organizational device that internalizes the externalities generated by locating certain types and qualities of stores together and providing certain services centrally—so too is a supermarket. On the other hand, as such organizations grow in size, shirking problems grow larger and so do other problems associated with providing department managers, buyers, etc. with the correct incentives. The shopping center with common ownership of buildings and parking facilities coupled with contractual procedures that control the types of stores in the center, their quality, and so on, can also internalize many of the externalities of pure independent ownership. Some of the incentive problems are solved in the shopping center structure by maintaining independent ownership of the individual stores and charging for participation in the organization through a fixed fee rental plus a percentage of revenues or profits.

Although this is not the place to pursue it, it is easy to see how comparisons of such organizational forms lead to questions regarding the factors that give competitive advantages to each of these three organizational types (shopping centers, department stores, and independently owned specialty stores) at various times and at various locations. Such questions are relevant because we know all three types of organizations continue to compete and survive. Close examination should also reveal differences in accounting systems in these organizations (differences that arise from the problems and opportunities peculiar to each of them) and the role accounting plays in permitting these

organizations to survive. Understanding such differences and why they arise will add another set of elements to the theory of accounting.

The nexus of contracts view of organizations also helps to dispel the tendency to treat organizations as if they were persons. Organizations do not have preferences, and they do not choose in the conscious and rational sense that we attribute to people. Anyone who has served on committees understands this fact. Usually no single person on a committee has the power to choose the outcome, and the choices that result from committee processes seldom resemble anything like the reasoned choice of a single individual. The voting paradox examined at length in the political science literature is an example of this point. The old description of the camel as a “horse designed by a committee” also captures the point.

The behavior of the organization is the equilibrium behavior of a complex contractual system made up of maximizing agents with diverse and conflicting objectives. In this sense, the behavior of the organization is like the equilibrium behavior of a market. We do not often characterize the steel market or the wheat market as having preferences and motives or making choices like an individual, but this mistake is commonly made about General Motors, Peat, Marwick, Mitchell & Co., and so on. Construction of a theory of organizations involves creating a theory that describes the equilibrium behavior of these complex contractual systems where the individual agent is the elementary unit of analysis.¹²

As Simon emphasizes, the definition of the elementary unit of analysis in science is not a matter of “right” or “wrong” but rather one of usefulness. Whether one chooses the “black box” or “nexus of contracts” definition of an organization depends on the question at hand. Some questions, like how outputs of a firm or industry respond to price

¹² See Meckling (1976) for a discussion of alternative models of man as the elementary unit of analysis. Sociobiologists, however, find it useful for analysis of some questions to view the gene as the elementary maximizing entity. See Hirshleifer (1978) and Dawkins (1976) and the references therein for discussions of this alternative model.

changes, are more productively addressed with the former. Other questions, such as those involving organizational problems like the choice of accounting practices, are more productively addressed in the nexus of contracts perspective. However, when using the black box approach it is important to remember that it is a convenient abstraction that is appropriate only for analysis of some questions. The danger in its use arises because it further encourages the tendency to personalize organizations by attributing motives and preferences to what is in fact a complex equilibrium system. Such personalization of organizations easily leads to uncritical application of the black box approach to questions it cannot handle.

VI. Some Recent Results on Control

Eugene Fama and I have been working for several years to understand the characteristics that give survival value to different organizational forms. One of our concerns has been to understand the factors that give survival value to organizations like large public corporations characterized by separation of “ownership and control,” or, more precisely, separation of the decision management and residual risk-bearing functions. Scholars from Adam Smith (1776), to Berle and Means (1932) have pointed out the inconsistency of interests between managers and outside stockholders and have emphasized the costs these conflicts generate. Yet, even though other organizational forms such as proprietorships, small partnerships, and closed corporations compete with corporations and do so without the handicap of the costs of separation of ownership and control, the evidence is clear: in the production of a wide range of activities, the corporation continues to win the competition for survival.

In fact, the large, publicly-held corporation is not unique in its separation of “ownership and control.” Separation of decision management and residual riskbearing characterizes many organizational forms, for example, financial mutuals and large

professional partnerships. Nonprofit organizations which have no alienable residual claims constitute the extreme form of separation of ownership from control.

Fama and I conclude that separation of decision management (the initiation and implementation of decisions) from decision control (the ratification and monitoring of decisions) in the organization is the major device that limits the costs due to separation of “ownership and control.” The evidence indicates that open corporations, financial mutuals, large partnerships, and nonprofit organizations are all characterized by separation of decision management and decision control functions. Moreover, all these organizations use a common device—boards of directors, trustees, or managing partners—to accomplish such separation at the top level of the organization. These boards have the rights to ratify and monitor the decisions that are initiated and implemented by top-level managers. In addition, they always have the power to hire, fire, and set the compensation of the top-level managers. This top-level separation of decision management from decision control and the separation and diffusion of decision management and decision control rights among agents throughout lower levels of the organization are the contractual responses that limit the costs of the separation of “ownership and control” and therefore foster survival of these organizations (Fama and Jensen, 1983b).

Watts and Zimmerman have pointed out that our separation proposition mirrors the standards recommended in the auditing and control literature. Stettler’s (1977) auditing text, for example, urges that operations responsibility be separated from accounting responsibility by vesting the two functions in different people.¹³ In handling cash, the recommendation is to separate the responsibility for the record-keeping function from the person who receives the cash, and similarly for authorizing and drawing checks

¹³ “In general, no one department should be responsible for handling all phases of a transaction, and if possible, the division of responsibility should keep operations and custodianship separate from accounting.” Stettler (1977, p. 56).

in the payout process. These widely practiced principles have evolved from long experience with conflicts of interest and evidently have survival value. Since Fama and I derived our propositions about control in a quite different context, these common practices for handling cash, accounts payable, and so on, are encouraging evidence consistent with our thesis. It is exciting that, appropriately generalized, some of the same principles that apply to the conflict of interest problem in the handling of cash also apply to the conflict of interests between managers and stockholders and boards of directors of corporations, financial mutuals, large partnerships, and even nonprofit organizations. It gives hope that the next decade will witness success in the construction of a rich and general theory of control.

VII. Methodological Issues

Whether the potential to develop a science of organizations will be exploited depends, of course, on many factors. I would like to discuss some important methodological issues: (1) the importance of tautologies and definitions, (2) the difficulty but desirability of dealing with qualitative institutional evidence, and (3) the role of mathematics.

A. The Importance of Tautologies

In the language of science, a tautology is a statement that is true by definition and can never be refuted by evidence.¹⁴ Therefore, it is not an hypothesis or a theory. A definition declares that a newly-introduced symbol means the same as another combination of symbols whose meaning is already known; it, therefore, also cannot be refuted by evidence.

¹⁴ Philosophers have a precise definition of tautology. I use the term here more loosely and more in accord with its use in the social sciences.

The choice of tautologies or definitions has a large impact on the success or failure of research efforts—a fact that often goes unrecognized. Discussion of new research efforts often meets with resistance on the grounds that the effort is purely definitional, or the propositions are tautological and devoid of empirical content. Yet thorough and careful attention to definitions and tautologies is often extremely productive in the early stages of research, especially if the research is a radical departure from the past. On the other hand, it is also common to observe talented manpower devoted to sterile research on toy problems or characterizations of problems that bear little relation to the world and the rich variety of options that people face. The sterility of this research can often be traced to the choice of definitions and tautologies that focus the effort. Unfortunately, there is no obvious criterion we can apply to help us select more productive rather than less productive tautologies or definitions. Perhaps such choices will remain one of the “artistic” or creative parts of science.

Alfred Whitehead and Bertrand Russell (1910, pp. 11ff) emphasize the importance of the choice of definitions:

In spite of the fact that definitions are theoretically superfluous, it is nevertheless true that they often convey more important information than is contained in the propositions in which they are used. This arises from two causes. First, a definition usually implies that the *definiens* [the meaning in terms of the combination of already known symbols] is worthy of careful consideration. Hence the collection of definitions embodies our choice of subjects and our judgment as to what is most important. Secondly, when what is defined is (as often occurs) something already familiar, such as cardinal or ordinal numbers, the definition contains an analysis of a common idea, and may therefore express a notable advance. Cantor’s definition of the continuum illustrates this: his definition amounts to the statement that what he is defining is the object which has the properties commonly associated with the word “continuum,” though what precisely constitutes these properties had not before been known. In such cases, a definition is a “making definite”; it gives definiteness to an idea which had previously been more or less vague.

For these reasons, it will be found, in what follows, that the definitions are what is most important, and what most deserves the reader’s prolonged attention.

The mathematical biologist, A. J. Lotka (1956, pp. 3f), provides another example when he characterizes the enunciation of the survival of the fittest as one of the fundamental advances of science. It is a tautology because the fit is defined to be that which survives. The Coase Theorem (1960) is another important tautology that has helped us to see the importance of transactions costs in a fundamentally different fashion. (See Demsetz, 1982, Ch. 2). The proposition that consumers make choices so as to maximize their utility is also a tautology that has proved useful in understanding human behavior and markets. Another tautology that accountants will agree is important is the proposition that assets equal liabilities plus equity—at least as long as I'm not doing the arithmetic. The usefulness and power of double-entry bookkeeping is testified to by its survival since at least the 15th century and its continuing widespread use. Viewing double-entry bookkeeping this way leaves me believing that we still do not thoroughly understand why it is a powerful organizing device. I am so used to thinking of assets and the claims on them, equities and liabilities, as a way of organizing thoughts about companies that it is hard to conceive of alternatives.¹⁵

The word tautology has strong pejorative overtones in our profession—to be accused of stating a tautology is practically the highest of professional insults. Therefore, I hasten to add that while a tautology of one form or another lies at the heart of all useful theory, this does not mean that such theory has no refutable, i.e., positive, implications. Darwin and the biologists who followed him as well as economists using the Coase Theorem and utility maximization have thoroughly demonstrated the empirical content of their theories.

The manner in which we use tautologies to develop positive theories is closely related to the nature of the scientific process itself. The process involves the use of the definitions and the underlying tautology (such as the survival of the fittest) and a subset

¹⁵ I am left with questions; for example why don't we organize our thoughts about the family through the double-entry tautology? Perhaps someday these issues will be better understood.

of the available data on surviving and extinct species to develop propositions about the important aspects of the environment and their relation to traits contributing to survival. When successful, the result is a theory that is consistent with the utilized data. This theory can then be tested with as yet unused data. In addition, the theoretical structure can be manipulated to derive additional nonobvious propositions which can also be confronted with new or previously unused data to provide tests. When the data is substantially inconsistent with the predictions, the theory is revised or replaced and the process continues. This is a continuing process, of course, and takes place over a series of studies and papers.

Finally, note how Whitehead and Russell's emphasis on the importance of definitions applies to the economic notion of the firm. Defining the firm as a black box diverts attention away from what is going on within the firm. The nexus of contracts definition of organizations, on the other hand, focuses attention on the problems that the contracts are intended to solve, i.e., on how things get done within the organization. Whether the nexus of contracts view will be as productive as I think it will be is itself an empirical question. However, the relatively recent development of the positive theory of agency lends encouragement to the view that the nexus of contracts approach will be productive.

B. Two Useful Tautologies—Agency Costs are Minimized and Survival of the Fittest

The positive theory of agency also derives from several definitions and a simple tautology. Cooperative behavior between human beings is viewed as a contracting problem among self-interested individuals with divergent interests. Agency costs are defined as the sum of the costs of structuring, bonding, and monitoring contracts between agents. Agency costs also include the costs stemming from the fact that it doesn't pay to enforce all contracts perfectly. Recognizing that one or more of the contracting parties can capture the benefits from reducing the agency costs in any relationship provides the

analytical device, the tautology, that yields implications for the forms of the contracts that evolve¹⁶—maximizing agents minimize the agency costs in any contracting relationship (Jensen and Meckling, 1976). Notice how conveniently this dovetails with the notion of organizations as a nexus of contracts; its application there implies that the organizational form, its contracts, will be those that minimize the agency costs.

Adding two more elements, (1) the notion that competition is a general phenomenon that takes place over many dimensions, including organizational form, and (2) the survival of the fittest tautology,¹⁷ completes most of the major building blocks of the analytical framework for creating a theory of organizations. The view is one of organizations competing with each other to deliver the activities demanded by customers. Those organizations survive that are able to deliver the activities or products at the lowest price while covering costs. Understanding the survival process involves understanding how the contracts of particular organizations achieve low cost control of agency problems and how they combine with the production technology of an activity to enable the organization to survive (Fama and Jensen, 1983a, 1983b, 1985)).

C. The Nature of Evidence

Since a theory of organizations is in essence a special case of a general theory of contracting, it is likely that some confusion and disagreement will arise in the profession over the nature of evidence bearing on the theory. Indeed, this disagreement is already becoming evident in the research on organizations and in positive research in accounting.

Economists, financial economists, accounting researchers and behavioral scientists are well indoctrinated in the methodology associated with the use of

¹⁶ For some interesting applications of this approach see Smith and Warner (1979) who use it to explain covenants in bond indentures, Mayers and Smith (1981, 1982a, 1982b), who examine contracting and organizational practices in the insurance industry, and Leftwich (1983), who examines the private contractual specification of accounting procedures. Holthausen (1981) uses the approach to derive hypotheses about management decisions to change depreciation methods. His tests indicate the data are not consistent with the hypotheses.

¹⁷ Alchian (1950) long ago argued for the use of the natural-selection principle in economic analysis.

quantitative evidence in the testing of theories. We have been fortunate, for example, that the theory of efficient markets yields direct predictions about the characteristics of the probability distributions of asset price changes and returns—predictions for which a rich variety of data and statistical theory are conveniently available for testing purposes. However, many important predictions of the research on positive organization theory and positive accounting theory will be characterizations of the contracting relations, and much of the best evidence on these propositions will be qualitative and institutional evidence, that is, evidence on the forms of the contracts, their provisions, and on other organizational and accounting practices. By its nature, much of this institutional evidence cannot be summarized by measures using real numbers. We simply do not know how to aggregate such evidence, nor can we calculate formal measures of central tendency and standard errors of estimate. This means, of course, that regression equations cannot be estimated, and this will not bring comfort to those empiricists who clutch regression equations to their breasts like security blankets. Statisticians and econometricians are likely to react because it violates a long and venerable tradition of formal testing.

Whenever feasible, of course, it is desirable to obtain quantitative predictions of a form amenable to the usual testing procedures. However, since the theory is aimed at explaining the contract structures and practices of organizations, it seems unwise to ignore evidence on such structures in testing the theory. It seems especially unwise in the early stages of development because any theory that is likely to be useful and worthy of detailed consideration should not be vastly inconsistent with the readily available institutional evidence. Not all such theories will, however, be acceptable and herein lies a serious inference problem. The fact is that a well developed theory of inference for dealing with quantitative data exists and it is of great value. Such a theory is not nearly as well developed for dealing with the qualitative institutional data that characterize the

organizational field, and therefore the likelihood of misuse of data and incorrect inferences is higher.

Nonparametric statistics provide only limited help in dealing with institutional evidence because these procedures generally presume independence in sample observations—a condition seldom satisfied. In addition, it is often difficult to know what procedures were followed in selecting a sample of institutional evidence, and this raises serious questions about the existence of selection bias and therefore about the inferences to be made from the evidence. Finally, because institutional evidence consists of non-commensurable items we do not know how to formally weight the individual pieces of evidence; they cannot be simply counted or added up. Yet this does not mean the observations are not evidence, and most people intuitively understand this when it comes to the issues considered in a criminal trial. With the help of statisticians and philosophers, perhaps some progress will be made in resolving these inference problems.

Meanwhile, it is unwise to ignore important institutional evidence while paying great attention to unimportant quantitative evidence simply because its dimensions are more familiar. The practice of using pejorative labels such as “casual,” “anecdotal,” or “ad hoc” to describe such institutional or qualitative evidence is counterproductive to the research process. Such labels suggest uncaring or sloppy methods or unimportant evidence. “Readily available” or “institutional” evidence are reasonable substitutes for these emotion-laden terms. “Incomplete,” or “inappropriate” evidence are reasonable descriptive labels to use when the researcher’s methods are in fact uncaring or sloppy. Not all institutional evidence is readily available: much of it requires a great deal of effort to gather. On the one hand, stock price data, accounting data, and national income data are readily available to the scientist but they are not given pejorative labels such as “casual.” For several carefully executed and useful studies using institutional evidence, I recommend the study of the covenants in bond indentures by Smith and Warner (1979), the Mayers and Smith (1981, 1982a, 1982b) work on organizations and contractual

practices in the insurance industry, the study of the market for accounting theories by Watts and Zimmerman (1979), and the study of private specification of accounting procedures by Leftwich (1983).

D. The Role of Mathematics

Mathematics is a very useful language, but not universally so. It is often useful in the derivation of non-obvious implications that are difficult to develop by other techniques. The propositions of portfolio theory and asset pricing are examples. The unaided human mind and the English language are not well suited to handling the complexities of the notion of a covariance matrix and solutions to sets of simultaneous equations. Without the help of the language of mathematics, the insights of portfolio theory and asset pricing along with many others would likely remain unknown.

Sometimes, however, the use of mathematics is counterproductive in the research process. This is especially true in dealing with new and uncharted areas such as organization theory and accounting theory. As implied by the previous discussion of definitions and tautologies, a great deal of work has to be done in a new area of analysis that represents a radical departure from current knowledge before the dimensionality of the problem and the major variables can be defined. Mathematics seems to be useless for solving these problems. My impression is that attempts to use it at such an early stage in the development of an area are often counterproductive because authors are led to assume the problem away or to define sterile “toy” problems that are mathematically tractable.

Unfortunately, there exists in the profession an unwarranted bias towards the use of mathematics even in situations where it is unproductive or useless. One manifestation of this is the common use of the terms “rigorous” or “analytical” or even “theoretical” as identical with “mathematical.” None of these links is, of course, correct. Mathematical is not the same as rigorous, nor is it the same as analytical or theoretical. Propositions can be logically rigorous without being mathematical, and analysis does not have to take

the form of symbols and equations. The English sentence and paragraph will do quite well for many analytical purposes. In addition, the use of mathematics does not prevent the commission of errors—even egregious ones.

There will always be some people who think and produce better in one language than another. And there will be problems and problem areas where one language or analytical approach is more productive than another. Nevertheless, some researchers take the attitude that analysis is worthwhile and important only if accomplished through the language of mathematics. Others are antagonistic toward analysis that uses mathematics. Hopefully, as the profession matures, more tolerance, understanding, and consideration of these issues will prevail. As our knowledge of organizations and accounting theory grows I expect to see increased productive use of mathematics.

VIII. The Two Agency Literatures

Since the original papers by Spence and Zeckhauser (1971) and Ross (1973), substantial attention has been given to the development of the theory of agency. Interestingly, that development has resulted in two almost entirely separate and valuable literatures that nominally address the same problem. However, the two literatures differ in many respects, and they reference each other less than one might expect given the closeness of their topics. Being actively involved in one of these efforts and a neophyte in the another, I am not the best person to provide an unbiased comparison of them, but some discussion seems appropriate at this point.

Earlier, I briefly discussed one of the agency literatures—what I have labeled the “positive theory of agency.” The other literature has acquired the label “principle-agent.”¹⁸ Both literatures address the contracting problem between self-interested

¹⁸ Some representative but far from exhaustive references are Spence and Zeckhauser (1971), Ross (1973, 1974), Raviv (1979), Harris and Raviv (1978), Mirrlees (1976), Harris and Townsend (1981), Townsend (1979), Holmstrom (1979), and Shavell (1979). Demski and Kreps (1982) review the accounting-related literature in this area.

maximizing parties and both use the same agency cost minimizing tautology (although not necessarily stated in that form). They differ, however, in many respects. The principal-agent literature is generally mathematical and non-empirically oriented, while the positive agency literature is generally non-mathematical and empirically oriented (although neither literature is entirely so).

The principle-agent literature has generally concentrated on modeling the effects of three factors on contracts between parties interacting in the hierarchical fashion suggested by the term principal-agent: (1) the structure of the preferences of the parties to the contracts, (2) the nature of uncertainty, and (3) the informational structure in the environment. Attention is generally focused on risk sharing and the form of the optimal contract between principal and agent, and on welfare comparisons of the equilibrium contracting solutions in the presence of information costs vis-à-vis the solutions in the absence of such costs.

The positive agency literature has generally concentrated on modeling the effects of additional aspects of the contracting environment and the technology of monitoring and bonding on the form of the contracts and organizations that survive. Capital intensity, degree of specialization of assets, information costs, capital markets, and internal and external labor markets are examples of factors in the contracting environment that interact with the costs of various monitoring and bonding practices to determine the contractual forms.¹⁹

Each of the agency literatures has its strong and weak points, and on occasion tension has surfaced between them. In some sense the reasons are understandable. Part is due to the “tyranny of formalism” that develops when mathematically inclined scholars take the attitude that if the analytical language is not mathematics, it isn’t rigorous, and if

¹⁹ See, for example, Jensen and Meckling (1976), Myers (1977) Smith and Warner (1979), Fama (1980), Holthausen (1981), Mikkelson (1981), Leftwich (1981, 1983), Mayers and Smith (1981, 1982), Watts and Zimmerman (1982a, 1982b), and Fama and Jensen (1983a, 1983b, 1985).

a problem cannot be solved with the use of mathematics, the effort should be abandoned. Part is due to the belief that the lack of the use of mathematics in the positive agency literature results in ex post facto theorizing that assures the hypotheses will not be rejected. Part is also due to the problems associated with the use of qualitative and institutional evidence, discussed earlier.

Though much of the principal-agent literature seems to be produced in the normative mode, most of it can be interpreted in a positive fashion. However, some believe that so little is put into the current principle-agent models that there is little hope of producing results that will explain much of the rich variety of observed contracting practices. Tractability problems seem to limit the richness of the input to the principal-agent models, especially when it comes to analyzing the effects of markets on the contracting process—for example, capital and labor markets and the market for control. It also seems difficult to analyze within the principal-agent models the effects of complex equilibrium systems in the contracting milieu, for example, mutual monitoring systems like the collegial system so familiar to academics.

The issue boils down to an empirical question regarding how useful the preference, stochastic structure, and information structure variables are in explaining observed contracting practices. The positive agency literature proceeds on the implicit assumption that the variables emphasized in the principal-agent literature are relatively unimportant in understanding the observed phenomenon when compared with richer specifications of information costs, other aspects of the environment, and the monitoring and bonding technology.

On the other hand, the methods of the positive agency literature justifiably seem unconstrained and often perilously close to tautological to some. In part this arises from a misunderstanding by some of the nature of the scientific process—the manner in which we use tautologies to develop positive theories. At the risk of oversimplifying, the ideal process proceeds by using the agency definitions and the cost-minimizing tautology

described earlier and a subset of the observed contract structures to develop propositions about the important aspects of the environment and the monitoring and bonding technology—that is, to derive a theory that is consistent with those contracts. If successful, that effort provides a structure that can be manipulated to derive additional non-obvious positive propositions, i.e., hypotheses. Confronting these propositions with previously unknown or unused data provides a test of the theory. If the data are substantially inconsistent with the predictions, the theory is then revised or replaced with a new alternative and the process continues. This is the scientific process. In the initial stages we should take care to avoid requiring researchers to accomplish all this in a single study or paper—an undesirable requirement from the standpoint of the progress of science. It is important as colleagues, referees, and editors to avoid applying standards to individual papers that are appropriately applied only to the scientific process as a whole.

On the other hand, it is appropriate to be suspicious of results obtained from “too much” fishing in the data—including the institutional data—although it is often difficult to tell how much of that has taken place. The appropriate response is to treat the results of early studies as more like a set of relatively untested hypotheses than a well-tested and surviving theory.

As a result of the continued gradual development of our empirical and conceptual knowledge, I expect to see the two agency literatures become closer, partly because the intellectual efforts devoted by both groups will result in a clearer understanding of the definitions of the important concepts and the relevant dimensions upon which to order the complexity of the world. Mathematics will then be of great help in the generation of non-obvious testable propositions and as a language for use in communicating the important aspects of the theoretical structure.

In the end, competition in research is as important to innovation and progress as competition in the product markets. Scholars will make their own judgments of what are currently useful results and where the productive and exciting research approaches and

opportunities are. I have little doubt that with the passage of time, the “fit” (that is, the productive and useful results and approaches) will “survive.”

References

- Alchian, Armen A. (1950). "Uncertainty, Evolution and Economic Theory." *Journal of Political Economy* 58, no. 3 (June): 221-221.
- Alchian, Armen A. (1968). *Corporate Management and Property Rights*. Economic Policy and the Regulation of Securities, Washington, D.C., American Enterprise Institute.
- Alchian, Armen A. (1981). Property Rights, Specialization and the Firm. *Unpublished manuscript, November*.
- Alchian, Armen A. and Harold Demsetz (1972). "Production, Information Costs, and Economic Organization." *American Economic Review* LXII, no. 5 (December): 777-795.
- Arrow, Kenneth J. (1971). *Control in Large Organizations: Essays in the Theory of Risk-Bearing*, Markham Publishing Co.
- Arrow, Kenneth J. (1974). *The Limits of Organizations*. New York, Norton and Company, Inc.
- Benston, George J. (1963). "The Role of the Firm's Accounting System for Motivation." *The Accounting Review* (April): 347-354.
- Benston, George J. (1975a). "Accountants' Integrity and Financial Reporting." *Financial Executive* XLIII (August): 10-14.
- Benston, George J. (1975b). "Accounting Standards in the U.S. and U.K.: Their Nature, Causes and Consequences." *Vanderbilt Law Review* 28 (January): 235-268.
- Benston, George J. (1979-80). "The Market for Public Accounting Services: Demand, Supply and Regulation." *The Accounting Journal* II, 1 (Winter): 1-46.
- Berle, Adolf A. and Gardiner C. Means (1932). *The Modern Corporation and Private Property*. New York, Macmillan Publishing Co.
- Bowen, R. E., E. W. Noreen and J. Lacey (1981). "Determinants of the Corporate Decision to Capitalize Interest." *Journal of Accounting and Economics* 3 (August): 151-179.
- Chandler, Alfred D., Jr. (1977). *The Visible Hand: The Managerial Revolution in American Business*. Cambridge, Mass, Belknap Press.
- Chandler, Alfred D., Jr. and Herman Daems (1980). *Managerial Hierarchies: Comparative Perspectives on the Rise of the Modern Industrial Enterprise*. Cambridge, MA, Harvard University Press.
- Chandler, Alfred D. Jr (1962). *Strategy and Structure*. Cambridge, MA, MIT Press.
- Coase, Ronald H. (1960). "The Problem of Social Cost." *Journal of Law and Economics* III (October): 1-44.
- Daems, Herman (1978). *The Holding Company and Corporate Control*. Amsterdam, Martinus Nijhoff.
- Dawkins, Richard (1976). *The Selfish Gene*. Oxford, Oxford University Press.

- DeAngelo, Linda E. (1981a). "Auditor Independence, 'Low Balling,' and Disclosure Regulation." *Journal of Accounting and Economics* 3, no. 2 (August): 113-127.
- DeAngelo, Linda E. (1981b). "Auditor Size and Audit Quality." *Journal of Accounting Perspectives* 3, no. 3 (December): 183-200.
- Demsetz, Harold (1982). *Economic, Legal, and Political Dimensions of Competition*. Amsterdam, North-Holland Publishing Company.
- Demski, Joel S. and David M. Kreps (1982). "Models in Managerial Accounting." *Supplement to Journal of Accounting Research* .
- Dhaliwal, D. (1980). "The Effect of the Firm's Capital Structure on the Choice of Accounting Methods." *The Accounting Review* 55 (January): 78-84.
- Dhaliwal, Dan S., Gerald Salamon and E. Dan Smith (1982). "The Effect of Owner Versus Management Control on the Choice of Accounting Methods." *Journal of Accounting and Economics* 4 (July): 41-53.
- Fama, Eugene F. (1980). "Agency Problems and the Theory of the Firm." *Journal of Political Economy* 88, no. 2 (April): 288-307.
- Fama, Eugene F. and Michael C. Jensen (1983a). "Agency Problems and Residual Claims." *Journal of Law and Economics* 26, no. 2 : 327-349.
- Fama, Eugene F. and Michael C. Jensen (1983b). "Separation of Ownership and Control." *Journal of Law and Economics* 26 (June): 301-325.
- Fama, Eugene F. and Michael C. Jensen (1985). "Residual Claims and Investment Decisions." *Journal of Financial Economics* 14 (July).
- Furubotn, Eirik G. and S. Pejovich (1973). "Property Rights, Economic Decentralization, and the Evolution of the Yugoslav Firm, 1965-1972." *Journal of Law and Economics* 16 (October): 275-302.
- Hagerman, R., and M. Zmijewski (1979). "Some Economic Determinants of Accounting Policy Choices." *Journal of Accounting and Economics* (August): 141-161.
- Hansmann, Henry B. (1980). "The Role of Nonprofit Enterprise." *Yale Law Journal* 89, no. 5 (April): 835-901.
- Hansmann, Henry B. (1981). "Nonprofit Enterprise in the Performing Arts." *The Bell Journal of Economics* 12, no. 2 (Autumn): 341-361.
- Harris, M. and A. Raviv (1978). "Some Results in Incentive Contracts with Applications to Education and Employment, Health Insurance, and Law Enforcement." *American Economic Review* 68 (March): 20-30.
- Harris, M. and R. Townsend (1981). "Resource Allocation Under Asymmetric Information." *Econometrica* 49 (January): 33-64.
- Harris, M. Kriebel, C.H. and Raviv, A. (1982). "Asymmetric Information, Incentives and Intrafirm Resource Allocation." *Management Science* 28, no. 6 (June): 604-620.
- Hayek, F. A. (1979). *The Political Order of a Free People*. Chicago, IL, The University of Chicago Press.

- Hirschleifer, Jack (1978). "Competition, Cooperation, and Conflict in Economics and Biology." *The American Economic Review* 68, no. 2 (May): 238-243.
- Holmstrom, Bengt (1979). "Moral Hazard and Observability." *Bell Journal of Economics* 10 (Spring): 74-91.
- Holthausen, Robert W. (1981). "Evidence on the Effect of Bond Covenants and Management Compensation Contracts on the Choice of Accounting Techniques: The Case of the Depreciation Switch-Back." *Journal of Accounting and Economics* 3 (March): 73-109.
- Holthausen, Robert W. and Richard W. Leftwich (1982). The Economic Consequences of Accounting Choice: Implications of Costly Contracting and Monitoring. *Center for Research in Security Prices Working Paper No. 87*. Chicago, IL, University of Chicago Graduate School of Business.
- Jarrell, G. A. (1979). "Pro-Producer Regulation and Accounting for Assets: The Case of Electric Utilities." *Journal of Accounting and Economics* (August): 93-116.
- Jensen, Michael C. and William H. Meckling (1976). "Theory of the Firm: Managerial Behavior, Agency Costs, and Ownership Structure." *Journal of Financial Economics* 3, no. 4 (October): 305-360.
- Jensen, Michael C. and William H. Meckling (1979). "Rights and Production Functions: An Application to Labor-managed Firms and Codetermination." *Journal of Business* 52, no. 4 (October): 469-506.
- Klein, Benjamin, Robert Crawford and Armen A. Alchian (1978). "Vertical Integration, Appropriate Rents, and the Competitive Contracting Process." *Journal of Law and Economics* 21, no. 2 (October): 297-396.
- Lazear, Edward P. (1979). "Why is There Mandatory Retirement?" *Journal of Political Economy* 87, no. 6 (December): 1261-1284.
- Lazear, Edward P. and Sherwin Rosen (1981). "Rank-Order Tournaments as Optimum Labor Contracts." *Journal of Political Economy* 89 (October): 841-64.
- Leftwich, Richard (1981a). "Evidence of the Impact of Mandatory Changes in Accounting Principles on Corporate Loan Agreements." *Journal of Accounting and Economics* 3, no. 1 (March): 3-36.
- Leftwich, Richard, Ross L. Watts, and Jerold L. Zimmerman (1981b). "Voluntary Corporate Disclosure: The Case of Interim Reporting." *Journal of Accounting Research* Supplement to Volume 19 : 50-77.
- Leftwich, Richard (1983). "Accounting Information in Private Markets: Evidence for Private Lending Agreements." *The Accounting Review* (January).
- Lilien, S. and V. Pastena (1982). "Determinants of the Intramethod Choices in the Oil and Gas Industry." *Journal of Accounting and Economics* (December).
- Lotka, Alfred J. (1956). *Elements of Mathematical Biology*, Dover Publications.
- Lys, Thomas (1982). *Selection of Accounting Procedures and Implications of Changes in Generally Accepted Accounting Principles: A Case Study Using Oil and Gas Accounting*. Rochester, NY, University of Rochester.
- Marvel, Howard P. (1982). "Exclusive Dealing." *Journal of Law and Economics* XXV, 1 (April): 1-25.

- Mayers, David and Clifford W. Smith, Jr. (1981). "Contractual Provisions, Organizational Structure, and Conflict Control in Insurance Markets." *Journal of Business* 54, no. 3 (July): 407-434.
- Mayers, David and Clifford W. Smith, Jr. (1982a). "On the Corporate Demand for Insurance." *Journal of Business* 54, no. 3 (July): 407-33.
- Mayers, David and Clifford W. Smith, Jr. (1982b). "Toward a Positive Theory of Insurance". E. B. a. P. Wachtel. New York, Salomon Brothers Center for the Study of Financial Institutions, New York University Graduate School of Business Administration. Monograph 1982-I.
- Meckling, William H. (1976). "Values and the Choice of the Model of the Individual in the Social Sciences." *Schweizerische Zeitschrift für Volkswirtschaft* (December).
- Mikkelson, Wayne H. (1981). "Convertible Calls and the Security Returns." *Journal of Financial Economics* 9, no. 3 (September): 237-264.
- Mirrlees, J. (1976). "The Optimal Structure of Incentives and Authority Within an Organization." *The Bell Journal of Economics* 7, no. 1 (Spring): 105-131.
- Myers, Stewart C. (1977). "Determinants of Corporate Borrowing." *Journal of Financial Economics* 5, no. 2 (November).
- Pareto, Vilfredo (1935). *The Mind and Society*. New York, Harcourt, Brace and Company.
- Pejovich, Svetoyar (1969). "The Firm, Monetary Policy and Property Rights in a Planned Economy." *Western Economic Journal* 7, no. 3 (September): 193-200.
- Raviv, A. (1979). "The Design of an Optimal Insurance Policy." *American Economic Review* 69 (March): 84-96.
- Reagan, Patricia B. and Rene M. Stulz (1986). "Risk Bearing, Labor Contracts, and Capital Markets." *Research in Finance* 6 : 217-232.
- Ross, Steven A. (1973). "The Economic Theory of Agency: The Principal's Problems." *American Economic Review* LXII (May): 134-139.
- Ross, S.A. (1974). "The Economic Theory of Agency and the Principle of Similarity". *Essays on Economic Behavior under Uncertainty*. M. D. B. e. al. Amsterdam, North-Holland.
- Shavell, S. (1979). "Risk Sharing and Incentives in the Principal and Agent Relationships." *The Bell Journal of Economics* 10 (Spring): 55-73.
- Simon, Herbert A. (1962). *The Architecture of Complexity*. Proceedings of the, American Philosophical Society.
- Smith, Adam (1776). *The Wealth of Nations*. Edited by Edwin Cannan, 1904. Reprint edition 1937. New York, Modern Library.
- Smith, Clifford W., Jr. and Jerold B. Warner (1979). "On Financial Contracting: An Analysis of Bond Covenants." *Journal of Financial Economics* 7 (July): 117-161.
- Spence, Michael and R. Zeckhauser (1971). "Insurance, Information and Individual Action." *American Economic Review* LXI, no. 2 (May): 380-387.

- Stettler, Howard P. (1977). *Auditing Principles*. Englewood Cliffs, NJ, Prentice-Hall.
- Townsend, R. M. (1979). "Optimal Contracts and Competitive Markets with Costly State Verification." *Journal of Economic Theory* 21 (October): 265-293.
- Watts, Ross L. (1977). "Corporate Financial Statements, A Product of the Market and Political Processes." *Australian Journal of Management* 2 (April): 53-75.
- Watts, Ross L. (1981). "The Political Economics of the Determination of Accounting Standards". *The Relationship of Accounting Theory to the Standard Setting Process*. R. Hoyt, Faculte des Sciences de l'Administratino, Universite Labal.
- Watts, Ross L. and Jerold L. Zimmerman (1978). "Towards a Positive Theory of Determination of Accounting Standards." *The Accounting Review* 53 (January): 112-134.
- Watts, Ross L. and Jerold L. Zimmerman (1979). "The Demand for and Supply of Accounting Theories: The Market for Excuses." *The Accounting Review* (April): 273-305.
- Watts, Ross L. and Jerold L. Zimmerman (1982a). "Agency Problems, Auditing and the Theory of the Firm: Some Evidence." *The Accounting Review* (July): 273-305.
- Watts, Ross. L. and Jerold L. Zimmerman (1982b). Positive Theories of the Determination of Accounting Procedures. *Unpublished manuscript*. Rochester, NY, University of Rochester.
- Webster's New World Dictionary (1978). *Second College Edition*. New York, William Collins and World Publishing Co.
- Whitehead, Alfred N. and Bertrand Russell (1910). *Principia Methematica*. Cambridge, Cambridge University Press.
- Williamson, Oliver E. (1964). *The Economics of Discretionary Behavior: Managerial Objectives in a Theory of the Firm*. Englewood Cliffs, NJ, Prentice-Hall.
- Williamson, Oliver E. (1975). *Markets and Hierarchies: Analysis and Antitrust Implications*. New York, Free Press.
- Williamson, Oliver E. (1979). "Transaction-Cost Economics: The Governance of Contractual Relations." *Journal of Law and Economics* 22, no. 2 (October): 233-261.
- Williamson, Oliver E. (1981). "The Modern Corporation: Origins, Evolution, Attributes." *Journal of Economic Literature* 19 (December): 1537-1568.
- Zimmerman, Jerold L. (1977). "The Municipal Accounting Maze: An Analysis of Political Incentives in Studies in Measurement and Evaluation of the Economic Efficiency of Public and Private Nonprofit Institutions." *Supplement to The Journal of Accounting Research* 15 : 107-144.
- Zimmerman, Jerold L. (1979). "The Costs and Benefits of Cost Allocations." *The Accounting Review* (July): 504-521.
- Zimmerman, Jerold L. (1980). "Positive Research in Accounting". *Perspectives on Research*. R. D. Nair and T. H. Williams. Madison, WI, University of Wisconsin.

Zmijewski, M. and R. Hagerman (1981). "An Income Strategy Approach to the Positive Theory of Accounting Standard Setting/Choice." *Journal of Accounting and Economics* 3 (August): 129-149.