Articles

Rewarding Performance That Is Hard to Measure: The Private Nonprofit Sector

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The private nonprofit form of institutions is large and growing. Its role in a mixed economy is the subject of this article. Nonprofits differ from private enterprises primarily in the constraints on them. The key element is that nonprofits may not distribute profits to anyone associated with the organization, a restriction that is in sharp contrast to the freedom that private firms have to reward owners and managers for generating profit. The theoretical case that such a constraint can be useful when consumers are poorly informed is examined. Also, the available empirical evidence on differences in behavior between nonprofit and for-profit organizations is presented.

ANY ECONOMIC SYSTEM IS, TO A SIGNIFICANT DEGREE, A system for rewarding "performance," to provide members of society with the incentives to behave in socially responsible ways. Performance, however, must be measured if it is to be rewarded (or in the case of socially undesirable behavior, punished), and in many instances there are enormous difficulties in developing adequate operational measures of performance. In this article I explore the role of "non-market" mechanisms—institutional arrangements other than the decentralized private-enterprise economy—for providing those incentives. The focus is on the private nonprofit form of organization.

The danger of rewarding "performance" when it is measured poorly has long been recognized, but it began to capture the active attention of researchers less than 20 years ago, in the wake of two events. One was the publication, in 1971, of a book on the market for human blood. Attempting to explain why a serious, often fatal, disease, hepatitis, was far less common in the United Kingdom than in the United States, Richard Titmuss's *Gift Relationship* (*1*) had a major impact on social scientists and, before long, on policymakers. Titmuss argued that the central cause of the lower hepatitis rate in the United Kingdom was institutional—the far greater reliance there on the voluntary, donated supply of blood, and the far greater reliance in the United States on the purchase of blood in private, profit-oriented markets.

Titmuss focused on the technical difficulty—indeed, the impossibility then—of determining whether blood obtained for a transfusion was free of the hepatitis virus. He suggested that people who sold their blood could lie successfully about not using intravenous drugs or partaking in other activities that increased the probability that they were carriers of the hepatitis virus; and those people who were most likely to be carriers were also the most likely to need the money they could get for selling their blood and, hence, were the most likely to lie about their health habits. Unpaid volunteer donors, by contrast, allegedly had little incentive to dissemble.

Another influential piece of work, seemingly unrelated, focused on the market for used cars. Economist George Akerlof presented a formal mathematical model of exchange in which buyers and sellers were unequally ("asymmetrically") informed (*2*). He showed that when informational asymmetries existed, private markets might well operate at inefficiently low levels, with a tendency for sellers of low-quality products to drive out sellers of higher quality; in the end, as consumers adjust to the deteriorating quality of the goods available for sale, exchange could cease altogether.

In both the used car and human blood markets, sellers are generally better informed than buyers about some important dimensions of product quality. Akerlof focused on the ability of the profit-oriented form of institution to deal with informational inequalities. Titmuss focused on the ability of other institutional mechanisms—based not on pursuit of profit but on volunteerism and donations—to cope with such problems. Each was concerned with the same basic question: When information differs markedly between buyers and sellers, which form of ownership arrangement is preferable (*3*)?

Toward a Theory of Institutional Choice

Waiting to be developed was, and still is, a general theory of institutional choice that would have two principal elements: it would identify the set of all possible forms of institutions; and it would identify a set of key features of a commodity that would imply the form of institution that would be most efficient for financing, producing, and distributing it.

The economic theory of "private market failure" represents a start on such a theory (*4*). Typically, however, the only alternative to the free market considered is "government." Other institutional forms exist (*5*).

Government, in fact, is not a single form of institution. It encompasses, for example, a wide array of operating organizations financed through taxation, independently financed organizations such as the Port of New York Authority, and a host of regulatory agencies at federal, state, regional, and local levels. Regulatory efforts, moreover, take many forms, including the regulation of price (electricity), types of resource inputs (day care centers), quality of outputs (prohibition of flammable pajamas), and the distribution of outputs (requirements that utilities not disconnect vital services to the poor during the winter). Some, but not all, of these regulations involve informational problems.

Another institutional form potentially able to deal with asymmetric information is the "nonprofit" organization. Unlike private enterprise, such an institution does not reward sellers who take advantage of consumers' informational handicaps. The reason is that

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nonprofits face a "nondistribution constraint"; it separates their financial rewards from their "performance"—as measured imperfectly by consumers or government regulators—by prohibiting the distribution of profit to owners or managers (*6*).

Any economic system can reward only what it can monitor, and monitoring involves cost. Thus, depending on the specific commodity, there may be a case for using a form of institution that explicitly divorces rewards from the easily measured aspects of performance when those measures do not accurately reflect the quality of output. For a consumer or a government regulator, what is critical is the lack of information about the unmeasured aspects of performance, and the uncertainty about the relation between the unmeasured and the more easily measured elements. When performance is gauged by the easily measured elements alone, suppliers have a financial incentive to distort decisions if doing so would enhance rewards; in a private firm it would do so, whereas in a nonprofit organization (or government agency) such rewards are legally restricted, although incompletely enforced.

Nonprofit Organizations in the U.S. Economy

Legally, a nonprofit organization is one that is incorporated under a state nonprofit corporation statute; generally, these organizations are exempt from the federal corporation income tax under section 501(c) of the Internal Revenue Code. Included are organizations engaged in "charitable" activities—for example, religious, charitable, scientific, and educational organizations—as well as mutual benefit organizations such as business associations, labor unions, and country clubs (*7*). Donations to many of the former group are deductible to donors on their personal income tax returns. Informational asymmetries are important in the financing of these organizations.

From the viewpoint of modeling economic behavior, and more particularly, behavior under conditions of informational asymmetry, nonprofits may be valuable precisely because they face the constraint on distribution of profit. Profit is not precluded. Its uses are restricted; a nonprofit organization may not distribute profit to officers, employees, or anyone else who exercises control over it (*8*). This constraint, which also applies to government, is generally counterproductive when information is widely available, but it can play a useful social role when informational asymmetries are large.

In exchange for accepting a restriction of the use of profit, nonprofit organizations obtain a variety of tax benefits. In addition to the organizations' exemption from the corporate profits tax, individual donations to some nonprofits are tax-deductible, and those nonprofits receive a variety of subsidies through the tax system ("tax subsidies")—in particular, exemption from state and local taxes on property and sales, and federal postal subsidies. Most nonprofits, however, do not qualify for these advantages. At the end of 1985, only 366,000 nonprofits of the total of 887,000 were in the class of 501(c)(*3*) organizations receiving benefits beyond the exemption from profit taxation (*9*).

Nonprofits as a whole have been growing rapidly; the total more than doubled between 1969 and 1985, from 416,000 to nearly 900,000, but the division in growth between organizations dealing with informational problems and other nonprofits is not clear. The growth rate for the tax-deductible organizations—which include the nonprofits most likely to be addressing public concerns, informational or other—has been especially impressive. These nonprofits leaped by 165%, from 138,000 to 366,000, nearly double the growth rate of other nonprofits (*9, 10*). The share of national income originating in the nonprofit sector has been growing rather steadily for more than 40 years—from 1.9% in 1943 to 4.4% in 1985 (*11*). Five to 8% of the labor force is employed in the nonprofit sector—and another 5% or more if volunteer labor is counted, for the vast majority of it goes to nonprofits. Nonprofits are a major force in many industries in which consumer information problems are likely to be sizable (Table 1).

Although nonprofits engage in hundreds of activities, a useful simplification is to divide them into two categories: public-type, which produce services of a "governmental" sort, and private-type organizations. The distinction corresponds roughly to that between the organizations that are exempt from taxation under section 501(c)(3) of the Revenue Code, and the others. Most of the half-million private-type nonprofits are organized for mutual benefit; although numerically great, they have a less central role to play in dealing with informational problems (*12*).

Public-type nonprofits presumptively engage in activities that benefit persons other than those who pay for the services. Some provide "collective" services–like medical research, wildlife sanctuaries, environmental protection, famine relief, and aid to the disadvantaged—which bring broad social benefits. Others provide "trust" services—for example, blood banks, nursing homes, and day care centers—which combine private-type services with an important element of consumer protection for underinformed buyers. Informational asymmetries are factors in both collective and trust services, for it is difficult for consumers to know precisely what their contributions are buying in these markets (*14*).

The long history of nonprofits highlights their relation to government-type activities. In 16th-century England there was little government provision of civilian goods or services; private philanthropies provided such services as education, health care (hospitals), parks, libraries, and aid to the poor (*15*).

Why Have a Nonprofit Sector?

There are two reasons why a form of institution that is private and subject to the nondistribution constraint can play a useful social role. One is the limited ability of government to meet the demands of a heterogeneous society. The second involves the monitoring of outputs and the potentially greater trustworthiness of nonprofits compared to for-profit firms, for consumers and donors. I focus on the latter, but there is interdependence.

If a democratic government is modeled as reflecting majority demands—that is, providing the quantity and quality of services demanded by the median voter (*16*)—then in a completely homogeneous society, a government that meets the economic demands of the median voter simultaneously meets the demands of all voters. In a society with heterogeneous demands, by contrast, a government that satisfies the median voter will leave a number of persons undersatisfied (*17*). These consumers, responding to the government failure to provide what they are willing and able to pay for, can seek other forms of institutions—private enterprise, nonprofit, and perhaps lower levels of government.

If, however, the commodity involved—be it medical research, charity, environmental protection, or something else—is of a type deemed appropriate for collective financing or control through government, private enterprise is not likely to be a satisfactory institution for meeting the undersatisfied demands (*18*). It is the deficiency of the private market that generates the demands on government in the first place (*19*). Thus, heterogeneous demands for those activities give rise to the research for a form of institution to supplement government and private enterprise (*20*).

No institutional mechanism is flawless in overcoming the costs of monitoring quality of service under all conditions. Indeed, the effectiveness of the nondistribution constraint depends on its en-

Table 1. Output supplied by nonprofit organizations, by industry (*13*, p. 190).

Industry	Percentage of output	Unit of measure
Nursing home	22	Beds
General hospital	65	Beds
Kidney dialysis	48	Stations
Day care	40	Children
Post-secondary school	20	Revenues
Research and development	15	Spending

forceability, and this too involves costs. In the recent case of the nonprofit PTL Ministry, for example, it took nearly 5 years for the Internal Revenue Service (IRS) to conclude that the organization had violated the nondistribution, or noninurement, constraint; the IRS claimed that a substantial portion of PTL's net earnings in 1981 through 1983 benefited former PTL President Jim Bakker, his relatives, and other PTL officers, and that Bakker was paid "nearly $1 million more than was *reasonable* those three years" (*21*).

When costs of monitoring output are high, sellers can behave opportunistically, failing to provide the quantity or quality of goods or services the consumer is paying for. If a seller is able to benefit from added profit, the incentive exists to "chisel"—to provide lower quality than was promised. If, however, the seller is effectively prevented, by the nondistribution constraint, from reaping benefits from any profit generated through underproviding quality, the incentive to chisel is weakened (*22*). At the same time that this adverse incentive is reduced, however, so, too, there is a weakening of the manager's incentive to be efficient. Thus, the optimal social choice of institutional form requires a balancing of these countervailing factors (*23*).

Other Nonmarket Devices for Dealing with Informational Asymmetries

The problem of rewarding good, and penalizing poor, performance under conditions of informational asymmetry is reflected in a variety of nonmarket mechanisms; the private nonprofit institution is only one. These arrangements—all of which divorce rewards from measured performance—have a common characteristic. They all disregard the kinds of information about performance that are readily available, because of a belief that the information is not merely incomplete but biased (performance that appears to be good may not be). Two mechanisms merit brief discussion in order to place nonprofit organizations in the context of solutions to informational asymmetry problems.

Consider, first, job tenure and the reward structure for federal judges. Federal judges are not only guaranteed employment for life, the retirement decision resting entirely with the judge, but they are guaranteed a salary that is the same for all judges at the same judicial level. Thus, except for the possibility of promotion to a higher court or leaving the federal judiciary for some other position, there is no additional financial reward for a federal judge who works hard, long, and effectively. Rewards and performance are totally sundered.

Such a system is understandable as a response to the presence of critical but hard-to-measure dimensions of judicial output. A judge knows when he or she is exercising careful, wise, and dispassionate judgment, but this is difficult, if not impossible, for other people to gauge. Rather than reward judges for, say, the number of their decisions or some other easily obtained measure, society may wish to neutralize any tendency for judges to respond to financial incentives. Under a full-tenure system, in which both employment and salary are independent of the individual's effort, those dimensions of output that are easily measured are disregarded in an attempt to avoid creating undesirable incentives.

The judicial independence that is maximized through the tenure system protects a judge, for example, from discipline by a superior who claims to be acting objectively but whose true motives cannot be detected. Such judicial independence may help to explain the action of Associate Justice of the United States Supreme Court John Paul Stevens who publicly criticized Chief Justice Warren Burger, charging him with "ill-considered" legal opinions (*24*). The chief justice may have been angered, but Stevens was insulated from retributive actions.

A second reward structure that may reflect informational asymmetries involves elected government officials—limitations on the number of terms served. Voters recognize their limited ability to gauge performance of officials who have a major administrative power, particularly when unsavory behavior is involved. Voters can monitor some aspects of officials' behavior, but they are systematically underinformed about others (*25*).

What is fundamental is not simply the information gap—in this case between officials and voters—but its systematic nature. Even with a competitive political process and the activities of investigative reporters, some crucial elements of officials' behavior may go undetected until serious and perhaps irreversible damage has been done. Thus, it can be rational for society to pay the price of losing the services of a candidate whose easily monitored behavior seems quite excellent.

In the economic realm, the nonprofit form of institution has an analogous role; it produces an incentive structure that leaves managers more neutral as between decisions that would increase profit and decisions that would do more to meet social needs, such as increasing aid to the poor, decreasing environmental pollution, and providing more information to consumers.

Does Institutional Form Matter? Evidence from Mixed Industries

Whatever economic theory may predict, public policy seems to imply that the nonprofit form of organization is sometimes preferable to the for-profit. This is suggested by the various subsidies and tax exemptions noted earlier. In addition, nonprofits are eligible for some federal grants and contracts from which private firms are excluded. National Science Foundation grants, for example, are not available to private firms (*26*).

Empirical studies of differences between the economic behavior of nonprofit organizations and their counterparts in the for-profit and governmental sectors exist for a number of industries, although largely in health care. Attention has been directed principally to differences in three dimensions of behavior: access to output, especially among the poor; costs and the use of resources; and quality of output. With respect to our focus on informational asymmetries, the interest is in differences among institutions in quality of output, and particularly in dimensions of quality that are difficult for consumers to evaluate. To give a more complete picture of behavioral differences, however, we also summarize briefly the evidence on the other two dimensions.

Access. A recent comprehensive review by the Institute of Medicine (IOM), National Academy of Sciences, of studies of hospitals led to the conclusion that for-profit hospitals provide relatively less "uncompensated care"—a proxy for care to the indigent—than do nonprofit hospitals (*27*). One study, for example, found that nonprofit hospitals provided more such care in each of the five states studied, and at least 50% more in four of the states (*28*). The extent,

however, to which uncompensated care is actually care for the poor and not simply "bad debts" is not clear, and it is not necessarily the same among for-profit and nonprofit hospitals. Moreover, the measurement of both forms of uncompensated care is problematic because of the difficulty of measuring the true marginal costs of services.

Another study compared for-profit and nonprofit organizations in their usage of waiting lists, rather than price, to ration access. If for-profit firms use waiting lists to the extent that this contributes to profit (*29*), a finding that nonprofit organizations use them either more or less would suggest that access differs systematically across types of organization. The comparative use of waiting lists was examined in three industries providing long-term health care—nursing homes, facilities for the mentally handicapped, and psychiatric care facilities (*13*, appendix F). After controlling for price, number of beds, and staff-patient ratios, it was found that church-owned nonprofits were more likely than for-profit facilities to maintain a waiting list for admission, and they had longer lists. Nonprofits not owned by churches were between church-owned nonprofits and proprietaries in their use of waiting lists.

Some evidence on access is also available for day care centers. Nonprofit centers in Massachusetts were more likely to serve children from low-income families than were for-profits, even when price was held constant; 40% of nonprofit centers, but only 15% of for-profit, had low-income children (*30*).

Costs and use of resources. The IOM study of costs in for-profit and nonprofit institutions in health care concluded that systematic differences do exist: (i) among hospitals, where, until recently, payments from insurers were typically based on costs incurred by the hospital, for-profits had higher expenses than nonprofits; (ii) among nursing homes, where payment is typically fixed on a per diem basis, for-profit institutions had lower costs per day than did nonprofit institutions. In short, when it is economically rewarding to incur more costs, for-profit institutions have had higher expenses; when it is disadvantageous to incur more costs, as when prices paid by insurers are fixed per day, for-profit firms have had lower expenses (*27*, p. 93).

There is evidence, in summary, that nonprofit organizations and for-profit firms in a number of social service industries differ in their cost and price behavior. However, whether the cause is differentials in efficiency, in patient or client difficulty, in workers' preferences to work for nonprofit organizations (*31*), or in something else is not yet clear.

Quality of output. The effects of ownership type on quality of outputs is often a subject of speculation. An important issue is whether for-profit firms—which may be more likely than nonprofit organizations to judge performance of managers on narrow profit grounds—cut quality more, especially in dimensions that are difficult for consumers or regulators to monitor. When quality is costly for buyers to monitor, provision of higher quality is financially unrewarded and, hence, is unprofitable, however socially valuable it might be. Thus, a key question is whether nonprofit organizations do or do not supply more of such quality than do private firms.

The IOM study of health care institutions examined a number of dimensions of hospital quality: accreditation, physician Board certification, evaluations of hospitals by physicians, and a limited set of data on outcome measures such as mortality rates. Some of this information is easier than others for consumers to obtain, either directly or through their physician agents. The IOM report concluded its review of the effect of institutional form on quality in hospitals by saying that the data now available, although "fragmentary and limited," do not support the position that for-profit health care is "incompatible with quality of care . . ." (*27*, p. 138).

On nursing homes, the IOM report concluded quite differently; it summarized the state of knowledge by saying that "most studies on quality (or surrogate measures) of nursing home care tend to favor the not-for-profit mode of organization. This finding holds up across a wide range of measures—amount of patient care staff, expenditures on food, complaints to state regulatory agencies, nonconformity with regulatory requirements . . ." (*27*, p. 136; *32*). Mean differences between for-profit and nonprofit institutions, however, even though discernible, are by no means consistent. As another study put it, ". . . on the average, voluntary facilities are somewhat better than proprietary ones. The worst nursing homes are almost exclusively proprietary. But in the middle ranges, there is substantial overlap" (*33*).

In a later study that covered not only nursing homes but also long-term care facilities for the mentally handicapped and facilities for psychiatric care, a number of information-related variables were examined. Church-owned nonprofits were particularly different from for-profit firms in such dimensions as family members' information about whether the facility had a periodic review of each patient's medical needs (family members were less informed at for-profit facilities), the use of sedatives (it was far greater among for-profits), and level of overall satisfaction by family members (it was lower at for-profits). Most of these findings held constant the price of care and other potentially confounding variables. Differences in favor of the nonprofits, and especially in favor of those that were church-owned, were quite consistent, and were generally statistically significant among nursing homes and facilities for the mentally handicapped (*13*, appendix F).

In the day care industry, quality appears to be higher in nonprofit centers. In a Massachusetts study, the staffs at nonprofit centers had more schooling and more experience; and nonprofit centers provided more paid staff time per child, after adjusting for the mix of infants relative to pre-schoolers and toddlers (*30*, pp. 26 and 56). Here, as in most other studies of comparative institutional behavior, however, the lack of control for differences in price and in subtle dimensions of service leaves open a number of interpretations. One is that for-profit and nonprofit providers occupy different market niches in markets with diverse, but well-informed consumers who prefer to purchase varied quality. Another is that some consumers are poorly informed, making purchases they would not make if they had better information.

With respect to each of the three dimensions of behavior—access, costs, and output quality—all of these studies have deficiencies; strong conclusions are not warranted. Even if it were clear, though, that nonprofits—church-owned or other—do behave differently from for-profit firms, and even if the behavior of nonprofits were judged to be socially preferred, it would not follow that public policy should be "tilted" in favor of the nonprofit form of institution. Appropriate changes in reward structures, through contract with, and subsidies to, private firms, might succeed in causing for-profit firms to deliver more services to the poor and produce higher quality services, while at the same time sustaining their incentives to be cost-efficient.

It is important to acknowledge this possibility, yet the difficulties of implementing such contractual arrangements with private firms should not be minimized. It can be very costly to develop contracts that specify operational measures of important but intricate aspects of output—such as "tender, loving care" in a nursing home, and "good judgment" in the care of prisoners or in the award of contracts and grants for scientific research. And without measures there can be no profit incentive to provide those outputs.

This difficulty of gauging important aspects of output may explain the debate over whether to "privatize" services such as education, jails, hospital care, and legal aid to the poor (*34*). Private industry can be expected to be efficient in providing those services that are

specified in the contract and defined operationally—and only those services; indeed, competitive bidding by private firms for government contracts tends to reward the firm that is most successful in finding ways to cut costs by not providing any qualitative characteristics not required. Thus, private firms are the preferred institutional mechanism when all of the desired characteristics of a commodity or service can be stated in a contract and monitored easily. The more important the unmeasurable dimensions, however, and the more complex and ambiguous the proposed measures, the stronger is the social efficiency case for the nonprofit alternative.

Concluding Remarks

The nonprofit sector of the U.S. economy is large and growing in comparison with the rest of the economy. The principal source of its theoretical justification is also the source of its principal liability—the nondistribution constraint. This legal restriction on distributing profit to anyone who has control over the organization has the adverse effects of reducing managerial incentives to minimize costs, seek out new markets, and innovate. It also has the favorable effect of reducing incentives to engage in anti-social activity, including taking advantage of consumers' informational handicaps. These handicaps can be substantial in some industries—particularly when either collective-type goods are involved, such as scientific research or aid to the poor, or goods characterized by severely underinformed consumers, such as some purchasers of nursing home and day care center services.

The optimal choice among institutional forms is a mixture, not a single form; neither government, private enterprise, nor the nonprofit form is best under all conditions. The mixture, moreover, cannot be fixed once and for all time. The informational problems that are at the core of the efficient choice among institutional forms are continually changing. Population mobility and increasingly complex technologies tend to increase informational asymmetries between buyers and sellers. Education and other types of technological change, such as computer-aided information, may narrow asymmetries, at least for some persons.

Economic research on the role of nonprofit organizations is in its youth. Neither economic theory nor quantitative evidence is yet strong enough to let us specify confidently the most efficient choice of institutional form for each service. The public policy issues—whether and when the nonprofit form should be mandated, encouraged, discouraged, and prohibited—are evolving faster than the theoretical and factual knowledge base on which wise policy should depend.

The growing claims from private enterprises, for example, of unfair competition from the expanding commercial activities of nonprofits, is but the tip of an emerging iceberg (*35*). The tension between the interests of society in having effective for-profit and nonprofit institutions is heightened as the sectors come into competition. There is much to learn about the efficient boundaries for each of these institutional forms, as well as for government, in a modern mixed economy. What is clear is that the role of nonprofit organizations should and will continue to change.

REFERENCES AND NOTES

1. R. Titmuss, *The Gift Relationship* (Vintage, New York, 1971). For a critique see K. Arrow, in *Altruism, Morality and Economic Theory*, E. Phelps, Ed. (Russel Sage, New York, 1975), pp. 13–28.
2. G. Akerlof, *Q. J. Econ.* **74**, 484 (1970).
3. A. Alchian and H. Demsetz [*Am. Econ. Rev.* **62**, 777 (1972)], writing at about the same time, also emphasized the importance of information in what they termed a "metering" problem.
4. It identifies attributes of a commodity—such as its generation of external costs or benefits—that suggest that another form of institution could be more efficient than the private market.
5. Various authors in *J. Policy Anal. Manage.* **6**, (1987). In this volume on "Privatization of the Public Sector," there was only passing mention of the private nonprofit form of institution. This was the case even in a paper dealing explicitly with the information problem of rewarding performance (D. Sappington and J. Stiglitz, *ibid.*, p. 587). Another paper in the same volume, on privatization of schools, did not distinguish between nonprofit (for example, parochial) schools and for-profit schools (H. Levin, *ibid.*, p. 628).
6. H. Hansmann, *Yale Law J.* **89**, 835 (1980).
7. *United States Master Tax Guide* (Commerce Clearing House, Chicago, ed. 67, 1983), section 501.
8. H. Hansmann, in *The Nonprofit Sector*, W. Powell, Ed. (Yale Univ. Press, New Haven, CT, 1987), p. 27.
9. *Annual Report: Commissioner of Internal Revenue* (U.S. Internal Revenue Service, Washington, DC, 1985), p. 70.
10. Applications for tax-exempt status have risen sharply. In the early 1960s, the IRS received some 7,000 applications annually. The number doubled in 1965, to more than 14,000, probably as a consequence of the federal "Great Society" programs. By 1984 the number of applications reached 64,000. The IRS has continued to approve 70 to 80% of the applications for nonprofit status. The result: in 1985 more than 44,000 new nonprofit organizations were approved, ten times the 4,554 approved in 1962 [U.S. Internal Revenue Service, *Annual Report* (Washington, DC 1962), p. 11; *ibid.* (1965), p. 6; *ibid.*, (1985), p. 70].
11. U.S. Bureau of the Census, *Statistical Abstract of the United States, 1982–83* (Government Printing Office, Washington, DC, 1982), p. 423; *ibid.* (1987), p. 421; U.S. Bureau of the Census, *Historical Statistics of the United States, Part 1* (Government Printing Office, Washington, DC, 1976), p. 237. These data include compensation of employees in private households, in addition to nonprofit organizations.
12. The 501(c)(4) nonprofits have some private- and some public-type characteristics. They are like the 501(c)(3) organizations, and they would typically receive the same subsidies, except that they engage in a significant amount of legislative lobbying. Some nonprofits, such as the environmentally focused Sierra Club, have divided into two organizations—one that does no lobbying, and qualifies for tax-deductible status, and another that does lobby.
13. B. Weisbrod, *The Nonprofit Economy* (Harvard Univ. Press, Cambridge, MA, 1988), p. 190.
14. The distinction between the problems of "quality monitoring," similar to trust-type services, and "marginal impact monitoring," similar to collective-type services, is made by I. Ellman [*Mich. Law Rev.* **80**, 999 (1982)].
15. W. Jordan, *Philanthropy in England, 1480–1660* (Allen & Unwin, London, 1959), *passim*.
16. On the median voter model, see A. Atkinson and J. Stiglitz, *Lectures on Public Economics* (McGraw-Hill, New York, 1980).
17. Undersatisfied in the sense that they are willing and able to pay the cost of additional public output but cannot obtain it [B. Weisbrod, in *Altruism, Morality, and Economic Theory*, E. Phelps, Ed. (Russell Sage, New York, 1975)], p. 171; also see E. James, in *The Nonprofit Sector*, W. Powell, Ed. (Yale Univ. Press, New Haven, 1987), p. 397].
18. The private enterprise market can respond to undersatisfied demanders only in limited forms. Consumers who demand higher levels of clean air, for example, can purchase a home air purifier in the private market, but not a reduction of other persons' automobile or industrial emissions.
19. K. Arrow, *Am. Econ. Rev.* **53**, 941 (1963); R. Nelson and M. Krashinsky, "Two major issues of public policy: Public subsidy and organization of supply," in *Public Subsidy for Day Care of Young Children*, R. Nelson and D. Young, Eds. (Heath, Lexington, MA, 1973), pp. 47–69.
20. This is not to argue that the private sector is unable to ensure quality. Consumers learn from experience, and a seller's reputation serves somewhat to protect inexpert buyers, as do seller warranties and agents such as physicians and lawyers.
21. Knight-Ridder News Service, "IRS seeking big cutbacks in tax-exempt status of PTL," *St. Paul Pioneer Press Dispatch*, 28 April 1987, p. 3A (emphasis added). For details see A. Shupe, *Televangelism: Power and Politics on God's Frontier* (Holt, New York, 1988).
22. The situation is made somewhat more complex by the fact that if a nonprofit organization is trusted more by consumers, they may do less monitoring. Thus, nonprofits have both less incentive to chisel and more opportunity to do so.
23. Factors other than profit—such as the desire to serve the public interest—can serve as incentives for efficiency, but that cannot be assured. Some evidence that managers having public-spirited motives are more likely to be "sorted" into the nonprofit sector is provided by D. Young [*If Not for Profit, for What?* (Heath, Lexington, MA, 1983)] and J. Rawls, R. Ullrich, and O. Nelson, Jr. [*Acad. Manage. J.* **18**, 616 (1975)].
24. S. Taylor, Jr., *New York Times*, 5 August 1984, p. 1.
25. The contemporary debate over "merit pay" for teachers involves similar informational issues. Student scores on standardized tests of reading and mathematical capability are readily obtainable, but, as one critic sees it, "No test yet devised can measure love, dedication, patience, warmth, and some of the other elements of successful teaching" (W. Raspberry, *Miami Herald*, 12 January 1984, p. 25A).
26. Also, Congress recently mandated that a study of allied health personnel be done by a "nonprofit private entity" [Public Law No. 99, Section 223, 22 October 1985 (*U.S. Statutes at Large* 99 Stat. 523)].
27. B. Gray, Ed., *For-Profit Enterprise in Health Care* (National Academy Press, Washington, DC, 1986), p. 187 and chapter 5.
28. L. Lewin, T. Eckels, L. Miller, *New Engl. J. Med.* **318**, 1212 (1988).
29. Private firms might use waiting lists as a means of price discrimination, with people being permitted to buy their way up a queue.

30. E. Mauser, unpublished paper.
31. B. Weisbrod, *J. Labor Econ.* **1**, 246 (1983); A. Preston, *J. Ind. Econ.* **36**, 337 (1988).
32. The IOM conclusion was based on a review of more than 20 studies of a variety of quality measures—resource inputs, licensure violations, complaints, and outcome-oriented measures of quality. The finding that quality was higher in nonprofit than in for-profit nursing homes was described as "fairly uniform" [C. Hawes and C. Phillips, in (*27*), p. 520)].
33. B. Vladeck, *Unloving Care* (Basic Books, New York, 1980), p. 123.
34. Privatization is the subject of (*5*).
35. U.S. Small Business Administration, *Unfair Competition by Nonprofit Organizations with Small Business: An Issue for the 1980s* (Small Business Administration, Washington, DC, 1983); S. Rose-Ackerman, *Stanford Law Rev.* **34**, 1017 (1982).
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Studies of Inositol Phospholipid–Specific Phospholipase C

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Inositol phospholipid–specific phospholipase C is the enzyme that generates phosphoinositide-derived messenger molecules. Mammalian cells contain at least five immunologically distinct phospholipase C enzymes that appear to be separate gene products. Complete amino acid sequences of four of these isozymes have been established. The overall sequence similarity is surprisingly low for enzymes catalyzing the same chemical reaction: three of them show limited amino acid sequence similarity to each other in two narrow regions, and the fourth enzyme is completely different. The diversity in primary structure together with different regional and cellular expression of the isozymes suggests that each isozyme has a defined function in processing the physiological response of different cell types to a variety of external stimuli and that each is regulated differently.

MUCH PROGRESS HAS BEEN MADE RECENTLY IN UNDERstanding the process by which cells respond to extracellular signals. These extracellular signals are transmitted across the cell membrane by a variety of mechanisms that use second messenger molecules. Hormones, growth factors, neurotransmitters, and other agonists bind to specific receptors on the external surface of a cell. Receptor occupancy initiates the production of active second messengers, including the well-characterized adenosine 3′,5′-monophosphate (cAMP) and guanosine 3′,5′-monophosphate molecules, as well as the more recently identified messenger molecules, diacylglycerol and inositol phosphates, that are derived from inositol phospholipids (*1–3*). Second messengers, once formed, evoke a host of intracellular reactions that eventually lead to many cellular processes such as metabolism, excitation, secretion, contraction, sensory mechanism, and cell growth.

Phospholipase C Isozymes

The phospholipase C (PLC) isozymes, which cleave inositol phospholipids to diacylglycerol and inositol phosphates, are present in most mammalian cells as well as in plants and various microorganisms (*4*). The first PLC purified to homogeneity was from rat liver; when subjected to SDS–polyacrylamide gel electrophoresis (PAGE), its molecular mass was 68 kD (*5*). Subsequently, numerous PLC activities have been resolved chromatographically from a variety of tissues and shown to differ in molecular mass, isoelectric point and *p*H optima, and calcium dependency, indicating the existence of PLC isozymes (*6*). Definitive proof of the presence of PLC isozymes was derived from the two distinct enzymes purified from sheep seminal vesicles (*7*). One enzyme purified to homogeneity was 65 kD on SDS-PAGE; the other enzyme, which was partially purified, was 85 kD when estimated by gel filtration techniques. Antibodies to each of these enzymes did not react with the other.

Three PLC isozymes of 150, 145, and 85 kD were recently purified to homogeneity from bovine brain (*8, 9*). Both polyclonal and a series of monoclonal antibodies to the three enzymes were prepared and characterized (*9, 10*). The characterization included the evaluation of immunoreactivity toward each of the PLC forms in their native and denatured states. Each antibody reacted only with the enzyme against which it was prepared.

The three enzymes were specific for phosphatidylinositol (PI) and the polyphosphoinositides (*9*) and did not hydrolyze other phospholipids. We studied the catalytic properties of the three isozymes by using small unilamellar vesicles prepared from either PI or phosphatidylinositol-4,5-bisphosphate (PIP_2) as substrates. Hydrolysis of both PI and PIP_2 by the three enzymes was dependent on Ca^{2+}. However, at low Ca^{2+} concentration, PIP_2 was the preferred substrate for all three enzymes. When PI was the substrate, the three enzymes had similar specific activities at their optimum *p*H, which was 4.8 for the 150-kD form, 5.0 for 145-kD form, and 5.5 for 85-kD form. But at neutral *p*H, the order of specific activity was 85-kD PLC > 145-kD PLC > 150-kD PLC. In contrast, the order of specific activity for PIP_2 hydrolysis was 150-kD PLC > 85-kD PLC > 145-kD PLC, meaning that the 150-kD enzyme is the most specific for PIP_2.

Several more PLC enzymes have been purified to homogeneity (Table 1). These include a 62-kD form from guinea pig uterus (*11*),

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