

Accounting and the Firm : A Contract Theory.

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ABSTRACT

We can think of each organization as a set of contracts among employees, customers, managers, shareholders, suppliers, auditors, etc. Each party seeks its goals through exchange of resources with the organization. Accounting helps implement and enforce this contract set by tracking resource inflows and outflows, furnishing information about fulfillment of contracts by various parties, distributing information to attract new participants in the organization, and by making some information public to reduce the risk of conflict and deadlock at the time of contract renegotiation. Accounting itself is a matter of negotiation and bargaining among the participating agents and the choice of the accounting system forms a part of the contracts it helps to implement. This way of looking at accounting encompasses virtually all its aspects including bookkeeping, cost and factory accounts, tax accounting, auditing, managerial accounting and financial reporting. In this sense, the contract model of accounting offers a unified economic approach to accounting, as well as a way of linking organizational forms to accounting solutions best suited to serve each.

Accounting makes it possible for firms to work. An understanding of accounting requires an understanding of the firm. How should we think about firms ? How do firms operate and what is the rule of accounting in making them work ?

There are many ways of looking at the firm that have been suggested, each suited to study of different phenomena. The neoclassical model of microeconomic textbooks visualizes the firm as a monolithic profit-maximizing entity. It is designed to explain equilibrium in markets for inputs and outputs of the firm and serves that purpose well. However, it does not yield insights into the internal workings of the firm. It is no more reasonable to expect the neoclassical model to help describe and analyze the accounting system of a firm than it is for microeconomic consumer theory to explain the structure and dynamics of a family. The neoclassical model of the firm with perfect markets

* A modified version of this paper appears as Chapter 2 of Sunder (1997).

¹ Though the discussion here is confined to firms, much of it is applicable to organizations in general. Accounting is, in varying degrees, an essential aspect of the working of governmental, charitable, not-for-profit and even religious organizations. Peculiarities of such variations in organizational form, and its consequences for the accounting systems that are designed to serve them, and discussed in Sunder (1997, Chapter 13).

to need or role for information, and therefore has no role for accounting in operating a firm.

Almost half a century ago, ideas of Berle and Means (1932), Coase (1937), and (1938), and Simon (1947, 1952) began to give shape to a model of a firm that can help understand the internal workings of a firm. Berle and Means documented the separation of managerial control from stock ownership in major corporations of the United States.² They argued that the interests of stockholders and managers diverge significantly, and therefore the behaviour of modern corporations is significantly different from the entrepreneur-run firm of neoclassical models. Though their analysis was widely interpreted as a condemnation of the modern corporation as an efficient device for resource allocation in society, implicit in that analysis is the need for mechanisms to align the diverse interests of stockholders and managers, a function which accounting helps carry out in a firm.

Coase (1937) addressed the question of why firms grow beyond the natural unit of a single person firm, and why they do not grow indefinitely. His argument is that all economic activity in the society is conducted by a single firm. His argument is that there is a cost to using price mechanisms in the market place³ and that the cost based on market transaction are internalized by the firm when the firm enters into such internal contracts. The design of a firm's accounting system is a major determinant of the costs of executing internal contracts in a firm.

Barnard (1938) viewed organizations as "system(s) of consciously coordinated activities or forces of two or more persons (p. 73)." Stability of the organization, he argued, depends critically on its ability to provide sufficient inducements or inducements to individuals so they find it more desirable to participate in the organization than to avail themselves of alternative opportunities. A mere six years after Berle and Means laboured to document the separation of share ownership and control in large publicly-held firms, it is interesting to find Barnard, a phone company executive, apparently unaware of their work, taking it for granted that it is the executive and not the stockholder who plays a critical role in survival of organizations.⁴

Simon (1947) developed Barnard's view of organizations, making it more formal and precise in his 1952 article. Simon's formal mathematical representation of an organization as a set of arrangements among various factors of production, each motivated by personal, though not necessarily egoistic, considerations provides the basic framework on which an economic theory of the firm can be built.

Though this idea can be traced back to Ripley (1927), Veblen (1923) and even to Adam Smith and Means,⁵ was the most effectively made argument. See Slichter and Friedland (1983) and Olson and Tollison (1982) for further discussion of the earlier literature.

Simon (1983) identifies four types of these costs: costs of discovering the relevant prices, costs of writing the characteristics of product, cost of measurement and the cost of identifying the characteristics of individuals to collaborative effort.

In the half century since publication of these seminal works, much has been done to clarify, revise and develop the original ideas. Interested readers may usefully refer to Cyert and March (1963) and Demsetz (1972), Williamson (1964, 1975, 1981), Fama (1980) and Fama and Blomquist (1983). Moe (1985) provides a comprehensive review of this literature.

The existence of diverse interests within the firm, and visualization of the firm as a set of contracts among these interests, are the two ideas in the contract model of the firm presented in the next section. Section 2 describes five major functions that accounting and control systems perform in order to implement and enforce the contract set. Enumeration of these functions amounts to a survey of the major components of the accounting and control system. An application of this economic perspective to the decisions faced by managers, investors and auditors yields a unified understanding of theory of accounting and is presented in Section 3. Different organizational forms have evolved their own accounting systems to serve these functions effectively. An approximate correspondence between organizational and accounting forms is sketched in Section 4.

THE FIRM AS A SET OF CONTRACTS

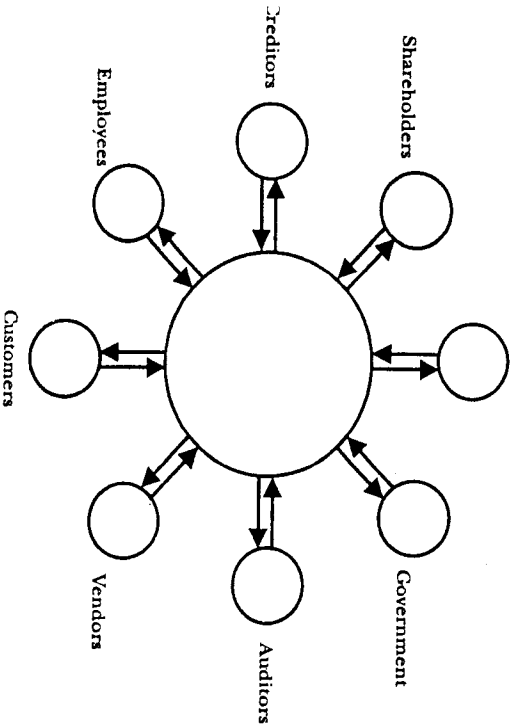
For the purpose of understanding and explaining its internal workings, the firm can be seen as a set of contracts among rational agents. Contracts can be explicit or implicit, short term or long term; agents can be of various types based on their preferences and endowments of capital, skill, and information. Agents are rational in the sense that they consistently seek preferred outcomes within the constraints of their opportunities and information. They do not knowingly pick less desirable courses of action over more desirable ones.

What do these agents contract for and why? Agents enter into contracts with others if they believe they can improve their welfare by doing so. Contracts obligate each agent to contribute resources—capital, skill or information—to the pool of the firm and, in return, entitle her to receive resources from the pool. The form, amount, and timing of contributions and entitlements⁵ is a matter of bargaining among the contracting agents (see Exhibit 1)

Agents make economic as well as noneconomic contributions to the firm; they receive economic as well as noneconomic inducements or satisfactions from their participation in the firm. A general theory of organization must take both economic as well as noneconomic factors into consideration, as both Barnard and Simon do in their work. Since the focus of this paper is on accounting, and accounting deals largely with quantifiable, mostly economic resource flows in organizations, I limit my discussion to economic variables. This choice does not imply that noneconomic variables are unimportant. There are important aspects of firms for which understanding these noneconomic factors is also important. However, we shall start to build a workable theory of accounting based on a simpler model of organizations by excluding variables that accounting systems are not usually designed to handle.

⁵ Barnard and Simon use the terms incentives and inducements. Income, wage or return to various factors of production could be used. Since we are concerned primarily with the problem of executing contractual arrangements among agents, the term entitlement (of those who supply various factors of production) seems more suitable.

Exhibit 1
The Firm as a Set of Contracts Among Agents
Managers



Whether an agent enters into a particular set of contracts depends on the opportunities for use or sale of her endowed resources that are available and known to her. A rational agent does not enter a contract that yields income which is less preferred than another which is known and available to her. An agent could consume her endowment of resources directly, use it in production acting alone, or enter into a contract with one or more other agents. If she follows this last course of action, she has, in the sense discussed above, "joined" a firm. Rationality implies that she does so only if she prefers the package of obligations and entitlements in the contract over her alternative opportunities.⁶

Who are these agents? Agents are individuals endowed with preferences and factors of production: capital, skills, and information. When many agents enter into similar endowments and preferences, they can be viewed as homogeneous agents with the same attributes as individuals.

An industrial firm, for example, could be seen as a set of contracts among agents who provide equity and debt capital, trade credit, labour, managerial services, auditing services, raw materials, cash, utilities, infrastructural facilities, and buy products and services from the firm.⁷ It is the self-motivated

⁶ The detailed example of the contract model of the firm in Barnard (1938, pp. 246-250). The definition of the exact boundaries of a firm seems neither feasible nor necessary for analysis. The modelling effort, which agents and which contracts are included in analysis depends on the purpose of analysis. For most accounting purposes, our attention must be focused on the agents, creditors, managers, independent auditors and sometimes on government and customers.

mutual cooperation of these agents that makes the firm possible. Other organizations, too, could be similarly defined as contracts among an appropriate set of agents.

A general model of the firm includes contracts involving all transacting agents. In order to explain a particular aspect of the behaviour of the firm, attention could be focussed on the relevant aspects of contracts and subsets of agents. For example, in examining the separation of ownership and control, Berle and Means, Williamson, and Fama and Jensen focus on the behaviour of two classes of agents—shareholders (the suppliers of equity capital) and managers (the suppliers of managerial capital). In analysis of accounting, three classes of agents—investors, managers and auditors play critical roles.

An individual may become a party to several firms either because she wishes to diversify the investment of her resources or because she may be endowed with several different types of resources. Investors holding diversified equity portfolios, most auditors, and moonlighting employees are examples of the first kind of individual; an accountant who works for one firm, buys a car from a second and invests her savings in shares of a third is an example of the second kind. Indeed, most people participate as agents in many organizations.⁸ Therefore, the term "agent" refers to a particular aspect of a person's behaviour and not to the person herself (see Exhibit 2).

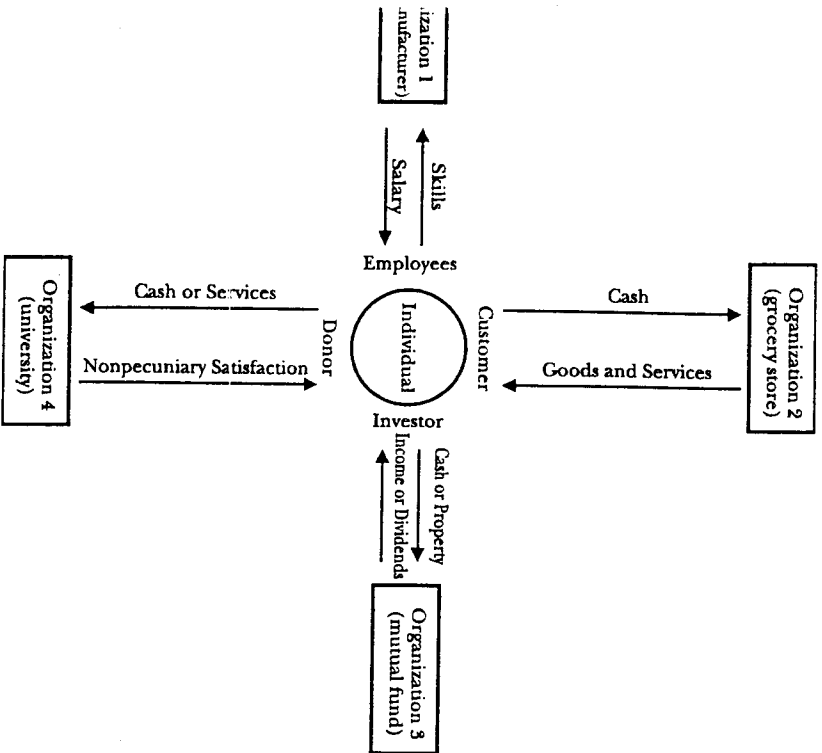
A firm consists of a set of relationships or contracts, explicit or implicit, that link its shareholders, managers, and employees, etc., into certain patterns of behaviour. It does not consist of these agents. Like molecules that constitute an organism, individuals come and go, often replaced in their positions by others with similar preferences and endowments; just as the pattern in which molecules are arranged persists and is recognized as the organism, so does the persistent contractual arrangement which is identified as the firm.

The contract model of the firm is different from the neoclassical model in important respects. In the neoclassical model, the firm is seen as an actor, motivated by a defined, usually profit-maximizing, objective; this firm is identical with the entrepreneur-manager and from this perspective all other economic

⁷ The point is well made by Barnard (1938, pp. 71-72):

"I select at random a man who is chiefly identified by his connection with the organization with which I am also ordinarily identified. He is an engineer whose career and living for many years have depended upon that organization. Without special enquiry, I know he has the following organization connections also: He is (1) a citizen of the United States, the State of New Jersey, the County of Essex, and the City of Newark — four organizations to which he has many inescapable obligations; he is a member of (2) the Catholic Church; (3) the Knights of Columbus; (4) the American Legion; (5) the Outanaway Golf Club; (6) the Democratic Party; (7) the Princeton Club of Newark; (8) he is a stockholder in three corporations; (9) he is head of his own family (wife and three children); (10) he is member of his father's family; (11) he is a member of his wife's family; (12) to judge from his behavior he belongs to other less formal organizations (but often seems not to be aware of it) which affect what he wears, how he talks, what he eats, what he likes to do, how he thinks about many things; and (13) finally he gives evidence of "belonging" also to himself alone occasionally. Let it be thought that his "major" connection is predominant, and the others trivial, it may be stated that he devotes to it nominally less than 25 percent of his approximately 8760 hours per annum; and that actually while he thinks he is working, and despite his intentions, he dreams of fishing, reflects on family matters, and replays a part of previous evening's bridge, etc."

Exhibit 2
Multiple Roles of an Individual as Agent in Various Organizations



and outsiders.⁹ In the contract model, the firm itself is not an economic as no objective or motivation of its own, and is not identifiable with any instead, it is seen as an arena in which self-motivated economic agents mutually agreed upon or implied rules to achieve their respective ends. This arrangement itself is labelled "firm" for convenience. A firm then as a purposive entity.¹⁰

Reason the neoclassical model of the firm is not useful in examining the role of accounting is the same as given by Demsetz (1983, p. 377) : "The chief mission of neoclassical is to understand how the price system coordinates the use of resources, not to understand workings of real firms."¹¹ The concept of firm of a purpose appears, at least on surface, a major departure from and Simon who emphasize the purpose of organizations. However, a closer scrutiny makes it most of what they call organizational purpose consists of the purposes of some subset participating in the organization. The choice of individual honoured with this privilege

Most organizations include a "statement of objectives" in their charter, however. It is tempting to argue on the basis of such statements that the objective of Calico Corporation, for example, is to manufacture and sell cloth. The irrelevance of such statements of objectives for our purpose can be seen by asking : Would the Calico Corporation still manufacture cloth if all participating agents felt that each of them would be better off if Calico produced, say, cars instead ? In the contract model, objectives attach to people, not organizations; when applied to organizations they are simply a statement of activity that the participants have agreed to carry out. For example, operating a blood bank is an activity that agents participating in the Red Cross may agree to for a variety of personal motivations. However, Red Cross' statement of objectives, which may include operation of a blood bank, has little power to explain the behaviour of these agents who may, one day, decide to abandon blood banks in favour of say, organ banks.

ACCOUNTING AND THE FIRM

Accounting helps to implement and enforce contracts that constitute the firm. In order to make the firm work, (1) the input of each agent to the firm's pool of resources must be measured, (2) contractual entitlement of each agent must be determined and disbursed, and (3) each agent must be informed, to the level she is entitled to learn, about the extent to which other agents have fulfilled their contractual obligations and received their entitlements. Furthermore, since the continued existence of the firm, as distinct from that of specific agents who participate in it at any given time, depends on replaceability or alienability of individuals from their contractual slot in the firm, participants find it advantageous to (4) make certain information available to the potential agents in order to maintain a liquid market for these slots and for the factors of production supplied by their occupants. Finally, (5) since contracts of various agents are periodically renegotiated, a pool of common knowledge of verified information must be provided to all participants to facilitate negotiation and contract formation. These functions, measurement of inputs and entitlements, distribution of information about contract fulfillment, maintaining liquidity of factor markets, and providing common knowledge to all agents are key to understanding the nature of accounting.¹¹

Before analyzing these functions of accounting, two caveats must be posted. Accounting is one of several necessary parts of the contract enforcement

seems to favour shareholders, managers or customers. Simon (1947, p. 113) recognizes this arbitrariness and discards it altogether in his 1952 article and treats all agents symmetrically :

"In the F-theory, a single participant, the entrepreneur, is explicitly treated as a rational individual. The other participants—employees, customers, suppliers—enter into the theory only implicitly and only as passive conditions to which the entrepreneur adjusts in finding the solution that is optimal to him....In the O-theory the participants are generally treated in a more symmetrical fashion. Each participant is offered an *inducement* for his participation in the organization. Through his participation, he makes a *contribution* to the organization. The participant's contributions may be regarded as 'factors'; the inducements offered to him as 'products' (p. 41)."

¹¹ See Butterworth *et al.* (1982) for a parallel, though independently carried out analysis of the role of accounting in firm.

nism of a firm. Common, civil, and criminal law, and the respective enforcement and adjudication systems on one hand, and the socio-cultural system on the other, combine with the accounting system to complete the enforcement mechanism. The following analysis is limited to accounting aspects of enforcement mechanism; excellent analyses of the legal and social systems available elsewhere.¹²

While the same system of law is applicable to all firms within a specified nation, agents have a degree of freedom in selecting the accounting system which the set of contracts will be operated and enforced.¹³ The accounting system itself is a part of the set of contracts it helps to operate and is subject to the same bargaining among agents and other economic considerations that apply to other parts of these contracts. Like a hand which feeds the body of a firm, it is a part, the functioning of the accounting system of a firm also is, therefore, self-reinforcing.

Measurement of Contributions

The survival of the firm requires that the resources contributed by each agent be measured and compared against her contractual obligation. Accounting systems are designed to efficiently measure and record these contributions. The problem of attaining such efficiency arises because all factor inputs are not equally measurable. The cost of measuring them with equal accuracy may vary and systems of measurement which have identical cost may yield measures of different accuracy for different resources. Some resources, like certain types of labour, materials, goods, and equipment can be measured reliably at a small cost. Attendance registers, punch clocks, and receiving dock procedures are examples of accounting systems that routinize the measurement of such inexpensive measurable factor inputs. Inputs in the form of cash, usually received from customers, creditors, and customers, are also easily measured and routinely recorded by the accounting system. The input of managers and certain types of services is not easily measured; direct measurement is either too costly (e.g., hourly guard at the bank) or simply impossible (e.g., chief executive officer). Differential measurability of factor inputs results in joint determination of firm of contracts for various types of agents and how their inputs and outputs are determined. When direct measurement of input is too costly or impossible, the form of the contract is designed to be "self-enforcing".¹⁴ This

¹² See the application of methods of economics to analysis of law by Coase (1960), Posner and others provided inspiration for the similar approach to accounting attempted here. Also see Teicher (1981) and Hirschmann (1977).

¹³ Opportunity for choice may be regarded as a crude boundary between the accounting and enforcement systems of the contract operating mechanism, crude because the system of law by which a firm is operated is not entirely beyond its choosing. The legal form of the business organization, partnership, cooperative or corporation) and the place of business and incorporation do determine, in part, the applicable laws. This unavoidable overlap between accounting and enforcement is discussed in Sunder (1997, Chapter 12).

¹⁴ Contract is self-enforcing when the penalties or denial of benefits built into the contract are sufficient to deter the agent from shirking her obligation as also the need to directly measure her contribution. Top managers and outside auditors belong to this class of agents.

Sunder

minimizes the agent's incentive to shirk her obligation as also the need to directly measure her contribution. Top managers and outside auditors belong to this class of agents.

Because their contributions and entitlements are easily measurable, contractual involvement of customers, vendors, and labour in the firm, and therefore in the accounting system takes relatively simple forms.

Measurement of Entitlements

The set of contracts that constitutes a firm entitles each supplier of a factor of production to receive from the firm some resources in exchange. The second major function of accounting is to determine the entitlement of each agent. The contracts specify how the entitlement of each is determined and what form it takes. The measurability of each type of contribution is a major determinant of the contractual form.

The accounting system measures the contributions of most employees in manufacturing operations in hours, days, or weeks worked, and most of their entitlements in wages and benefits. The payroll part of the accounting system performs similar functions for other employees: Receivables, payables, purchasing inventory, and shipping accounts are designed to keep track of the entitlements of customers, vendors, and other agents involved in the firm. Loan accounts measure the entitlements of the creditors.

When the input of an agent is not easily measurable, her entitlement cannot be determined by a simple function of measured input because doing so may induce her to behave in a manner that is unacceptable to other contracting agents. This is true of the top managers and auditors. When the direct measure of an agent's input is difficult, her entitlement is either fixed in advance and thus made independent of measured input or made to depend on surrogate measures of factor input. The former method is used for auditors; both are combined to determine the compensation of the top managers.

The input of shareholders consists of capital, which is easily measured by the contributed capital accounts, and of risk-bearing which is not directly measurable.¹⁵ The precommitment of capital by shareholders is coupled with their status as residual claimants. Given the size of the total wealth pool of the

¹⁵ The behaviour of agents from those in which exogenous variables are necessary to predict behaviour. See Teicher (1981) and Bainman (1982) for elaboration.

¹⁶ Involvement of the Department of Defence in the accounting system of the cost-plus contractors is an interesting exception caused by the difficulty of measuring the entitlements.

¹⁷ Of course equity shareholders do not bear all the risk, only a relatively large part of it. Risk arises when one or more contracting agents behave differently than what others expected of them at the time of contracting: last year's customers may fail to return to buy the firm's products, employees may demand higher wages and go on strike, managers may prove to be extraordinarily foresighted or stupid and the auditors may prove to be negligent or worse in their duties. Such unexpected good or bad performance on the part of any agent affects the pool of wealth represented by the firm from which all agents draw their share. Certain contractual forms may shield some agents from short term variations in the size of the pool of wealth but sooner or later, all are affected to some degree. On the negative side customers may not be able to obtain spares, employees may lose jobs, auditors lose clients and reputation and managers lose both jobs and reputations. Even creditors may lose the principal amounts of a loan. Perhaps the key difference between equity shareholders and other agents is not that the former bear residual risk but that they

and n agents, at most $n-1$ entitlements can be determined independently; the entitlement is determined by the first $n-1$, and is not directly linked to corresponding input. This lack of a direct link between input and entitlement, necessary because there are only $n-1$ degrees of freedom in giving wealth to n agents, is accepted by the group of shareholders as a *quid pro quo* for rights to all residual wealth.¹⁷ The double-entry accounting system reform designed to measure the entitlement of the shareholders as a whole.

Position of Information about Contract Fulfillment

Each agent wants to know her own contribution to and entitlement from the contract to verify that she has received what she contracted for. In most cases, an agent can determine her own input without the help of the firm's accounting system. In some cases, especially when her entitlement does not depend on the actions and entitlements of others, she can also determine her own entitlement to help of the accounting system. Most creditors, vendors, and customers belong to this category. Such agents are interested in the firm's accounting system to the extent that the disputes about the exchange of goods, services, and cash are minimized and settled promptly. Accounting systems produce bills, invoices, and other documents to accomplish efficient settlements. Other agents, such as hourly or weekly labourers and many salaried executives, may at least partly depend on the accounting system to measure their own entitlements even though their entitlements are largely independent of inputs and entitlements of others. The payroll accounting system provides enough data to these agents so they can verify that the terms of their contract have been fulfilled by the firm. Such agents are interested in the accounting system in that it accurately records their input and calculates their entitlement.

It is hardly surprising that the agents whose own entitlements depend on the actions and entitlements of other agents exhibit the greatest interest in the accounting system. Such agents contribute no less than their obligation and receive more than their entitlement. Accounting systems are designed to efficiently measure each agent of this type with information about the fulfillment of their own entitlements by other agents. Much of the cost accounting system, which includes direct or process costing, cost allocation, transfer pricing, and budgeting, is designed to enable managers in a decentralized firm to evaluate contract performance. It is not by other managers at higher levels of the organization's hierarchy. The accounting system also enables the top managers to determine if they themselves have

¹⁷ Flexibility, having bought the stock, to act to improve their contractual terms with other agents thereby to affect the total size of the pool of wealth. (They can, of course, sell the stock at the price but they themselves end up bearing the brunt of such loss in wealth.) In this regard equity holders as a body are almost completely *precommitted* with respect to this set of actions and are therefore passive bystanders after the *primary* issue of the stock is completed. This is the nature of the relinquishment of the right to periodically recontract. This feature distinguishes the shareholders' contract and distinguishes them from all other agents. The entitlement of the shareholders as a group has been determined, the allocation of the entitlement among the individual shareholders as a group has been determined, the allocation of the entitlement among the individual shareholders is determined in strict proportion to their input.

received their due compensation. Shareholders do not have many further obligations to meet because of precommitment. However, creditors use the accounting system to ensure that shareholders have not taken out more than their contractual due in the form of dividends or stock repurchases. Shareholders themselves, being most vulnerable to excess withdrawals by other agents, use the accounting system to ensure, through the board of directors and with the help of outside auditors, that the top management has not taken more than its due and is worth what it receives. Finally, the accounting system, which is verified by auditors cannot, in principle, be the instrument to determine whether or not the auditors have fulfilled their contract; the auditors' fees are determined outside the firm's accounting system and verification of their input is governed by laws on auditors' responsibility.¹⁸

Liquidity of Markets for Contractual Slots

While the first three functions of accounting involve only the participating agents, this fourth function relates to potential participants. Individuals or groups who occupy a contractual slot in a firm may sometimes wish to relinquish that position due to changes in endowments, expectations or preferences. If the law and the existing contracts permit them to capitalize the value of the slot, they will sell the slot to another agent who is willing to accept the terms of the contract.¹⁹ It is in the interest of individuals who presently occupy those contractual slots in a firm which can be sold to create and maintain a liquid market for these slots. They can do so by distributing information to potential buyers about the contractual obligations and entitlements that attach to each slot and the profitability of occupying it in the past. Fear of manipulation or selective release of information can make potential buyers skeptical of the reliability of the information unless steps are taken to provide credible assurances to them. The desire to attract new contracting agents leads to the use of an accounting system which provides audited information about the past performance and future prospects of the shareholder and creditor slots in the firm to the potential entrants.²⁰ The presence of moral hazard constrains the information that can be *effectively* communicated to the potential buyers of verifiable facts.

Even if the current occupant of a contractual slot in the firm cannot sell it, she often has an interest in making her contributions to the firm known to other potential buyers of her contribution. The "free" distribution of accounting information of a firm to nonparticipating agents is particularly important for

¹⁸ This principle is violated when auditors are retained for recruitment of managers and other advisory services. Investors often disapprove of such activities by the auditors.

¹⁹ If the capitalized value of the slot is negative, the agent will have to buy himself out by paying a price. For example, Westinghouse Electric Corporation bought itself out of long term contracts to supply uranium to certain electric utilities by paying hundreds of million dollars.

²⁰ While shareholder and creditor positions in firms are easily capitalized and frequently sold, they are not the only ones. Exclusive contracts to supply goods and services to a firm can sometimes be sold to other suppliers. Exclusive contracts to buy goods and services from a firm, called distributorships, are also sold. Even the top management positions are "sold", when in a negotiated corporate merger, the top executives of the acquired corporation are handed a "golden parachute" as the price of relinquishing their positions.

pliers of skills which are difficult to measure. Thus, a manager, auditor, or consultant carries much of her earning capacity in the form of reputation and therefore interested in aspects of the accounting system that help create a market for her skills.

Finally, the agent interested in leaving the contractual slot is not the only one interested in creating a market for these slots; all other participating agents also potentially interested in filling the vacated slots. Indeed, much of the value of participation in a firm arises from the unexpected departure of co-participants. Departure of customers lowers sales, departure of employees lowers production, departure of managers lowers efficiency and departure of auditors reduces the credibility of the accounting system in everyone's eyes. The remaining agents are adversely affected by unexpected departures if the vacated slots are filled. Thus, it is in the interest of the participating agents to create and maintain a liquid market for the inputs the firm needs. The accounting system designed, in part, to help create such markets for equity and loan capital, managerial, and other human skills, equipment, materials and suppliers, and its products and services. It helps to create security markets as well as to assist managers and engineers, and it assures vendors and customers that the firm is a reliable business partner. A substantial part of the print order of annual reports of large publicly-held corporations is distributed to nonparticipating agents.²¹ The importance of the role played by financial analysts, the business press and other information intermediaries in accounting is explained by the fact that they provide in maintaining the liquidity of markets for the inputs.

Common Knowledge for Renegotiation of Contracts

The length of individual contracts that constitute a firm varies, both when measured in time and in the number of transactions covered. A contract to buy a cell could be a one-time deal or a long-term commitment. The same is true of employment and credit arrangements. The audit contract is usually for a year, while the commitment of shareholders is indefinite. With the exception of shareholders, all contracts are periodically renegotiated.²² The fifth function of accounting considered here is to facilitate contract renegotiation.

Accounting systems are designed to provide at least a minimal amount of "common knowledge" to all participating agents; this knowledge serves as the basis for negotiation and bargaining.²³ Of course, agents may also use additional information. However, the availability of a common, verified database helps eliminate certain types of strategic bargaining behaviour which may result in Pareto inefficient outcomes.

A dramatic illustration of how large deadweight losses to social welfare can be when information asymmetries prevent economic agents from arriving at mutually beneficial arrangements is provided by Wiggins and Libecap (1985).

Unitized operation of oil and gas leases on a single pool of these resources yields very large gains, as much as 100 or 200 percent in the value of resources that can be extracted from the field. Yet, for a majority of oil fields in the United States, lease owners are unable to successfully conclude negotiations for unitization of their leases.²⁴ Recovery of oil from independently operated leases leads to inefficient utilization of the underground pressure of gas to get the oil out and reduces the extent of secondary recovery. This loss frequently amounts to hundreds of millions of dollars. However, since the lease owners and their engineers have superior information about the value of their own leases rather than of the value of other leases, negotiation often fails because the parties fail to agree on the relative shares of the net profits from the unitized operation of the field. It is interesting to note that the same lease owners apparently have no difficulty in joining hands to share the cost of exploratory drilling on neighbouring lease tracts. The absence of asymmetric information at that stage of negotiations makes it much easier for them to reach agreements. Most of the unitization that does take place in the United States occurs during the secondary recovery phase of oil fields; by that time most of the information about the relevant characteristics of various leases has passed into public domain and it becomes easier to reach an agreement.

Securities laws in many countries require not just disclosure of financial statements to those who request them, but *public* disclosure as well. If that information were only privately available, many agents may have reason to doubt that others have received the information and, therefore, may be tempted to behave strategically.²⁵ Public disclosure laws reduce such behaviour by making financial statements "common knowledge."

THEORY OF ACCOUNTING AND CONTROL

Contractual forms that tie individuals to the organizations vary according to the economic characteristics of resources each of them contributes to and receives from the organization. Rational agents participate in an organization as long as the value of what they receive, or expect to receive, from the organization exceeds what they can get elsewhere for the resources they wish to give to the organization. Some resource flows can be measured more easily or more precisely than others (e.g. machinery and cash versus managerial effort). These economic characteristics lead to simultaneous determination of the contractual links of the agent to the firm and the accounting and control mechanisms to execute the contracts.

Managers and Income

Managerial input, for example, is difficult to measure. Organizations and their control systems are designed so they can operate efficiently without having

²¹ Arreaga and Reyes (1984, p. 14) : "W. R. Grace, for example, prints four times as many reports as it has shareholders and advertises the report in financial publications."

²² See Dye (1985) on optimal length of contracts.

²³ Common knowledge" as a technical term is defined as follows : Information I is common knowledge to agents X and Y if (1) X knows I, and (2) Y knows I, and (3) X knows (2), and (4) Y knows (1), and so on to infinity. See Aumann (1976).

²⁴ In India and in many other countries, mineral rights belong to the state and the problem of unitization of leases held by independent leaseholders is solved by the state.

²⁵ Amershi and Sunder (1987) provide an example of suboptimal resource allocations when the common knowledge assumption is weakened. Strategic behaviour implies acting in one's own best interest *other* taking into account how others might behave in a given situation.

to measure this input. Managers are induced to deliver on their obligations by linking their compensation, promotion, and retention to output data which are observable as well as informative about their effort. These data are often produced by the accounting and control system.

Senior managers negotiate contracts of their juniors on a one-on-one basis. There is little effort to standardize this aspect of accounting across firms. At the top of managerial hierarchy, however, managerial performance is monitored by investors and auditors who deal simultaneously with many organizations. Since financial reports are also used for evaluating the top managers, financial reporting has been subjected to a substantial degree of standardization.

Income serves several functions and is the single most important number in financial reports. It is a measure of the entitlement of the shareholders as well as a basis for rewarding managers whose input cannot be measured directly. Most important, the residual nature of net income provides a vital clue to the continued viability of the contract set of the firm. When income becomes negative for reasons other than temporary, all participants in the contract set are immediately alerted that the existing contract set must be modified or dissolved. The use of income figures in managerial compensation and in stock valuation also induces managers to expend resources to "manage" income to their own advantage.

Shareholders, Stock Markets, and Auditors

The shareholders' contract has four major characteristics: (1) shareholders are completely precommitted to the firm in the sense that they have already put their money down; (2) their resource entitlement is the residual amount after entitlements of all other agents are set aside; (3) their contractual rights are transferable and often readily sellable in a liquid market; and (4) the shareholders as a group have the right to choose managers and auditors, and to dissolve the organization. Without the protection afforded to the shareholders through items (3) and (4), few agents are likely to subject themselves to the risks imposed on them by items (1) and (2).

Managers control the information generated in the firm and may be tempted to be selective in allowing information to leave the firm. Shareholders need information to protect their own interests against managerial incompetence or malfeasance. To limit such selective controls over the information reaching shareholders from managers, publicly-held firms engage the services of independent auditors to verify the information. Managers furnish the auditors with unaudited reports and access to the corporate records so the reports can be verified. The auditors provide verified reports to the investors and other participants in the firm so they can make their own decisions on subsequent participation.

Shareholders incur a cost (auditing fees) to reduce the chance of being misled by erroneous reports from managers. In the absence of verification, managers have an incentive to try to conceal unsatisfactory performance and to exaggerate good performance. Auditors receive fees for their professional services and for the risk of attesting to reports produced by managers. Managers' role in the process is more complex. Payment of audit fees to auditors reduces the net income of the firm as well as the financial remuneration of the managers.

At the same time, the audit process makes managers' reports more credible and therefore increases the value of these reports to the investors.

Each class of economic agents, shareholders, managers, and auditors, has its own vested interest in accounting and seeks the accounting system that advances its welfare. Any change that adversely affects the interests of an agent would be resisted by her; if the change is effected, the agent can be expected to adjust her behaviour in such a way as to gain advantage under the circumstances. Given the existing behaviour of other agents, a manager chooses an accounting method that maximizes her welfare under the assumption that the behaviour of other agents remains unchanged. After the manager has made and implemented her choice, the behaviour of other agents does not remain unaffected since they, too, seek to adjust their behaviour to maximize their welfare under the changed circumstances. This new behaviour on the part of other agents presents the manager with a new situation in which her original choice may no longer be the most desirable one, and a new sequence of adjustments occurs. These adjustments continue until the system has reached equilibrium and no agent can increase her welfare by making further adjustment. Accounting theory is the study of each accounting agent's behaviour and the nature and conditions of accounting equilibrium.

Government and Public-Good Organizations

Government plays multiple roles in accounting. First, the government is a contracting agent in ordinary firms, sometimes as a customer or vendor, and almost always as a tax collector. Since the government must simultaneously deal with millions of tax payers, the economics of tax collection dictates relatively hard, non-judgmental methods of accounting for the determination of tax liability of individual tax payers. A bilateral monopoly between the federal government and defence contractors also generates custom-designed accounting systems for enforcement of those contracts.

Second, the government acts as a super-firm in setting the laws, rules, and regulations in certain areas of accounting. This effort produces template contracts which can form the starting point of negotiations among the agents participating in an organization. These templates save negotiating effort, search costs and time for participants in the firm, just as printed lease forms for apartments do for tenant and landlord. The template contracts are fleshed out in negotiations among the participating agents. The imposition of mandatory audit requirements on publicly-held firms and the laws governing the training and licensing of auditors are examples of such template contracts.

Finally, government itself is an organization like others. It, too, is a set of contracts among a large number of agents. These contracts also need to be implemented and enforced in an efficient manner. Accounting and control systems of government and many not-for-profit organizations differ significantly from those of business organizations. These differences can be understood in terms of the economic characteristics of the output of various organizations. Customers of private goods must be persuaded to buy them through arms length transactions; they impose a market discipline on the managers. This discipline is absent in organizations which produce public goods. Additional constraints on managerial behaviour and lower levels of discretionary freedom granted to

such managers is an attempt to provide an equilibrium system of controls for them. The differences in the accounting and control systems, and indeed, in their organizational structure, can be understood in terms of the economic characteristics of the output of government and not-for-profit organizations.

CORRESPONDENCE BETWEEN ORGANIZATION AND ACCOUNTING FORMS

Since accounting systems help implement and enforce the set of controls that constitute a firm, it is hardly surprising that these systems vary with the nature of the contracts they must help enforce. To illustrate the point, consider three stylized forms of business organizations and the features of accounting systems that serve them.

The corner grocery store or fruit stand, operated by its proprietor with little or no outside help, is a simple business organization. The owner may use personal savings or borrow to finance the operation, may lease the premises, buy daily or weekly from wholesalers on credit and sell for cash to her customers. Few of these agents, other than the Income Tax Department and perhaps the bank, depend on the grocer's accounts to carry out their exchanges with her. Most of the grocer's accounting effort goes into recording transactions to help her own memory and much of it could be dispensed with if she could remember them. This form of business organization, without managerial hierarchy and with a closely-held residual interest, is the oldest and, even today, the numerically dominant one. The original forms of bookkeeping evolved as simple accounting systems to serve such organizations, largely as an aid to memory.

For a second organizational form, consider a firm whose residual interest is closely held but which is internally decentralized by introduction of more than one level in the managerial hierarchy. The problems the accounting system must solve in such an organization are qualitatively different from those of the grocery store discussed earlier. Given the difficulty of directly measuring the contribution of each manager, a more complex system is designed to evaluate and control the performance of such agents in the firm. Budgets, transfer prices, interdepartment- and interperiod-allocations of costs and revenues are some of the devices used for this purpose in such organizations. These tools of accounting are rarely used or useful in the family run small businesses.

Finally, consider a third firm which is internally decentralized and in which the number of residual interest shareholders has become so large that they can no longer exercise direct control over the activities of the managers. When this diffusion of ownership is extreme, its shareholders are willing to pay for the services of an independent auditor to verify the information provided by the management. Usually the diffusion of owners' control over management takes place through expansion in the number of owners in the corporate form of business. Diffusion can also take place through the increased heterogeneity of the nonmanagement group that has interests in the firm. The demand for audited reports by banks and other creditors is an example of this latter phenomenon.

The above correspondence between accounting and organizational forms relates the entire system of accounting to the organizational form.²⁶ Accounting scholars have long recognized and analyzed this connection. Yamey (1977) traces the historical evolution of organizational and accounting forms. Skinner (1972, pp. 25-26) also identifies a similar correspondence between accounting and organizational forms. Littleton (1953, pp. 183-4) describes this relationship as follows :

Accounting has always been primarily a service tool of enterprise management. Morality is clearly involved here. As long as an owner-operator was the only person concerned accounting could only be operative in a very private and personal way. If deception was involved it was self-deception, except, of course, where an embezzling bookkeeper would try to falsify records. Whenever partners operated a business there was need for a factual record to which certain differences of opinion could be referred. Accounting however was still a personal service, although it must be said that a partner had more opportunity than a bookkeeper to falsify the facts into a deceptive picture. When we think of limited liability corporations of today with hired managers and large numbers of absentee stockholders, it becomes evident that the moral scope of accounting has been vastly expanded. Many people, wholly out of touch with the physical aspects of enterprise operation, depend upon future representations of managerial actions, of results of actions, and of potentialities for future actions. As the size of enterprises increases and the distance between the owner-lenders and the operating managers grows wider, the opportunities expand for the practice of deceit by people of authority.

Each organization develops a system of accounting suitable to its own unique characteristics so that it may serve as an effective instrument of control. In small business firms, the control function is best served by simple forms of bookkeeping, but larger, more decentralized firms need more complex forms of accounting.

SUMMARY AND CONCLUSIONS

In summary, each organization can be seen as a set of contracts among the people who participate in it in a variety of roles such as employees, customers, managers, shareholders, suppliers, auditors, etc. Each party agrees to contribute to, and receive from, the organization specified resources, and thus seeks its own interests through such participation. Accounting can be thought of as a system that helps implement and enforce the contract set.

Implementation and enforcement of contracts requires five important functions to be carried out. First, resource contributions to the organization from various parties have to be measured and recorded. Second, resources

²⁶ The distinctions between bookkeeping and accounting, and between financial and managerial accounting, have long been a matter of debate among accountants. More familiar definitions draw the line between bookkeeping and accounting in terms of the mechanical or procedural details versus judgemental or discretionary actions; managerial and financial accounting are differentiated on the basis of internal and external use of the data provided by them.

disbursed to various parties have to be measured and recorded. Third, whether and to what extent each contracting party has fulfilled its contract must be determined, and this information about contract fulfillment must be provided to the relevant parties. Fourth, since many participants in the firm are free to leave at will (e.g., customers, employees and individual shareholders), the firm must have a mechanism in place to attract their replacements when needed. In order to attract new contracting parties who are willing to take the vacant contractual slots, the organization must "advertise" the costs and benefits of occupying these slots to potential participants. Fifth, all contracts, with the exception of shareholders', are limited term contracts and they come up for periodic renewal. At the time of contract renegotiation, people are tempted to bluff in the hope of getting a more favourable contract. Such behaviour often leads to deadlock and strikes that hurt all parties. In order to minimize the chances of such losses, organizations design their accounting systems to make specified information public, because there is little reason for people to try to bluff on the basis of public information.

Different systems affect various agents differently. Therefore, accounting itself is a matter of negotiation and bargaining among the participating agents and the choice of the accounting system forms a part of the contracts it helps to implement. The degree of interest various agents exhibit in the accounting system and the part of the system in which they are interested, varies according to the form of their contractual involvement and the characteristics of their contribution and entitlements.

This way of looking at accounting encompasses virtually all its aspects including bookkeeping, cost and factory accounts, tax accounting, auditing, managerial accounting and financial reporting. In this sense, the contract model of accounting offers a unified economic approach to accounting. It also offers a way of linking a variety of organizational forms to a variety of accounting solutions that are best suited to serve each form of organization.

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