

## **STRUCTURE OF ORGANIZATIONS FOR PRODUCTION OF PUBLIC AND PRIVATE GOODS**

Shyam Sunder  
Graduate School of Industrial Administration  
Carnegie Mellon University  
Schenley Park  
Pittsburgh PA 15213  
(412) 268 2103  
(412) 268 6837 Fax  
[sunder@cmu.edu](mailto:sunder@cmu.edu)

### **Abstract**

Business organizations produce and sell private goods for a price. Since their customers, if not satisfied by the product, can withhold revenue, it is possible for the shareholders to control the performance of hired managers through residual net income-based contracts. Public good organizations, on the other hand, have beneficiaries, who have no simple and direct way of imposing a comparable discipline on the managers. This weakness, even absence, of the product market discipline greatly complicates the task of establishing effective management control in public good organizations. Weber's model of bureaucracy is close to the best one can do to accomplish the more arduous task of efficiently producing public goods. It is hardly surprising that a quarter century of efforts, since the New York City bankruptcy, toward harmonizing the organizational designs for public and private good producing organizations have borne little fruit. Barnard and Simon's view of organizations as a set of contracts among various participants provides a useful platform for building a unified theory to compare and contrast the design of public and private good organizations.

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## Structure of Organizations for Production of Public and Private Goods

Shyam Sunder

The production and distribution of public goods are an important part of all economies.

Some goods are public to members of small groups (e.g., a golf partnership or a family) while others are public to members of larger groups such as the citizens of a city or a country.<sup>1</sup> Under conditions of uncertainty and asymmetry of information, organizing the production of public goods presents some special problems that do not arise in producing private goods under similar conditions. When their effort or output cannot be measured with reasonable cost and precision, managers of private good production may still be disciplined by their customers who can withhold their patronage and revenue. This direct disciplinary mechanism is not available when the output is public to a large group. Under such conditions organizational forms for efficient production of public goods must diverge from organizational forms that are employed to produce private goods.<sup>2</sup>

The purpose of this paper is to analyze how the organizational design for production of public goods differs from the design for production of private goods and to reconcile these differences with the economic perspective on organizations. I assume that each organization can

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<sup>1</sup> A pure public good has two characteristics: (1) the marginal cost of producing the good for the benefit of one more member of a specified group is zero, and (2) if the good is produced, is it not feasible to exclude other members of the group from enjoying its benefits. Most goods and services lie somewhere on the continuum between pure public and pure private goods.

<sup>2</sup> These organizational forms are special only relative to the private-good organization which is used as a standard in most of economic theory. Weber (1947) and Niskanen (1971) point out that, historically, bureaucracy is the older form of organization, perhaps as old as help in the king's household.

be viewed as a set of contracts among egoistic individuals. The level of analysis is the unit that produces a specified good, irrespective of whether it is a part or the whole of a legal entity.

A microeconomic view of organizations as sets of contracts among individuals is outlined in section 1. I discuss the structure of contracts and their feasibility and enforceability. The problem of designing an enforceable set of contracts for the production and distribution of public goods is analyzed and the resulting contract set is contrasted with the contract sets used for the production of private goods in section 2. Decision-making in public-good organizations differs from that in the private-good organizations, yielding processes similar to the classical descriptions of bureaucracy. Some special features of accounting and control systems of public-good organizations have long puzzled students of private-good organizations and have often, and mistakenly, been viewed as *prima facie* evidence of inefficiency of the former. I conclude with some comments on choosing the level of analysis.

## ORGANIZATIONS AS SETS OF CONTRACTS

Barnard (1936) proposed that an organization can be thought of as a set of contracts among people, each contributing resources to the organization and each receiving inducements from the organization in return. Simon (1952) formalized this view of organizations by specifying that each participant, as an economic agent, demands an inducement at least as large as the opportunity value of her contribution to the organization. If the inducement received falls short of what she can get elsewhere in exchange for her contribution, the agent cannot be expected to participate in the organization. There are usually a large number of contracts which are Pareto

efficient subject to this feasibility condition; the choice of a contract from this Pareto efficient set is a matter of bargaining among the participants over division of the surplus.

In addition to meeting the reservation "wage" of each participant, a feasible contract must also satisfy the incentive compatibility constraint under conditions of uncertainty and asymmetric distribution of information among the participants.<sup>3</sup> When the state of the world is uncertain and the available information is distributed asymmetrically among participants, one participant does not necessarily know the actions and contributions of the others. For a contract to be feasible, it is necessary that the actions of each participant under such conditions be consistent with what others expect her to contribute to the organization. If the actions of one agent are not observable to others, this condition would be fulfilled only when the contract is such that each agent finds it in her own best interest to act in a manner which is expected of her by the others.

Under uncertainty and asymmetry of information, even the best of all feasible contracts (the second-best contract) cannot be as efficient as the result that would be attainable when all participants have the same information (the first-best contract). This difference between the first and the second best solutions, the agency cost, is the cost of organizing in an uncertain environment.

Control in organizations consists of those features of contracts that implement and enforce all contracts in the set. In addition, control is a mechanism to negotiate and revise contracts in response to changes in the environment, changes in preferences of the participants, and changes in the participants themselves. Five specific functions of control systems can be identified.<sup>4</sup> (1)

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<sup>3</sup> See Hurwicz (1972) and Harris and Townsend (1981).

<sup>4</sup> See Sunder (1997)

measuring contributions from each participant to the organization; (2) measuring the inducement received by each participant; (3) comparing the contributions made and the inducements received by each participant to the respective contractual quantities and distributing this information to various participants; (4) distribution of information to potential participants for the purpose of maintaining the liquidity of resource markets; and (5) provision of some information in the form of common knowledge<sup>5</sup> for the purpose of facilitating negotiation and bargaining among agents at the time of contract renewal.

In order to enforce a contract between two parties, it is necessary that it depend on variables which are common knowledge to the participants.<sup>6</sup> If the wage of a worker is made to depend on the number of widgets of acceptable quality produced by her, the contract cannot be enforced unless the number and quality of widgets produced can be observed by the worker and her employer. The worker would have incentives to overstate production if her employer cannot observe the numbers. Anticipating this misstatement, the employer will lower the piece rate to protect herself and thus induce the worker to engage in even greater misstatements. The sequence will simply be reversed if the production could not be observed by the worker. In either case, the contract will ultimately break down and be replaced by an alternative form that depends only on variables that are common knowledge to both the parties.

Common knowledge of a variable requires not only that all agents know its value, it also requires that the agents know of the other agents' knowledge and so on through higher orders of

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<sup>5</sup> A piece of information is defined to be common knowledge to all players in a game if (i) all players know the information, (ii) all players know that all players know the information, and (iii) all players know that all players know that..., ad infinitum. See Aumann (1976).

<sup>6</sup> If a third party is brought in to enforce a contract, the original contract must be replaced by two or three contracts among the three participants, and the common knowledge condition is applicable to each.

knowledge. If both the worker and the employer could observe the number of widgets produced, but the employer did not know that the worker could observe the number, the employer may try to underpay the worker, and thus cause an avoidable dispute and diversion from productive activity.

Control systems in organizations are designed to produce and distribute certain mutually observable data which can be trusted by various participants and can therefore function as practical substitutes for common knowledge and help to implement and enforce the organization's contract set. Who has access to which data is specified. The feasibility and cost of producing and distributing these data are traded off against their value in implementing and enforcing contracts. If the quality of widgets could not be ascertained at a reasonable cost, the piece-wage contract (that defines the relationship between the worker and the employer) would not be feasible and would have to be replaced by a different contractual or organizational form.

Contributions from participating agents to an organization take a variety of forms: capital from investors, creditors, donors and legislatures; skills from employees and managers; goods and services from vendors; cash from customers; and public goods from government and the community. Inducements offered to participants from the organization also take several forms: dividends and residual rights-to shareholders; interest to creditors; wages, salaries, benefits and bonuses to employees and managers; cash to vendors; products and services to customers; and taxes to government. The first requirement of control design is to devise a system of measuring the contributions made by each agent, determining the amount of inducement due to them, and monitoring the distribution of inducements so that each agent receives her due, no more and no less. Agents who do not receive what is due to them will be inclined to leave and agents who

receive more than their contractual due will force others to get less and may induce them to leave. In either case, a failure to perform this basic control function can lead to the collapse of an organization.

Special problems arise in measuring the contribution of managers to organizations. Managers occupy the procedural hub of an organization's system of contracts. They have (1) the physical control of the organization's resources, (2) preferential access to information about the stocks and flows of resources, and (3) control of the flow of information about the firm's resources and contracts to various participating agents. In addition, (4) a major part of their contribution to the firm consists of monitoring and negotiating with each participating agent on behalf of all other participants; and (5) manager's contributions cannot be measured as accurately as cash, goods, and many other services. A manager's pivotal position in the organization provides her with an opportunity to appropriate the firm's resources and information for personal gain; such misappropriations cannot easily be detected by non-managerial participants. Devising a self-enforcing scheme of inducements that will motivate the manager to contribute the efforts and skills expected of her by the other participants is, perhaps, the most important problem in organization design. Public-good and private-good organizations require a fundamentally different solution to this problem, generating many of their structural differences.

#### COMPARISON OF PUBLIC AND PRIVATE-GOOD ORGANIZATIONS

The contract model of organizations can be used to identify and analyze several differences between organizations designed to produce private and public goods. Briefly, the reciprocity of resource flows in private-good organizations is substituted by a non-reciprocal flow of certain important resources in public-good organizations. Residual interest plays an important role in making managerial contracts self-enforcing in private-good organizations. This interest

has no direct counterpart in public-good organizations and the duties and contracts of managers in such organizations must be defined without the benefit of a residual measure. Pressure that can be exerted by the beneficiaries of public goods depends on the size and specificity of the group, and, in any case, this pressure is no substitute for the immediate and unambiguous discipline that customers can impose on the managers of private-good organizations by withholding their purchases. As a result, the accounting control systems of public-good organizations designed to enforce their contracts differ significantly from accounting for private business.

Insert Figures 1 and 2 here

### Resource Flows

There is an important difference between the resource flows of private and public-good organizations. Customers of the former pay a per unit price for what they buy and this sales revenue constitutes the largest inflow of resources to the organization. Public-good organizations have beneficiaries instead of customers. Except in relatively small units with easily identifiable beneficiaries who can be sanctioned for their failure to pay through means other than the denial of public goods<sup>7</sup> public good organizations do not receive resources from the beneficiaries as a quid pro quo for rendering goods or services. This unreciprocated outflow of resources must be made up by an unreciprocated inflow of resources from some other source.

The unreciprocated resource inflow to public-good organizations comes from legislatures or city councils in the form of appropriations of tax revenues and from the boards of trustees in

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<sup>7</sup> Hechter (1986) provides an extended analysis of compensation and obligations as means of enforcing contracts in a variety of groups. Also see Lindsay (1980) for examples of how relatively small groups can effectively organize for producing goods which are public within that group.

the form of gifts and donations gathered for the purpose of producing and distributing public goods. This resource flow from governing bodies has, at most, superficial resemblance to the resource contributions from shareholders to private-good firms.

Shareholder's and creditor's contributions to private-good organizations are on "capital" account; they expect to receive a return on their contribution in the form of dividends or interest, plus the return of the capital itself in the form of repayment of the principal or redemption of stock. The contribution of capital to public-good organizations from their creditors is similar. However, resource contribution from the governing body of the organization, irrespective of whether it is made on revenue or capital account, pays for the production and unreciprocated distribution of public goods and it is not expected to be returned to the governing body, either immediately or in the long run. The so-called "capital" contribution from governing bodies for acquisition of fixed assets (plant, equipment, property, etc.) is qualitatively different from the capital contribution received by the private-good organizations from their shareholders; the former are not expected to be paid back to the governing bodies, with or without a return. Instead, these "capital" contributions are, in fact, lump sum revenue contributions that enable public-good organizations to acquire long-term assets when the production of public goods is anticipated to continue for some time and acquisition of such facilities is expected to lower the cost of production. Thus, the economic function and expectations associated with the flow of resources from the governing bodies to public-good producing organizations are fundamentally different from those associated with the flow of resources from shareholders to private-good producing organizations, in spite of common terminology frequently used to describe them.

### Residual Claims

The introduction of a residual claimant to the contract set is an economizing device. A residual claim may be the only claim its holder has in the organization, though such a claim is frequently combined with others (e.g., with the claims of the suppliers of capital, labor, management, or with the claims of customers). The presence of a residual claimant reduces a large number of multilateral contract negotiation and monitoring functions to a smaller number of bilateral processes. For example, if an organization consisted of five agents and no residual claimant, any surplus would have to be shared among the five agents. The welfare of each agent would be influenced by the contracts and the performance of every other agent and, therefore, each agent would have an interest in negotiating and monitoring the contracts of the other four agents. This would amount to a total of ten negotiating and monitoring links in the organization. The introduction of a residual claimant to this system of contracts can reduce the number of these links in our example to four, by substantially insulating various claimants (other than the residual claimant) from the contracts and the performance of one another.

The economic value of a residual claim derives from the anticipation of future surpluses that can be appropriated by the claimant. Contributions from, and inducements to, each agent affect the surplus available to the residual claimant by equal magnitude. No economic agent would be willing to commit herself to be the residual claimant if she could not receive credible assurances that the receipt of such contributions and the payment of such inducements will be controlled by a satisfactory set of pre-specified rules. In the absence of such control, the claimant will expose herself to an almost certain loss of all her wealth. Even if the claimant is protected through the provision of limited liability, the value of the residual claim will almost certainly be driven to zero unless the claimant can exercise such control.

On the other hand, if other participants do not have the ability to protect their own interests by negotiating contracts and monitoring resource flows to which they are entitled, they would not agree to have a residual claimant in charge of negotiating and operating the contract set.<sup>8</sup> A residual claimant in a contract set can be allowed to have managerial control only if every other agent in the contract set can effectively defend her own interests.

Stock market trading in residual claims in private-good organizations has two important consequences for the design and enforceability of their contract sets. First, trading provides incentives for individuals to gather information that may be useful to determine the value of the residual claim in the organization. The residual nature of the shareholder claims makes nearly all information about the past and future resource flows relevant to its valuation. Participants in such organizations do not depend solely on the information produced by the organization itself. A large information industry exists to sell information about private-good organizations. A second, related, consequence is that traders in residual claims search for, and heed, not only the information about the current or short-term value but also about the longer-term resource flows of the organization.

In public-good organizations, the absence of residual claims eliminates a major source of private incentives to produce and disseminate information about the long-term resource flows of the organization. Annual budget cycles and current disbursements occupy virtually the entire attention span of participants in public-good organizations.<sup>9</sup> Long-term resource flows in public-good organizations are matters of intergenerational transfer that do not receive much attention in

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<sup>8</sup> See Fama and Jensen (1983) for an analysis of special features of residual claims in different organizational forms.

<sup>9</sup> See Leonard (1985)

the two or four-year political cycle that plays a major role in production of public goods by governments.

Organizations that produce private goods use several strategies to provide self-enforcing inducements for managers. A frequently employed solution is to eliminate the need to measure the manager's contribution by making the manager the residual claimant of the firm's resources. This is the entrepreneur-managed firm of neoclassical models. In larger private-good organizations, this problem is solved by giving managers a stake in the residual claims, either directly or indirectly, and by spending some of the profits on an independent audit for the purpose of verifying the reports produced by managers. A direct stake can take the form of stock ownership, a bonus which is based on net income of the firm, or some other similar measure of accomplishment. An independent audit is used to limit the possibility of self-serving reports by the manager. Net income of a firm is determined through partially standardized accounting rules, discretionary procedures being disclosed in the financial statements.<sup>10</sup> In the absence of product-market discipline, such an arrangement for production of public goods is not an equilibrium solution.

### Product-Market Discipline

Customers of private-good organizations negotiate on the quality, quantity, and price of the goods and services they buy. In most cases, they also have the ability to judge the quality of

<sup>10</sup> I shall return to a discussion of some of these rules in order to contrast the control systems of organizations that produce public and private goods.

what they buy.<sup>11</sup> If they are not satisfied, they may refuse to enter the transaction. The customers' ability to withhold revenues from an organization is a powerful device to discipline the managers of the firm and makes it possible to specify a relatively simple objective function for the managers of such firms. In the presence of customer constraint (and other similar constraints imposed on the firm by other suppliers of resources to the firm) it is possible to promise the managers a reward based on the income they produce for the residual claimants without endangering the stability of the organization.

Unlike customers of private-good firms, individual beneficiaries of public-good organizations cannot withhold resources from the organization. They receive, but they do not contribute, resources to the organization, at least not directly. They would continue to consume resources even if the goods are of a poorer quality. Before we consider how this problem is solved in public-goods organizations, let us examine what might happen if the contract system of private-good organizations were retained for the production of public goods. Managers in private-goods organizations are encouraged to treat all agents other than residual claimants and themselves as constraints.<sup>12</sup> They are asked to get as good a deal from them as possible and are promised a share of the residual in return. These managers are expected to rely on their own superior information on market conditions and production technology to make financing, investment, production, and marketing decisions. The residual claimants do not make these decisions. The residual reflects the efforts of managers' who must persuade the suppliers of

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<sup>11</sup> When customers do not have this ability, as is the case with medical care and many other services, the structure of such private-good organizations also acquires certain characteristics of the structure of public-good organizations.

<sup>12</sup> Prevalence of a contractual form for senior managers that links their compensation to the residual is the source of the idea of the "profit maximizing" firm and its variations.

various contributions to participate in the organization by offering them sufficient inducements. It would be simple for managers of public-good organizations with a large, diffuse body of beneficiaries to maximize the residual if they were given a similar contract: they could minimize costs by cutting the quality or quantity of production. But without the production of public goods, the organization itself would be unnecessary. The structure of contracts which is quite efficient for production of private goods is not feasible for the production of public goods.<sup>13</sup> Such a control system cannot maintain equilibrium in a public-good organization.

Given the inability of the individual beneficiaries of public goods to engage in bargaining with the managers, the decisions on the quantity and quality of public goods to be produced and distributed by the organization are made collectively by the governing bodies who supply the funds for production of these services. An equilibrium system of contracts for public-good organizations is achieved by redistributing responsibilities between the hired managers and the governing bodies and by adjusting the compensation scheme of managers accordingly.

### Decision Making in Public and Private-Good Organizations

#### Product Decisions

The selection of products in private-good organizations is made by the managers who have the best expertise and information to identify the surplus-generating potential of various products. The linkage between the residual they produce and their own remuneration gives them

<sup>13</sup> In the language of the literature of the design of economic mechanisms, we might say that the game (specified by a system of contracts typically used to produce private goods) does not implement social choice correspondence for public goods. We know that Pareto optimality cannot be attained through any informationally decentralized message exchange mechanism in environments with increasing returns. See Hurwicz (1987) for an exposition of design perspective on economic institutions.

an incentive to engage in search for such products. The boards of directors approve these decisions only in the sense that the members of the board may bring an outsider's view to examine the manager's conclusions about the ability of the proposed product to generate the projected residuals. If the managers can convince the board of the ability of a proposed product to generate residuals, the board's approval is practically automatic. They do not much care if the firm generates a residual by making cars, cameras, clothing or chemicals. The "ethical" concerns of these boards are rarely aroused until the residual-generating potential of the policy is endangered.

In contrast, the governing body that supplies funds for the endeavor selects the public good to be produced and distributed by the organization. The will to provide public goods originates in these governing bodies or in the taxpayers or donors represented on these bodies, and is manifested in the willingness to pay for the cost. Public goods produced are those that taxpayers or donors are willing to pay for. The possibility of residual generation is irrelevant to this decision because the net residual is negative. The informational advantage managers have in selection of residual-producing private goods is irrelevant to the production of public goods. Therefore, managers are not offered incentives to look for newer types of public goods to be produced and distributed by the organization. They may do so, anyway, to seek promotion and power, or to retain their jobs.

## Investment and Production Decisions

In private-good organizations, the quantity of each good produced is chosen by the managers who have preferential access to information to make the necessary residual-maximizing decisions. Delegation of quantity decisions is possible because the linkage between the residual and their own remuneration constrains the managers from producing too little or too much

relative to the residual-maximizing quantity. The same is true of the quality of private goods. Decisions to invest in plant and equipment derive from production decisions and are largely made by the managers subject to the board's verification of the residual predictions on which such decisions are based.

In contrast, the quantity and quality of public goods are specified by the governing bodies of the organizations that produce them.<sup>14</sup> In the absence of discipline imposed by customers, it is not possible to design a self-enforcing contract for managers to make such decisions in equilibrium. If production of a greater level of public goods enhances their power or importance, managers might be inclined to increase the scale of operations and present the bill to the governing bodies. On the other hand, if production of more public-goods involves just more work for the same remuneration, managers would be inclined to produce less.

Besselman, Arora and Larkey (1999) provide evidence of reduced efficiency of U.S. Department of Defense purchase functions when the private sector purchasing practices were mandated by the Congress as part of a reform movement. As a result of using private sector benchmarks, the Department of Defense was unable to utilize its large purchasing power to get lower prices from private sector vendors, and thus ended up paying more rather than less after the reforms intended to save money.

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<sup>14</sup> This is the traditional distinction between politics and public administration on the lines of setting policy versus making decisions to carry out the policy. In private good organizations, policy is made by hired managers; in public good organizations it is made by the controlling body. See Landau (1962).

## Accounting Controls

There are significant differences between the internal control procedures and the system of financial reporting of public-good and private-good organizations.<sup>15</sup> Contract implementation and enforcement procedures, internal controls, and financial reports designed for public-good organizations are different from designs which are suitable for private-good organizations. These differences are often misinterpreted as *prima facie* evidence of poorly designed or poorly run public-good organizations.<sup>16</sup> Closer scrutiny reveals other reasons for these differences.<sup>17</sup>

### Entities, Funds, and Consolidation

A distinctive feature of the accounting and control systems of larger public-good organizations is segregation of funds. Though resources in all funds may be overseen by the same group of managers, governing bodies, through legislative appropriation, place sufficient restrictions on their use and transfer to render each fund a distinct entity. Funds provided by governing bodies to these organizations are supposed to be used to provide specific public goods to specified classes of beneficiaries. Given the inability of the beneficiaries to discipline the managers, the segregation of funds is used by the governing bodies as a device to ensure that the funds provided to these organizations are used according to their instructions. Reporting by funds

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<sup>15</sup>See Bolton (1977), Chan (1985), Drebin (1981), Mautz (1981), Leonard (1985) and Sharp and Ingram (1985).

<sup>16</sup> Arthur Andersen (1975) and Coopers and Lybrand (1976) recommended an overhaul of the financial reporting practices of government organizations so they would conform more closely to business reporting.

<sup>17</sup>It is not my purpose to argue that all is well with the accounting control systems of public-good producing organizations. The financial problems of New York and other cities in the Seventies drew attention to numerous weaknesses of controls in such organizations, many of which have since been attended to. Instead, my purpose is to point out that there are legitimate economic reasons to expect that the control systems that work effectively in private-good organizations will not necessarily function in public-good organizations.

is necessary for the governing bodies and beneficiaries to verify that management follows their intent.

For example, General Motors Corporation in 1974, consisting of hundreds of legal entities, employed 734,000 people, had a gross revenue of \$31 billion, and used 14 pages to present its financial report and added 10 pages of narrative. In the same year, a city with gross revenue of \$1 billion and 50,000 employees needed more than two hundred pages to report its results. Public-good organizations are often criticized for presenting great detail in their reports, and for their failure to aggregate sufficiently to provide the reader with an overall picture. Why are more aggregated, simpler financial statements not sufficient for such organizations?

The planning and policy-making function in public-good organizations is performed by the governing bodies and by hired managers in private-good organizations. The reports of public-good organizations to their governing bodies are comparable to the reports junior managers (who carry out the orders) make to senior management in private-good organizations. The reports of private-good organizations are meant to enforce the contracts between the operating managers at lower levels and the senior managers who make policy; therefore they are more voluminous and detailed than the reports management makes to shareholders and the general public.

Another way of looking at the differences in financial reporting of public and private-good organizations is to recognize that the governing bodies of public-good organizations place enough restrictions on the use of funds that it is not useful for any agent to know the total value of all funds. Given their different purpose and constituencies, consolidation of financial reports amounts to adding apples and oranges.

Each constituent of a public-good organization is interested in learning about the resources spent by the organization to produce public goods because they cannot directly monitor the organization's output. Consolidated financial statements do not serve this purpose.

Finally, and most importantly, consolidation of funds would be dysfunctional for the purpose of contract enforcement if it allowed an impression that resources under the control of the organization are fungible across funds. Resistance of constituent and governing boards to consolidation across funds arises from their unwillingness to leave an impression that the hired managers can trade off the production of one public good against another by treating the funds provided for production of various public goods as fungible.

#### Fixed Assets and Depreciation

Private-good organizations record and value their long-term assets at acquisition cost and allocate this cost as a cost of production over the useful life of the asset. This cost allocation or depreciation is reckoned by a standard formula.<sup>18</sup> Valuation of fixed assets helps provide an objective basis for valuation of individual assets and the residual rights in the firm.<sup>19</sup> This valuation is useful because in private-good organizations individual assets as well as the residual rights are traded. Indeed, the precision with which the accounting valuation approximates the transacted prices is a major criterion for assessing the usefulness of various methods of accounting valuation. On the other hand, there are no residual interests to be traded in public-good organizations and, therefore, accounting valuation does not assist in trading these rights.

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<sup>18</sup> The statistical inaccuracy of these mechanical formulae is the price a diffuse body of shareholders pays to obtain objective information.

<sup>19</sup> Lim and Sunder (1990) show that in the presence of measurement errors in current value of assets due to market imperfections and incompleteness, historical is not necessarily dominated by

Moreover, many public-good organizations acquire fixed assets only if they expect to be long-term producers, and therefore rarely sell their fixed assets. Monetary valuation of assets which are not intended for sale or exchange by public-good organizations is therefore not relevant.

Many of the assets held by public-good organizations are either unique (so it is not feasible to place a meaningful valuation on them; e.g., Mount Rushmore), or the organization has such a dominant position in the market that its actions largely determine the exchange value of the asset. In either case, no meaningful valuation can be placed on these assets. They are disclosed in nonmonetary form in the reports.<sup>20</sup>

The practice of charging depreciation of fixed assets in computing net income of private-good organizations serves three contracting functions. First, depreciation helps estimate the residual surplus generated by the firm during a given period by providing an estimate of the opportunity cost of the services provided by fixed assets. This residual surplus not only informs the residual claimants about the value generated for them in the firm, it is an important statistic for all other participating agents because it informs them of the continued viability of the system of contracts and warns them of any forthcoming pressures in re-negotiation of contracts. Second, charging depreciation to the cost of production helps estimate the full cost of production which enters into the pricing decisions of many firms. Finally, depreciation is an important device to induce hired managers to make production-investment decisions that do not conflict with the interests of residual claimants. Managers are promised a share of the residual surplus. If

current valuation as a statistical estimator of the unobserved current value of a firm's asset portfolio.

<sup>20</sup> Mautz (1981) points out that the “assets” such as the Lincoln Memorial could just as easily be considered liabilities because they represent a net cash outflow for the government in the form of maintenance costs.

managers invest too much in plant and equipment relative to what they can sell at profitable prices, depreciation on the plant and equipment reduces the residual or surplus and hurts their interests. On the other hand, if they invest too little in plant and equipment relative to what can be profitably sold, the depreciation charge is small but revenue is even smaller and the residual is not as large as it could have been. Thus the practice of charging depreciation is analogous to charging managers for the opportunity value of the capital they tie up in plant and equipment to induce them to optimize investment in such capital.

In public-good organizations, none of the three reasons for charging depreciation are applicable. There is no residual claimant in such organizations and therefore there is no market for residual claims. Public goods are not sold to customers at a price so depreciation is unnecessary to help set pricing policy.<sup>21</sup> Finally, production investment decisions in such organizations are made by governing bodies, not by hired managers. The decision to invest in long term assets can be defended as an economizing production decision; accounting for depreciation does not play a useful role in making either acquisition or replacement decisions. The governing bodies can determine the need for replacement by directly ascertaining the state of the plant and equipment.

#### Accruals and Recognition of Revenue and Expense

Public-good organizations frequently use cash-basis or modified cash-basis accounting as opposed to the wider use of accrual accounting found in private-good organizations. In accrual accounting, revenue from a sale is recognized when the firm renders services or goods and when either cash has been received or it is expected to be received with a high probability. Similarly,

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<sup>21</sup> Deprecation may still be useful to assess the production decision so correct quantity decisions may be facilitated.

whenever possible, costs are subtracted from net income (i.e., recognized as expenses) when the inputs obtained by that sacrifice yield the corresponding revenue. Thus, accrual accounting is based on subjective estimates of the economic substance of transactions, and not on the formal appearance of transactions as revealed in cash flows. Cash flow accounting, on the other hand, equates revenue to the receipt of cash and expense to its disbursement. This difference between private and public accounting and control systems is considered by some to be indicative of a weakness of the latter, and proposals to move public good organizations to full accrual accounting are frequently made.

Matching of expenses to revenues, and the corresponding accruals in private-good organizations, are possible as well as useful for control because of the causal link that exists between revenue and expense in commercial transactions. There is no such causal link between revenue and expense in public-good organizations. Expenditures are committed by governing bodies and carried out by hired managers, and do not depend on what the beneficiaries do or fail to do. Similarly, revenues for such organizations originate in actions by their governing bodies in the functional form of taxes, donations, wills, legacies, fines, etc.; they do not depend on the actions of the beneficiaries. Delivery of public goods does not specifically cause the inflow of resources from the governing bodies except in an anticipatory or in a long run sense. Introduction of standard accrual and matching concepts in the accounting and control systems of such organizations would have to be based on an economically vacuous link between their resource inflows and outflows.

Budgets, Appropriations and Encumbrances

Governing bodies of public-good organizations appropriate funds for specific items and transmit this information to hired managers through budgets. The budget constitutes an authorization to the managers to expend specified amounts of resources on the production of specified public goods to be distributed to defined beneficiaries. In the absence of budgetary controls, there is no mechanism to ensure that the resources of the organization are utilized in accordance with the wishes of the governing body which supplies these resources. Item-by-item detail in budgets and in the reports produced by managers of public-good organizations is necessary to maintain this control.

#### CONCLUDING REMARKS

Legal form has been a major criterion for categorization and study of organizations. Whether an organization is labeled for-profit, not-for-profit or governmental, is based on the laws that govern its charter and on the decisions of the Internal Revenue Service about the tax status of its income and contributions it receives. The use of legal form as the starting point for study of organizations has significant disadvantages. First, legally-defined organizations (e.g., corporations, associations, trade unions, and city governments) become the units of analysis, and less attention is paid to smaller units of organization that lack a legal status (e.g., research laboratory of a corporation, storage facilities of a blood bank, and road repair crews in the department of streets and sanitation of a city government). The assumption that all sub-units of an organization conform to the model applicable to that organization unnecessarily restricts the application of economic analysis to the detailed design of organizations.

A second disadvantage of building a theory of organizational forms on the basis of categories defined by the extant law is that such theory is unlikely to guide us in changing or refining these laws. Legal categories of for-profit and not-for-profit organizations include an

extreme diversity of products and services.<sup>22</sup> Many services provided by not-for-profit organizations are also provided by for-profit organizations. If the current legal framework for determining the charter and tax obligations of organizations is to be altered to attain specified social goals, such an argument would have to be built on a classification of organizations based on criteria other than the extant law.

In this paper the “architecture” of organizations is examined on the basis of the differences among economic characteristics of resources used and produced.<sup>23</sup> This approach to economics of organizations is built on three major assumptions: (1) the organization is seen as a set of contracts designed to produce goods and services demanded by society from resources available in the society, (2) the unit of analysis is the individual contract instead of the macro-level organization, and (3) the design of individual contracts is seen as a function of the characteristics of resource flows involved in the contract and macro-level organizations are seen as composite matrices of a variety of contractual forms.

Organizations can be thought of as sets of contracts among participating agents who seek their goals through such participation. Each agent contributes resources and, receives inducements in return. Control in organizations is the property of the contract set by which its integrity is preserved from the pressures of the self-interest of its participants and changes in the environment of the organization. Organizations disintegrate when their contract set is no longer stable relative to their environment. The economic characteristics of an organization's resource inflows and outflows are matched to the design of the contracts that govern these flows. The

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<sup>22</sup> See Hansmann (1980 and Weisbrod (1980).

<sup>23</sup> Sah and stiglitz (1985) use the term “architecture” to refer to the structure of information gathering, communication and decision making.

public and private nature of resource flows is one of their important characteristics, and major features of organizations can be traced to the necessity of designing contracts that can effectively monitor and enforce contracts based on such resource flows.

Looking at organizations from the perspective of contract design and enforcement permits differentiation of structural features of organizations according to the economic environment of each contract or set of contracts. Prior work on the economics of organizational forms has focused on categorizing legally defined units of organizations into for-profit, not-for-profit and governmental forms. Most legal units of any significant size are, in fact, composite organizations consisting of a matrix of bilateral and multilateral contracts that constrain and motivate each individual. Some of the contracts in an organization compensate individuals on the basis of their measured performance while others may not. While we can usefully call performance-based compensation contracts as for-profit and fixed compensation contracts as not-for-profit<sup>24</sup>, few macro-level organizations employ contracts of one form to the exclusion of the other. For example, research scientists at private corporations receive fixed salaries and vendors to Red Cross are paid on a per unit basis. It is possible to assign a label to classify a whole organization on the basis of the form that the contract of senior managers or some other subset of participants takes. However, in doing so, we forego the opportunity to examine the rich structural detail and functional characteristics that explain how organizations are engineered. It does not advance our ability to design buildings if we classify all buildings into categories of brick, concrete, and steel when, in fact, they all use all types of materials in varying proportions and in different places. The important feature for an engineer is not whether a building is made entirely or predominantly of

<sup>24</sup> See Easley and O'Hara (1986)

brick or steel but where and how each type of material has been employed or can be employed.

Attention to which contractual forms are used to govern which resource flows in the organization facilitates our understanding of the architecture of organizations.<sup>25</sup> A change of focus from legal unit to contracts that link individuals enables us to use flexible boundaries in defining organizations and to abandon the idea of organization as an actor in favor of organization as an arena in which individuals play the game.

Governments are also organizations in the sense of existing as a set of contract among their citizens.<sup>26</sup> From an economic perspective; there is only one qualitative difference between government and any other organization that the citizens may devise to produce and distribute public goods: the contribution of citizens who choose to participate in the government (i.e., choose not to emigrate) are defined by an agreed upon set of rules called tax laws which are enforced by the powers granted to the state. Contributions to non-governmental producers of public goods are not induced by such power, though the social inducements used may be just as compelling. In any case, the difference lies in the source of contributions which does not, in itself, affect the structure of organizations that produce public goods. The difference is important for political economy but not for the economics of organizations.<sup>27</sup>

<sup>25</sup>Niskanen (1971, p. 16), an exception in the literature, notes: “Some component units in profit-seeking organizations, however, may be bureaus. Any identifiable profit center such as a product division, cannot be considered to be a bureau. But some staff units providing such services as advertising, public relations, and research have both the critical characteristics of bureaus. Thus the more difficult it is to identify a component’s contribution to corporate profits, the more likely that the component will behave like a bureau.”

<sup>26</sup> See Coase (1960, pp.17-18).

<sup>27</sup> See Niskanen (1971) for an analysis of the interaction between bureaucracies and democratic political systems.

The prevailing attitudes in accounting and economics characterize bureaucracies, and their accounting and control systems, as inefficient anomalies. If reformers could pursue their zeal, such organizations would be radically restructured on the lines of private-good producing organizations. Consequently, I have focussed my argument to show that many of these “inefficient” features of public-good organizations may be better suited to their special environment than the corresponding “efficient” features of the private good organization. However, it is easy to overstate such a case. Mere existence of an organizational design in the field, whether in private or in public-good organizations, is no proof that it cannot be improved upon.

The discussion in this paper is limited to the polar cases of organizations of production of pure public goods and pure private goods. As a practical matter, few goods satisfy the definitions and most goods have some public as well as private characteristics. Organizations designed to produce these goods also have appropriately mixed characteristics. The organizational design of universities and utilities and other natural monopolies show some characteristics of both public and private-good organizations. Correspondence between the market power of organization exercises in its product and other factor markets, and its internal organization presents a rich spectrum of opportunities to study organizational economics.

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Figure 1

## Resource Flows in Private-Good Organization

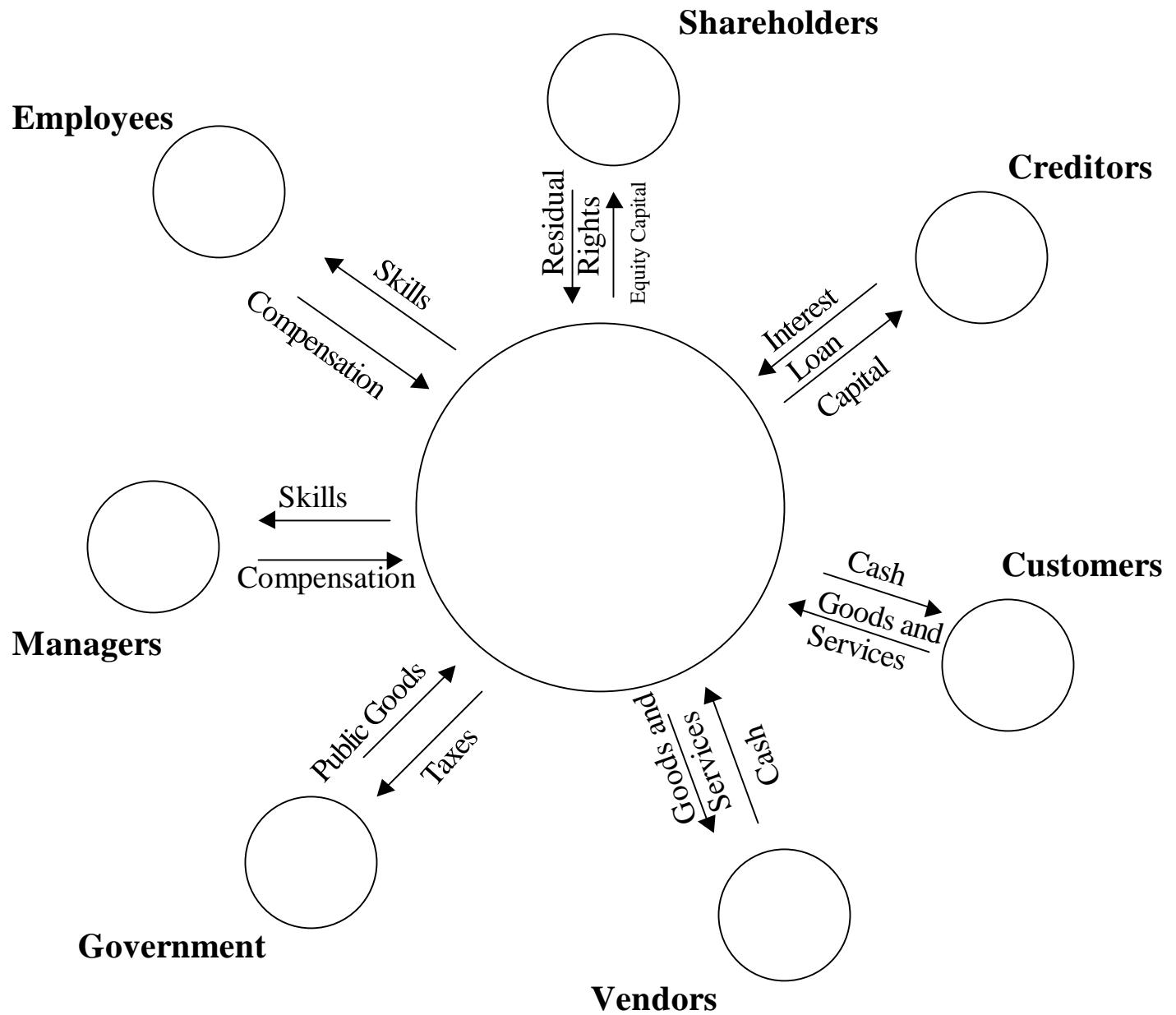


Figure 2

## Resource Flows in Public-Good Organization

