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Why Private Firms, Governmental Agencies, and Nonprofit Organizations Behave Both Alike and Differently: Application to the Hospital Industry

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Abstract

This paper addresses two specific questions: (1) What behavior is predicted by a "two-good model" in which nonprofit and governmental organizations maximize output of a mission-good—defined as socially desirable but privately unprofitable—and produce a profitable revenue-good to finance that mission? (2) To what extent can the observed differences in economic behavior among institutional forms be explained by differential organizational goals as reflected in managerial reward structures? Weisbrod finds that for-profit and three forms of not-for-profit hospitals provide significantly different sets of outputs, generally consistent with the model in which not-for-profits provide all the outputs that are profitable, as gauged by their provision by for-profits, but also provide many outputs that for-profits do not, reflecting not-for-profits' broader objectives. About half of the observed differential organizational output mix is explained by a set of three variables capturing CEO incentives: total monetary compensation in the forms of base salary and bonus, the relative importance of each of those components, and a measure of CEO job complexity. Differential institutional behavior is substantially a consequence of reward structures, which reflect the organization's objective functions.

Why Private Firms, Governmental Agencies, and Nonprofit Organizations Behave Both Alike and Differently: Application to the Hospital Industry

I. Introduction

Do the differing subsidies to, and constraints on, organizations of various institutional form—private firms, nonprofit organizations (religious and secular), and governmental—lead to systematically distinct behavior? Social decisions that encourage particular institutional forms imply the expectation of differential behavior, but what should be expected—and why? This paper provides, first, a model showing that there are identifiable dimensions of behavior in which all forms of institutions will behave alike, and other identifiable dimensions in which they will differ. The paper goes on to examine the mechanisms through which the differences are brought about, specifically through managerial incentives. Those incentives, which can be observed, are viewed as reflections of unobservable organizational objective functions. Incentives are the instruments that link organizational or institutional "form" with organization behavior.

The conclusion is that when multiple institutional forms coexist in an industry, as they do in higher education, hospitals, nursing homes, day care, and the arts, for example, both systematic differences and similarities in behavior can be expected, and the empirical work discloses both.

The efficient allocation of responsibilities between private enterprise and

government has been central to economics at least since Adam Smith. Far more recently this dichotomous choice has been extended to include hybrid organizations such as private nonprofit organizations, which combine characteristics of government and private firms. Empirical literature in recent years has expanded the scope of institutional options, considering organizations within the nonprofit sector -- religious and secular nonprofits.

Understanding institutional behavior is important at a number of levels: Modeling and predicting behavior of various forms of institutions, and how they respond to market opportunities, are clearly prominent research goals. Evaluating organization "performance" is important for public policy decisions on the choice among alternative institutional mechanisms. Decisions on whether to privatize a governmental activity, for example, involve implicit, if not explicit, choices not only between governmental and private firms, but among a wider array of organizational forms. Efficient public and private subsidies among organizational forms hinge on expectations of differential effects.

Determining the efficient roles for each institutional form of organization is central to many issues of public policy. When airport security, for example, was debated after September 11, 2001, a principal outcome was a decision to "federalize" employment of security guards, who had historically been employed and paid for by commercial airlines. The efficiency case for shifting from private to public provides of airport security rested implicitly on understanding comparative institutional behavior: What differences in behavior could be expected depending on whether airport security personnel were employees of the federal government or of private firms, or, for that matter, of nonprofit organizations?[1] Yet evidence was and is sparse, as is the theoretic base for predicting

differential behavior.

More generally, the key public policy questions are what can be accomplished more efficiently through one form of institution than through another, and why? It is noteworthy that at the same time that the role of government in the U.S. was expanding in the airport security market, it has been contracting in another industry, jails. In the past decade the private enterprise jail sector has grown to the point that it incarcerates, under government contracts, some 10 percent of all jail inmates. The behavior of nonprofit organizations and their response to exogenous constraints, compared with other forms of organization, is increasingly important for setting public subsidy and regulatory policy, as the nonprofit sector grows. President Bush's "faith-based initiative" (FBI) is but another policy the efficiency of which hinges on whether and how outputs can be expected to differ depending on the choice of institutional form that produces it, and on the associated contracting mechanisms (Chaves 2003).

This paper has twin goals. One is to advance the theory of behavioral differences among forms of institutions, and to provide empirical evidence regarding the nature of differences and similarities. The second is to understand what it is about the various ownership forms that lead to differences or similarities in behavior, and to estimate the importance of these mechanisms. Particular mechanisms are identified—including the use of strong incentives in the form of performance-based bonuses--through which top management (CEOs) could be given incentives to optimize organizational objective functions.[2]

The specific questions addressed are: (1) What differential behavior is predicted

by a two-good model in which nonprofit and governmental organizations maximize output of a Mission-good—defined as socially desirable but privately unprofitable--and produce a profitable Revenue-good to finance that mission? (2) To what extent can the observed differences in economic behavior among institutional forms be explained by a model in which organizations, pursuing different goals, provide differential managerial reward and incentive structures? If organizations of various institutional forms do pursue distinct objective functions, then even if those are not directly observable, their implications should be reflected in distinct CEO reward structures.

The empirical estimates below provide evidence on both questions, from a major industry, hospitals, in which all four types of providers exist. The two-good model implies that all types of organizations will produce profitable goods, but that the uses of profit will differ, governmental and nonprofit organizations channeling the profits to mission outputs that for-profit firms will not provide. Supportive evidence is found. Differential CEO compensation structures go far in explaining the observed differential outputs.

Prior empirical research on institutional behavior has examined many mixed industries. These include, for example, hospitals (Gray 1986, Sloan 1998, Roomkin and Weisbrod 1999, Nicholson et al 2001, Ballou and Weisbrod 2003, Erus and Weisbrod 2003), facilities for the mentally handicapped (Weisbrod 1988), psychiatric care facilities (Schlesinger and Dorwart 1984), nursing homes (Weisbrod and Schlesinger 1986, Ballou 2000, Kapur and Weisbrod 2000), hemodialysis centers (Devereux et al 2002), day care centers (Mauser 1998, Krashinski 1998), railroads (Caves and Christensen 1977), trash

collection (Savas 1977), airlines (Davies 1971), and jails (Levin 1985, Logan 1992, 1996). These empirical studies have examined behavioral differences in many dimensions: efficiency (cost per unit of "output" in trash collection, nursing homes, airlines, railroads, and jails); mortality rates (in hemodialysis centers); "satisfaction" of staff members (in jails) and among patients' families (in nursing homes); distributional access, as measured by the use of prices and waiting lists (in nursing homes and facilities for the mentally handicapped); and responses to legal constraints, as gauged by regulatory violations (in nursing homes).

While statistically significant differences in behavior have been found across industries and in various dimensions of output, there has been extremely little attention to the mechanisms through which the observed behavioral differences occur. This paper, focusing on those mechanisms, identifies the linkage between organization behavior and CEO incentive structures. The hypothesis tested is that observed behavioral differences across institutional forms reflect diverse organization objective functions as they are manifest in managerial reward systems.

At the theoretic level, prior research has directed attention to two types of models: One distinguishes between private firms and all other forms of institutions, nonprofit and governmental, collectively. It emphasizes the effects of a "nondistribution constraint" (NDC), which limits the lawful uses to which organizations subject to that constraint may put any profit or surplus (Hansmann 1980). Both governmental and nonprofit organizations confront such a constraint, but private firms do not. Emphasis on the NDC implies that when organization behavior differs across sectors it is the result

of this differential constraint, not differences in other constraints or in objective functions. This emphasis is consistent with the frequent empirical finding that private firms act differently from other forms of organization. It is not consistent, however, with findings that governmental and private nonprofit organizations behave in systematically different ways, as do religious and secular nonprofits, in such industries as hospitals (Ballou and Weisbrod 2003), nursing homes (Kapur and Weisbrod 2000), and facilities for the mentally handicapped (Weisbrod 1988), for a NDC applies to all of them.

A second type of theoretic model distinguishes between governmental and private nonprofit organizations. This work points to the effects of differences in other constraints such as access to volunteer labor and private donations of money (Weisbrod 1975, 1988), and also in objective functions (Newhouse 1970, Steinberg 1986, Kapur and Weisbrod 2000). If institutional form affects organization behavior, the underlying factors would be either differential objective function being optimized, differential exogenous legal or other constraints on organization behavior, or both.

If the only variable determining differential behavior among institutional forms were the NDC, not only would governmental and nonprofit organizations behave alike, but so would nonprofits that are church-related (religious) and those that are "secular." All are subject to a NDC— organization profit or surplus may not be lawfully paid out to officers or owners. There is evidence, however, that behavior does differ systematically among these institutional forms. In such industries as nursing homes, mentally handicapped facilities, and hospitals, studies cited above found that religious and secular nonprofit organizations differ significantly in a number of dimensions: labor input ratios,

use of volunteers, use and length of waiting lists, probability of offering their CEOs performance-based bonuses, consumer satisfaction, and regulatory violations. Generalizing about behavior of all organizations that are subject to a NDC—governmental and nonprofit, religious and secular -- masks important differences among them.

Nevertheless, current U.S. law applying to non-governmental, nonprofit, organizations does not distinguish between the two types of nonprofits.[3] They are treated the same under personal income tax laws that provide for the deductibility of charitable donations. They are treated the same under laws that provide subsidies and tax exemptions to nonprofit organizations. They are treated the same under antitrust law.

This paper advances on most previous research by going beyond the empirical determination of whether behavior differs across institutional forms. It presents and tests a theoretic model that implies that organizations of varied institutional forms will behave differently in some identifiable dimensions but the same in others. Then, it confronts empirically the question of specifically what is it about an organization's ownership form that explains its behavioral pattern.

The empirical methodology employed here involves two steps: First, the degrees to which hospitals of each institutional form produce different outputs are estimated for each of 80 forms of output. Second, for all the outputs for which significant differences across institutional forms are found, the proportions of those differences that can be explained by three elements of CEO compensation are estimated. This approach de-mystifies the role of institutional form as a cause of differential behavior, for it identifies

what it is about an organization's "institutional form" that transmits its objective function and constraints into organization behavior—namely, managerial reward structures.[4] In prior research "institutional form" has been a sort of "black box," affecting observed behavior but through a process not identified.

II. The Model

An organization of any institutional ownership form may be considered a producer of two goods. One is a "mission" good, M, maximization of which is the organization's objective function. The other is a "revenue"good R, which finances production of M. For a private firm seeking to maximize profit, M and R are the same good, the firm producing a good if and only if doing so generates profit.

For a nonprofit organization, M and R may differ. Its mission could be to produce some public-type good that, while socially desirable, is privately unprofitable—for example, medical care for the indigent at a hospital, basic research at a university, and cultural and species preservation at a museum or zoo. Alternatively, if the nonprofit were a "for-profit firm in disguise" (Weisbrod 1988), taking advantage of lax enforcement of the "nondistribution constraint" to generate private profit, then it might behave indistinguishably from a private firm. Empirical testing of alternative models, such as that reported below, is needed to discern which model provides more useful predictions of behavior.

In the two-good model, in which the nonprofit pursues a public goods mission, M is unprofitable, and this necessitates finding a source of revenue to finance M.. The R

good is simply a source of revenue for M, affecting the organization budget constraint but not otherwise contributing to the organization objective function. M can take many forms. In addition to the *public (or "collective") goods* illustrated above, M might also encompass *trust goods*, about the quality of which consumers are asymmetrically underinformed and, hence, are vulnerable to opportunistic behavior by sellers—e.g., "tender loving care" at a nursing home, and analogous services at child day-care centers.

Provision of public goods by nongovernmental nonprofit organizations, as well as by governmental organizations, is frequently exempted from taxation of profit, property, and sales, even if it generates profit. Public policy, however, treats M and R-goods differently, although the conceptual distinction in the two-good model does not involve tax status, and the legal distinction between taxable and tax-exempt activities need not coincide with the organization's own distinction between M and R goods. While specific activities by a nonprofit organization are granted tax-exempt status (under section 501(c) of the Internal Revenue Code), other activities deemed by the IRS to be "not substantially related" to the tax-exempt mission are subject to taxation as "unrelated business activities" (Colombo 2002, Sinitsyn and Weisbrod 2004). The key legal criterion, it should be noted, is not the use to which any profit from a good is put, but whether the activity generating the profit is deemed by the regulatory authority, the IRS, to be "substantially related" – and not simply via the budget constraint -- to the organization's tax-exempt mission. Whatever a good's tax status, however, in the two-good model a profitable R-good is produced because it generates revenue for M, not because it is a form of M-Good.

The nonprofit organization objective function has the following general form (For related models see, especially, James 1983, but also Steinberg 1986, Schiff and Weisbrod 1991, Lowry 1997, and Weisbrod 1998a):

(1) Max Q(M), subject to a break-even constraint,

$C * Q(M) - \pi(R) \leq 0$

where $\pi(R)$ = profit from sale of R, Q(M) = quantity of M, and C = average cost of producing good M. Thus, any unprofitable good, M, can be provided only insofar as a profitable good, R, is produced to finance it. (There may, of course, be exogenous revenue in such forms as donations of money, goods, and time, which would permit provision of M. It would not, though, alter the organization's activity in R-good markets.)

In one formulation of the model, good M is privately unprofitable though socially desirable. In a more general formulation, however, M may be considered to be a composite of two Mission goods, M_1 and M_2. M_1 consists of output that the organization seeks to produce and sell unprofitably. It may generate uncaptured external benefits, perhaps because free-rider problems resulting from the good's collective-good nature precludes profitability, or the organization may wish to serve some "deserving" subset of the population at unprofitable prices, even zero (Steinberg and Weisbrod 2003). M_2 consists of output that provides no benefits outside the organization, but that is unprofitable because it is consumed by the nonprofit organization's managers.
The latter involve the distribution of profit to managers, which is illegal for a nonprofit organization, and so M_2 would be zero in a world of full information and costless enforcement of the NDC; it may be positive, though, in realistic settings. A nonprofit,

having no organizational shareholder-owners, and facing regulators (IRS in the United States) constrained by limited enforcement resources, might be able to operate not to maximize output of a collective good but in the private interests of officers.

The relative importance of the two elements of M can vary greatly. Denoting the relative weight of M_1 in the organization objective function as α, a nonprofit acting as a "pure bonoficing" organization (Weisbrod 1988), $\alpha = 1$, seeks to maximize collective-good output, M_1. At the other extreme, $\alpha = 0$, corresponding to a weight on M_2 of 1, implies that the organization, while legally a nonprofit, acts as a "for-profit-firm-in-disguise" (FPID). In the more general case, weights other than zero or unity may be found, implying that the nonprofit acts as a hybrid of a pure profit maximizing FPID, acting as though the manager were the owner, and a pure bonoficer. A nonprofit acting as a FPID would take advantage of all profitable activity while avoiding unprofitable outputs, thus behaving like a private firm. A pure bonoficer, by contrast, would also seek to maximize profit in the R-good market, but would use the profits to finance maximum provision of unprofitable M_1. If, for example, a nonprofit community hospital sought to be a "supplier of last resort" (Kapur and Weisbrod 2000)--providing health care services to all who "need" it, regardless of ability to pay—it would maximize profit from R and then maximize output of M, conditional on that profit.

A private firm, by contrast, would be expected to produce only good R, and none of the unprofitable good M_1, unless there were interactions between the goods such that the profit from R varied positively with the quantity of M_1 provided--that is,

$\partial\Pi(R)/\partial QM_1 > 0$. For example, it could be the case that a profit maximizing firm would find that its profit would increase if it donated money or goods to some charity. This apparently happened when American Express announced that it would contribute to the Statue-of-Liberty Fund a portion of gross amounts charged to its credit card.

An implication of this two-good model when the M and R goods are independent is that an organization of any form—that is, regardless of the value of Π in its objective function--will produce $QR > 0$. In this sense, private firms and nonprofit organizations, whether acting as profit-maximizers or bonoficers, will behave alike. All organizations wish to take advantage of opportunities to generate revenue—some doing so to distribute it to owners or managers, others to subsidize provision of certain unprofitable outputs. When production of good R does not enter the organization objective function (neither positively or negatively), but only affects the budget constraint, all organizations, regardless of institutional form, would seek to maximize profit from R.[5] Differences in behavior in the market for R would be not in the form of that good, nor in the magnitude of profit (apart from differential taxation or other costs), but in how the profit from R is used—to increase shareholder value, to benefit the manager, to subsidize provision of good M_1, or some combination of these. A good deal of economic research, some of which was cited above, has attempted to detect systematic differences in behavior across institutional forms, but little attention has been paid to the question of precisely which kinds of "behavior" can be expected to differ and which to not differ. As this paper proceeds, reference to M-goods will refer to what has been referred to as M_1, the socially valuable but privately unprofitable outputs.

Do for-profit and not-for-profit organizations act alike? In this two-good model the answer is that they behave the same in R-good markets but differently in M-good markets (when M ≠ R). The model has another testable implication. It is that not-for-profit organizations will be larger than for-profit firms in industries in which they coexist and when they face constraints that are otherwise the same. Both types will produce the same basket of R goods, but not-for-profits would produce more of the unprofitable M goods, if they acted as at least partial bonoficers.

This model provides a basis for additional empirical testing. If we assume that private firms are profit maximizers, producing all goods that are profitable and none that are not, then R goods can be identified as the outputs of those firms – hospitals, in the empirical section, below. If, as a first approximation, we assume that an output that is profitable for a private firm would also be profitable for a nonprofit or governmental provider, then everything that private for-profit hospitals provide would also be provided by the other hospitals, and in that sense there would be no difference in their behavior in R-good markets, but nonprofits and governmental hospitals would provide more of the unprofitable M-good outputs not provided by for-profits.[6] Differences in R-good markets could occur across sectors, however, even independently of differential objective functions, if marginal production costs differed among institutional forms. For example, nonprofits might have lower costs because of greater availability of volunteer labor and lower taxes on capital through property taxation, and these could cause profit-maximizing output to be greater.

In the empirical section, below, estimates are presented of the degree to which each

form of nonprofit organization, church-related and secular, and governmental, differs from private firms in terms of services offered. Estimates are provided of both of the quantitative relationships discussed above: (1) Do suppliers of each form of not-for-profit organization, religious and secular nonprofit, and governmental, produce outputs that private firms do not? These are, presumptively, the unprofitable Mission goods. (2) Do the nonprofit and governmental suppliers –hospitals -- produce all the outputs that private firms do? These are, presumptively, the Revenue goods, which generate revenue for financing the Mission good. On the assumption that input prices are not lower at for-profit firms, and that market prices are not higher, nonprofit and governmental sellers would find it profitable to produce all the outputs provided by private firms.

A testable conjecture, though not an implication of the two-good model, is that the governmental and the two forms of nonprofit hospitals behave differently from each other – because their objective functions, constraints, or both, differ. In other research it has been suggested that governmental providers (of nursing home care and care of the mentally handicapped) act as suppliers-of-last-resort, being more willing than nonprofit organizations to trade off incremental quality for increased quantity (Kapur and Weisbrod 2000). A further conjecture is that behavioral differences will be greatest between for-profit and governmental suppliers, while nonprofits will be intermediate between these two forms of organization, with religious nonprofits acting more like governmental organizations and secular nonprofits acting more like private firms. Evidence of this ordering has also been found in prior research on the nursing home and mentally handicapped facilities industries (Weisbrod 1988, 1998b).

It is noteworthy that in the two-good model even a "pure" bonoficer--for which profit does not enter directly to its objective function (equation 1)--would, nevertheless, engage in profitable activity. Profit, however, would not be a gauge of a nonprofit's "success," at least from a social perspective, since maximum profit from R, while necessary for maximization of M, is not sufficient.

In summary, the model can be re-stated as follows: Any organization, regardless of its objective function, can value profit for one or both of two reasons: Profit may be an objective, as is presumably the case for a private firm, or/and it may represent a revenue source that can be used to pursue the organization's other objectives. In the two-good model an organization seeking to provide a socially desirable but privately unprofitable Mission good can generate the needed revenue only if it can provide a profitable Revenue good. The latter can take many forms. For example, it could involve hiring fundraisers or advertising for donations (Weisbrod and Dominguez 1986), or production of ancillary outputs such as a hospital's using its cardiac rehabilitation facilities to establish a commercial fitness center, or a scientific organization selling advertising space in its publications. The real profitability of any activity depends on its tax status—untaxed if "substantially related" to the nonprofit's tax-exempt mission, taxed otherwise—but also on the organization's ability to utilize joint inputs and accounting mechanisms for minimizing corporate taxation, both of which vary across such industries as health, education, and the arts (Sinitsyn and Weisbrod 2004).

The two potential routes through which an activity can affect an organization's achievement of its Mission are, thus: a *Profit Effect,* which operates through the

production of R-goods, and a *Mission Effect*, which operates through the production of M-goods. The Profit Effect of the Revenue Good is its *indirect* contribution to the production of M, through the organization budget constraint. This effect is:

(2) $\partial M/\partial Q(R) = \partial M/\partial \pi(R) * \partial \pi(R)/\partial Q(R)$,

where $\pi(R)$ = after-tax profit generated by good R.

Added output of the R good may contribute additional profit, which, in turn, makes possible additional output of M.[7]

The *mission effect* of a good is its *direct* effect on Mission-- $\partial M/\partial Q(M_1)$.

A "pure" Mission-good may be defined as a good for which (a) its increased production is an argument in the organization's objective function, while (b) its contribution to revenue is zero, i.e., $\partial R/\partial Q(M) = 0$. The good contributes no net revenue, but it contributes to the organization mission—e.g., providing health care services to the indigent uninsured, basic research at a university, and cultural and species preservation at museums and zoos.

A *pure Revenue-good*, also termed an "ancillary" good, generates revenue but does not otherwise affect the organization goals.

A *hybrid "Mission/Revenue" good* would have a *total mission effect* equal to the sum of its partial direct mission effect and its indirect effect on mission via its contribution to revenue and, thus, to the budget constraint. Examples include a college that reaps some net tuition revenue from a "deserving" student who receives substantial financial aid, or a hospital that receives some revenue, though less than marginal cost, from an indigent uninsured patient (Steinberg and Weisbrod 2003).

A nonprofit or governmental activity could bring both positive effects on the Mission or on the Revenue constraint, and negative effects on the other. When, for example, nonprofit "public" radio and television stations engage in on-air fundraising, there is a positive effect on revenue but, at the same time, the use of airtime to plead for contributions reduces (short-run) programming time. Fundraising, a Revenue-good, thus has a positive profit effect on the budget constraint, and a negative direct mission effect.[8]

A similar conflict illustrating the non-independence of M and R goods involves universities' admission decisions. Admission of a student who would not be admitted but for the family being a major donor is an act of trading-off short-term maximization of mission in order to increase revenue and thereby relax the budget constraint. The admitted student is, in effect, an R-good, displacing an M-good student. When a research university contracts with a private pharmaceutical or chemical company to support faculty basic research, but allows the company to see the resulting findings months before publication, the university is trading off some of its mission, to disseminate knowledge, in return for added revenue that expands its budget for advancing the mission.[9]

When such mixed effects occur, provision of additional R-goods having a negative *direct* effect on the nonprofit's objective function but a positive *indirect* effect through the budget constraint, the organization will not act as a profit maximizer in the R-good market (James 1983, Segal and Weisbrod 1998, Weisbrod 1998a). The organization will balance opportunities to generate additional profit against the undesirability of cutting directly into the mission. Charging a greater user fee at a soup kitchen or college, for example, might increase aggregate revenue but nevertheless be avoided if the well-being of

particular patrons enters the organization objective function positively (Steinberg and Weisbrod 2003).

The testable implications of this two-good framework can be stated as hypotheses to be tested. Again, assuming that for-profit hospitals provide all services that are profitable, and that a given service is equally profitable or unprofitable for a hospital regardless of its ownership form,[10] the following will be tested:

H1: *There are no services that are significantly more likely to be provided by a for-profit hospital than by any other form of hospital.* Equivalently, every service offered at a for-profit hospital is equally likely to be offered at each of the other ownership forms—religious nonprofit, secular nonprofit, and governmental. (Recall that if R-goods and M-goods are independent, as defined above, nonprofit and public organizations would act as profit maximizers in R-good markets, just as private firms would.) However, if provision of an R-good exerted a negative direct effects on Mission—apart from its positive indirect effect on the budget constraint--nonprofit and governmental organizations would not maximize profit from R-goods, not providing all R-goods that would be profitable. Moreover, an output that is profitable for one form of organization need not be profitable for all the others, and in that case the extreme version of H1—that there would be *zero* differences between activities provided by for-profit firms and by any other form of organization--would be rejected.

H2: *There are no significant differences among the three forms of organizations that are subject to a NDC--religious nonprofit, secular nonprofit, and governmental--in the probabilities that any particular service is provided.* Note that while all of these

organizations are subject to a NDC, they may differ in terms of other constraints such as labor supply and access to donations, and their unobserved objective functions may differ. (In the empirical work that follows we cannot identify the separate effects of each potential source of differential behavior.)

H3: *There are some services that are significantly less likely to be provided by for-profit hospitals than by each type of nonprofit and governmental hospital.* This would be the case for outputs that are M-goods for any or all of the various not-for-profit organizations but not for the for-profits. H3, together with H1, imply that both types of nonprofit hospitals, as well as governmental hospitals, provide (a) *all* the services that for-profit hospitals provide, and also, because the two-good model implies that nonprofit and governmental organizations will provide unprofitable M-good outputs that for-profit organizations will not, (b) *some* services not supplied by the for-profits. The strong version of these hypotheses predict that there are no outputs that are *more* likely to be provided by for-profit firms, although, as noted above, such a result could occur if the M and R-goods were inter-related, or if the equation estimates reflected omitted-variable bias attributable to differential input or output prices across ownership forms.

H4: *Institutional form affects an organization's output mix through the incentive/reward structure with which the CEO is confronted*. Measuring this "compensation structure" in three dimensions – total base salary plus bonus, ratio of base salary to bonus, and job "complexity," as defined below – these reflections of unobserved objective functions are hypothesized to be the mechanisms through which an organization's institutional form affects its output decisions.

The process of testing the first three hypotheses involves estimating output differences between for-profit and each of the other three forms of hospitals, in terms of their offerings of various specific services. Testing hypothesis 4, which is of interest to the extent that service-output mixes differ across institutional forms, involves specifying how an organization's institutional form affects its decisions to provide or not to provide particular services. We focus on observable incentive mechanisms that reflect unobservable organization objective functions. The variables arguably capturing managerial incentives are: "total" monetary compensation, in the forms of base salary plus performance-based bonus; strength of incentives, as measured by the ratio of bonus to base salary; and how the CEO job responsibilities are structured, as proxied by the "Job Points" measure developed by the consulting firm, The Hay Group, to gauge job "complexity." The approach deployed examines the ability of these three variables to explain the differential output behavior that is found.

In short, the model is one in which institutional form reflects organization objective functions that are, in turn, manifest in managerial incentives. The emphasis is on variation among institutional forms in the use of strong rewards, in the form of performance-based bonuses, relative to weaker rewards in the form of base salary.[11] This measure is intended to reflect principal-agent relationships when performance of an agent (CEO)—that is, the contribution to the principal's objective function, M -- is more costly to observe for the principal than for the agent (Holmstrom and Milgrom 1991).

Profit is, arguably, easier to monitor and, hence, to reward than are such mission goods as basic medical research, environmental preservation, and services to the poor.

Thus, stronger rewards, in the form of performance-based bonuses, would be used more by private firms. Even if nonprofit and governmental organizations were just as oriented to maximize profit in R-good markets as are private firms, if they were more interested in unprofitable M-goods they would provide weaker overall incentives to their CEOs. The weaker rewards would reflect organization desire to avoid biasing managerial choice toward the more easily-observed outputs. Structures of CEO compensation systems would, then, differ among institutional forms. Accounting for those differences, as well as for differences in total monetary compensation and in the complexity of the job, would then "explain" differential behavior. Differential institutional behavior would, then, be captured by identifiable CEO rewards.

The two-stage empirical approach is as follows:

Stage 1. Every hospital's "performance" is examined in terms of whether it provides each of 80 types of hospital outputs (See table 1 for the listing). Data indicate only the dichotomous presence or absence of each output at each specific hospital. Probit regressions are estimated to determine whether the probability that a hospital provides that particular output varies systematically between for-profit hospitals and those of each of the other three institutional forms. Control variables include hospital size (number of annual admissions), the population size of the area in which the hospital is located, ranging from non-metropolitan area to areas with more than 2.5 million population—the Metropolitan Statistical Area (MSA class)—whether the hospital is a teaching hospital, and two indicators of each hospital's competitive situation, the HMO penetration rate and the Herfindahl Index for the county.

Stage 2. Having identified, in stage 1, the subset of outputs for which there is a statistically significant difference between the probabilities of their being provided by a for-profit hospital and one or more of the nonprofit or governmental forms of hospitals, the next challenge—which is the principal focus of this paper--is to analyze why those differences exist, and specifically the importance of the three CEO compensation variables as proxies for organization objective functions.

This approach involves estimating, in the first stage regressions, the effects of institutional form (specifically religious nonprofit, secular nonprofit, and governmental, relative to for-profit hospitals) on outputs, including regressors for institutional form but not for CEO compensation structure, and then attempting, in the second stage regressions, to determine, for each of the outputs for which significant cross-ownership form differences were found, the degree to which those differences are diminished when the CEO compensation variables are added to the set of regressors used in the first stage. Thus, we can estimate the degrees to which the compensation variables explain the previously-estimated effects of institutional form. If it were the case that the three compensation variables captured all the mechanisms through which institutional form affects organization behavior, the effects of institutional form estimated in the stage 2 regressions would be insignificantly different from zero. The effects previously attributed to institutional form (stage 1) would be captured entirely by the compensation variables. Such a strong finding is unlikely, since the three variables do not constitute the only ways through which organization objectives and constraints are translated into CEO incentives. The point, however, is that *if* institutional form does affect output decisions—as has been

found in numerous studies of various mixed industries--the causes are not institutional form *per se*, but the differential incentives that they utilize to achieve the varied organizational goals.[12]

The balance of this paper includes specification of the models being estimated (section III), description of the data on hospitals (section IV), and presentation and analysis of the quantitative findings (section V). A concluding section (VI) summarizes and points to future research on the behavioral effects of public policies that influence choice among institutional forms.

III. Empirical Model Specification

To determine, first, whether outputs vary systematically among institutional forms, the following model is estimated, in probit form, for each of the 80 hospital outputs ("services") that are described in the data section:

(3) $Y = 1(\alpha_1 + \beta_1 X + \gamma_1 Z + \varepsilon_1 \geq 0)$, where

Y is a dichotomous variable indicating whether a particular service is (Y=1) or is not (Y=0) provided by a given hospital,[13]

X is a vector of control variables, enumerated above,

Z is a vector of dichotomous variables indicating whether the hospital is (Z=1) or is not (Z=0) of a particular institutional form. Four forms are considered--governmental, church-related nonprofit, and secular nonprofit, each being compared with for-profit (the omitted class), and

ε is an error term, assumed to be normally distributed with mean zero.

For the subset of services for which at least one of the γ differs significantly from zero—that is, one or more of the governmental, church-related nonprofit, or secular nonprofit forms of institution is significantly more likely, or less likely, to provide that service compared with a for-profit-—an additional probit equation is estimated (in stage 2) to determine the extent to which the institutional-form effect operates through, and can be explained by, the CEO reward structure. Thus, when any of the three institutional form variables, Z, is significantly different from for-profits in the likelihood of supplying a given output, we estimate the effect on the first-stage institutional form coefficient, γ_1, of adding the three variables that measure CEO compensation structure. To the extent that these compensation measures capture the effect previously attributed to institutional form, adding the compensation variables would reduce the estimated remaining effects of the institutional form dummies. This process seeks to identify what it is about an organization's ownership form that causes differential behavior.

Thus, the following is estimated:

(4) $Y = 1(\beta_2 + \beta_2 X + \gamma_2 Z + \delta_2 S + \varepsilon_{2\ 1} \geq 0)$,

where S is a vector of the three compensation-structure variables and all other variables are as defined above.

For each output for which an institutional form variable is estimated to be significant, at the .10 level or better, the coefficients on the institutional form dummy variables, γ_1 and γ_2 from equations (3) and (4), were then compared. The objective is to

determine, when a form of institution is found to be a significant variable, the extent to which that form affects output through particular compensation mechanisms. If institutional form affected output decisions *only* by determining managerial incentive in the three forms captured in S, then when the estimated β_1 (from equation 3) is significant in explaining differential output of some Y, the corresponding estimate of β_2 (from equation 4) would = zero. At the other extreme, if institutional form affected output entirely through mechanisms other than these managerial rewards, then the addition of S in equation (4) would have no effect on β, so that $\beta_2 = \beta_1$.

The framework of the two-good model permits testing the hypotheses identified earlier. First, do nonprofit and governmental hospitals provide *all* outputs that are presumptively profitable, as reflected in their being provided by private firms—Revenue Goods--or do they provide only some of those outputs? (H1.) They would provide all of them if they, like private firms, were acting as profit maximizers in those markets, and if an output that is profitable for a private firm is also profitable for a nonprofit. Second, do nonprofit and governmental hospitals provide any outputs that private firms do not? (H3.) They would if their objective functions differed from the private firms' by including unprofitable Mission Goods. They might also display such behavior, however, if they were attempting to act as profit maximizers in all markets but were inefficient in doing so, perhaps because of the attenuated property rights associated with the nondistribution constraint (Alchian and Demsetz 1972).

The hypothesis that the three forms of not-for-profit hospitals --governmental and each form of nonprofit--behave indistinguishably from each other (H2) is also

examined. While all of those three forms of institution confront a nondistribution constraint, their objective functions may differ, as may other constraints such as access to volunteer labor, and these would dictate differential output decisions.

IV. Data and Methodology

The two-stage methodology involves linking two types of data. First, the influence is estimated of each institutional form, relative to the for-profit form, on each output—specifically, on the provision of each of the 80 types of hospital services, as presented by the American Hospital Association (AHA). Second, the degree to which the cross-form differences found in step 1 can be explained by differences in managerial incentive structures is estimated, using data on managerial rewards, from a proprietary source described below. The two types of data are then linked. Controls are introduced for hospital size (number of beds), the size of the metropolitan area in which the hospital is located (classified into 6 size groups[14]), whether the hospital is a teaching institution, and two measures of the hospital's competitive state, to capture price pressures—the Herfindahl index for the county, and the HMO Penetration Rate, the percentage of people in the county that are members of a HMO.[15] Data are for the year 1992. See table 2 for descriptive statistics.

Data on a hospital's provision of each of the 80 outputs are from the AHA annual survey. The data are dichotomous, disclosing whether a specific hospital does or does not provide each of the outputs, not the magnitude of outputs. While a continuous measure of output quantity would be useful, there is considerable variation across hospitals in

whether each type of output is provided, and so systematic patterns can be, and are, observed. The AHA survey also provides detail on hospital size.

CEO compensation data were provided by The Hay Group, Inc., a management consulting organization specializing in compensation issues. Hay provided information on (a) the "complexity" of the CEO's job responsibilities, as measured by "Hay Points" (See Roomkin and Weisbrod 1999 for a description of this measure); and on (b) base salary and (c) performance-based bonus. We use these three statistics to characterize the CEO "reward structure" or "incentive structure" at each hospital.

The compensation data are incomplete measures of financial rewards. They do not include rewards in the form of stock options, which are clearly more important in the for-profit sector. Neither do they encompass expense accounts or fringe benefits, which could also vary across institutional forms.[16]

The Hay Group attempted to survey all U.S. hospitals, but only some 25 percent responded. Relative to the entire U.S. hospital industry, the usable Hay sample hospitals are disproportionately large and urban, and governmental hospitals are relatively under-represented while for-profits and nonprofits (religious and secular) are over-represented, but hospitals of all size groups, locations, and institutional forms are included. We know little about the potential selection bias with respect to the relationships between institutional form, output bundles, and CEO reward structures. For the analysis in this paper psychiatric hospitals were eliminated, leaving 1,268 general acute-care respondent hospitals. Hay Group data on managerial incentives are available for 559 of those hospitals.

Control variables used to estimate equations 3 and 4 include, for each hospital: its size (in number of beds[17]), the MSA population size (in size groups), a dummy variable disclosing whether it is a teaching hospital, and two measures of the hospital's competitive circumstances--the Herfindahl Index (HHI) in its county (more specifically, 1 minus HHI, so that a larger value denotes greater competition), and the HMO Penetration Rate, the percentage of persons in the county who are HMO members, to capture the financial pressure on hospitals associated with increased HMO buying power.

V. Findings

Table 3 summarizes findings from the 80 probit regressions in the form of equation (3). One finding, predicted by the two-good model and largely consistent with Hypothesis 1, is that for the vast majority of the 80 service outputs there are no statistically significant differences in the probabilities of their being provided by for-profit and one or more form of not-for-profit hospitals. These outputs are, in the two-good model, presumably profitable R-Goods. The model predicts that outputs provided by for-profit organizations would also be provided by the other forms of hospitals—insofar as outputs that are profitable for for-profit hospitals are also profitable for the others; even M-good maximizers would engage in all profitable R-Good activities.

The model also implies, Hypothesis 3, that for-profit hospitals would provide a smaller set of outputs than would nonprofit or governmental hospitals, since for-profit hospitals would avoid the unprofitable Mission goods. This, too, is consistent with the

findings in table 3, which shows that for-profit hospitals are significantly less likely than are the other forms of institutions to provide each of a substantial number of services.

The results in table 3 also show, consistent with Hypothesis 1, that many activities—29 of the 80 (36 percent)--are equally likely to be provided at for-profit and all three other forms of hospitals. That is, the hypothesis cannot be rejected (at the .10 level) that the true relative frequency with which each of those 29 activities is provided is the same in for-profit hospitals and in each of the other three forms. Those activities are listed in table 3, column 1, with details in table 4, columns 1-3.

There are also many dissimilarities between for-profit hospitals and one or more of the three forms of not-for-profits, as can be seen in table 3, columns 2-4 and in tables 5-7, columns 1-3. The for-profits are significantly *less* likely to provide many outputs that are provided by governmental, religious nonprofit, or secular nonprofit hospitals—consistent with hypothesis 3; this is the case for 19 (24 percent) of the 80 types of output. In the framework of our model, these outputs are presumably unprofitable, but would be provided by not-for-profit organizations with social missions broader than profit maximization.

In short, the model implies, and we find, that for-profit and not-for-profit hospitals are both the same and different. The not-for-profits provide more types of outputs, consistent with their having broader missions that encompass particular unprofitable activities, but they also provide many of the same outputs as the for-profits, reflecting the search for profit. In the model, while organizations of all forms seek to maximize profit from R-good activities, the profit is used differently across institutional

forms. All organizations confront budget constraints, whatever objective functions.

The empirical findings in tables 3-7 also disclose differences among the three types of not-for-profit providers, even though all are subject to a nondistribution constraint. Comparing for-profit hospitals with each of the other three institutional forms, while we find that there are 29 outputs, out of the total of 80, for which these other three forms are alike in exhibiting no significant differences from for-profits (table 4, columns 1-3), and there are another 19 outputs for which all three not-for-profit forms are alike in that all exhibit a significant difference from for-profits in probability of provision (table 5, columns 1-3). There are many outputs for which the three types of not-for-profits are quite different—one or two, but not all three types differ significantly from for-profits: (a) 14 other outputs for which governmental and for-profit hospitals are significantly different in likelihood of provision (9 shown in tables 6, column 3, and 5 in table 7, column 3); (b) 18 outputs for which religious nonprofit and for-profit hospitals are significantly differentially likely to be providers (15 shown in table 6, column 1, and 3 in table 7, column 1); and (c) 22 outputs for which secular nonprofits differ significantly from for-profits in the likelihood of provision (15 shown in table 6, column 2, and 7 shown in table 7, column 2).

Evidence that the three forms of not-for-profits behave differently in output markets is noteworthy in highlighting the importance of variables other than the nondistribution constraint, which is confronted by all three forms of not-for-profits. The findings here are consistent with evidence from prior research showing that the three forms of not-for-profits behave differently in other dimensions such as the financial

incentives they provide to their CEOs, specifically in their use of strong vs. weak incentives (Ballou and Weisbrod 2003). The findings on outputs are, as expected, not consistent with the null Hypothesis 2, that the *only* material difference among institutional forms is the presence or absence of a nondistribution constraint. The differences among the three forms of not-for-profits reflect either divergent objective functions among the three forms of governmental and private nonprofit organizations, systematic differences in other constraints, or both.

Consistent with the two-good model, which highlights the potential importance of differential missions, not simply the differential relevance of the nondistribution constraint, our findings disclose important inter-form differences. For-profit providers, with their hypothesized concentration on profitability, do provide fewer outputs than the other institutional forms that are hypothesized to have broader, bonoficing, missions, leading them to intentionally provide some unprofitable outputs. The probability of a particular service being provided in a for-profit hospital is significantly smaller than it is for one or more of the not-for-profits for a sizable percentage of activities-- for 34 activities (42% of all 80) in the case of church-related hospitals, also for 34 activities (42%) in the case of secular nonprofits—27 of the 34 are the same in the two cases--and for 28 activities (35%) in the case of governmental hospitals.

These findings are consistent with the hypothesis that governmental and nonprofit hospitals pursue objective functions that differ from for-profits as well as from the other forms of not-for-profits. The explanations could involve differential missions, but there are other possibilities. One is that not-for-profits engage in activities that are

expected to be profitable Revenue Goods, but were not (Sinitsyn and Weisbrod 2004)—consistent with the property-rights prediction that not-for-profits, subject to the nondistribution constraint, are inefficient. And the possibility cannot be ruled out that omitted variables mask situations in which the profitability of an activity is, itself, a function of institutional form, as would be the case if, for example, a public or a nonprofit organization could get donations of money or volunteer time for particular outputs while for-profit organizations could not. We also cannot rule out the possibility that some outputs, but not others, are unprofitable at for-profit hospitals but not at not-for-profits.

Until this point we have assumed that R-goods and M-goods are independent of one another. When they are not, however, the two-good model has other implications. That is, when provision of an additional unit of one good exerts a direct effect on the other, those effects would be taken into account by both profit maximizers and bonoficers. For example, if provision of a marginal unit of R-good diminished M directly-- $\partial M/\partial R < 0$ -- even while it exerted a favorable effect on a not-for-profit's budget constraint, then the organization would engage in less than the profit-maximizing level of R-good activity. This has been claimed to occur when, for example, a research university engages in commercial ventures with private biomedical research firms, insofar as the university's mission of knowledge dissemination is undermined when the lure of money leads the university to accept conditions of secrecy (Bok 2003, pp. 64-66).

The potential interdependencies can take varied forms and have varied effects. Even a profit maximizing firm would produce an ostensibly "unprofitable" output, such as charity care, for example, if doing so led to a sufficient increase in donations, for in that

case it could be profitable to give away charity services.

As noted above, additional output of an R-good could contribute negatively directly to mission even while it contributed positively through its indirect effect on the budget constraint. For example, charging even some of the poor a user fee for hospital care (or undergraduate education) could generate net revenue, but it could also cut access for a mission-related population, unless the organization was able to price discriminate effectively (Steinberg and Weisbrod 2003). In such a case, with $\partial M/\partial R < 0$, the generation of added revenue exerts a negative direct effect on mission, at least partially offsetting the favorable budgetary effect. Under those conditions a not-for-profit bonoficer would choose to forego profit from additional R-good output (Weisbrod 1998a), and output that would be provided profitably by private firms would not be provided by not-for-profits, even if the output was equally profitable for them.

The findings in this paper reveal some, but relatively little, evidence of negative interdependencies among M and R outputs in the hospital industry. While there are 44 outputs that are significantly *less* likely to be provided by a for-profit organization than by at least one form of not-for-profit (tables 5-6, columns 1-3), consistent with the basic two-good model, there are 8 outputs that are significantly *more* likely to be provided by for-profits than by at least one form of not-for-profit (table 7, columns 1-3). For these outputs it appears that the not-for-profits are foregoing potential profit, which, within the two-good model, would be the case only if R and M goods were interdependent with $\partial M/\partial R < 0$. We find, however, that among the 80 hospital outputs there are only two, angioplasty and reproductive health services, that are significantly less likely to be

provided by all three forms of not-for-profit hospitals compared with for-profits (table 7). There are six other outputs for which one or two types of not-for-profits are significantly less likely than a for-profit to provide them (table 7): alcohol/chemical dependency inpatient unit (by governmental hospitals), cardiac catherization unit and open heart surgery (by secular nonprofits), organ/tissue transplant (by secular and religious nonprofits), and senior membership program and extracorporeal shock wave lithotripter (by secular nonprofit and governmental hospitals). Note the finding that for reproductive health services, religious nonprofits are significantly and substantially *less* likely than are for-profits to be providers, while secular nonprofits and governmental hospitals are significantly and substantially *more* likely than are for-profits to be providers. Reproductive health services exemplify the conflict between revenue generation and pursuit of mission, and the associated foregoing of potential profit by the religious, often Catholic, hospitals.

It is noteworthy that the evidence is only scant, at most, that any form of not-for-profit is foregoing a profitable opportunity. Of the total of 240 output comparisons—eighty outputs and, for each, comparisons of for-profits with each of the three forms of not-for-profits—the estimates reveal only 13 in which any form of not-for-profit is significantly *less* likely than a for-profit to provide a particular output (12 in table 7, columns 1-3, and one, reproductive health, in table 6, column 1). By contrast, there are 96 cases of the opposite, a form of not-for-profit being significantly *more* likely than a for-profit to provide the output (tables 5-7, columns 1-3); these are the cases involving Mission outputs.

In summary, in the context of the two-good model, the findings for the 80 hospital outputs and three differences between a form of not-for-profit hospital and the for-profit form are as follows: (1) Overall, and as expected, not-for-profits generally provide the outputs that for-profits provide—outputs that are presumptively profitable R-Goods. This is consistent with the prediction that the not-for-profits act as profit maximizers in R-Good markets. Tables 4-7 disclose that for 132 of the 240 output-institutional-form comparisons, there is no significant difference in probabilities that a particular output is provided by a not-for-profit and a for-profit provider.[18]

(2) The model also implies that not-for-profits will produce additional outputs (Mission goods) that for-profit firms will not. This, too, has been found.

(3) As noted earlier, the predictions that all outputs will either be provided with equal likelihood between for-profit and not-for-profit organizations (R-Goods), or will be provided with greater likelihood by not-for-profits (M-Goods), predicts that there will be no outputs provided with greater likelihood by not-for-profits, but that prediction depends on two assumptions. One is that any output that is profitable for a for-profit firm is also profitable for a not-for-profit provider that is similar (in size, MSA class, teaching hospital status, Herfindahl Index, and HMO penetration rate). The other is that there is no *negative* direct effect of a profit-generating R-Good activity on the not-for-profit provider's Mission (thus, $\partial \square / \partial R \geq 0$). If either of these assumptions does not hold, a third type of finding is implied by the model: An output would be *less* likely to be provided by a not-for-profit organization than by a for-profit. We found but a small number, 13, of such cases—5 percent of the 240 differentials. This finding suggests that

even a simple version of the two-good model, in which any output that is profitable for a for-profit firm is also profitable for all forms of not-for-profits, and in which provision of a R-good by a not-for-profit has no adverse direct effect on the organization's mission, has considerable explanatory power.

Having found substantial evidence of systematic behavioral differences between for-profit and not-for-profit organizations, and also among the three forms of not-for-profits, we turn now to the mechanisms through which institutional form affects organizational behavior.

Explaining Differential Institutional Behavior: Managerial Incentives

What is it about "institutional form" that generates the observed patterns? What, in short, are the mechanisms that lead to the observed choices of outputs? Specifically, this section provides estimates of the extent to which the differential behavior across institutional forms reported above is explainable by the differential reward structures that the firm offers its top manager. If objective functions differ among institutional forms, differential incentive structures would be optimal.

Can the observed differences in outputs be explained by differential managerial incentives? The right panels, columns 4-6, of tables 4-7 provide the answers. They show, for each ownership form, the estimates from equation 4, which adds three compensation variables to the previous set of regressors. The goal of the new coefficient estimates is to determine the degree to which the institutional form dummy variables that have

previously been found to be statistically significant in explaining output differentials (as noted in columns 1-3 of the tables) lose explanatory power when managerial compensation variables are added. As noted above, these managerial incentives could capture the ways through which institutional form effects behavior. If they captured the process fully, their addition would eliminate the estimated effect of institutional form; more generally, they would diminish its estimated importance.

That is, we seek to determine the degree to which the effects of institutional form result from the use of systematically different CEO incentives, reflecting different organizational objective functions. Thus, we compare the estimated coefficients on institutional form from equations that do and do not include compensation variables. This is done for every output and institutional-form pair for which the estimates of equation 3, which *exclude* compensation variables, revealed significant differences between for-profits and any of the not-for-profit institutional forms in provision of a particular output (tables 5-7, columns 1-3). The estimates for equation 4, which *include* the compensation variables, appear in columns 4-6 of tables 5-7. The question: How much of the estimated effects of institutional form can be explained by the effects of differential managerial (CEO) incentives?

CEO "compensation" is measured by three variables: the level of "total" annual monetary compensation (base salary plus bonus), the ratio of bonus to base salary, and how the CEO job is structured, as reflected in Hay Job Points—a measure of the "complexity" of the job. As noted above, if differential organization performance were explainable *entirely* by these variables, which in the model largely reflect organization

objective functions, then adding them to the estimating equation would cause the effect of the institutional form, *per se*, on the output variables to become insignificantly different from zero. Even, however, if managerial incentives were actually the only mechanisms through which organizations influenced CEO behavior, those incentives could take forms not captured by the three measures examined—such as expense accounts, stock options (at for-profits), and other financial and non-financial job perquisites.

Table 8 summarizes the estimated effects on the three not-for-profit institutional-form dummies of adding the compensation variables. Those effects are calculated as follows: To begin with, every activity for which the equation 3 estimates (left panels of tables 5-7) disclosed that institutional form matters—that is, the estimated coefficient on at least one of the three not-for-profit institutional form dummy variables is significantly different from zero, was examined. These are the outputs for which there is a significant difference in the probability of its being provided by a for-profit hospital and another institutional form of hospital. Those equations were then re-estimated after adding the three compensation variables. Results are in columns 4-6. Finally, the institutional form coefficients in the two models were compared, to determine the degree to which the influence of institutional form operates through, and is captured by, differential CEO incentive structures.

The comparisons of coefficients on institutional form in the initial and augmented equations present three cases. Note that in all cases the output equations considered are those for which an institutional-form dummy variable is significant in the initial equation. *Case A*: For these outputs, addition of the compensation variables caused institutional

form to become insignificantly different from zero. Institutional form appears to affect organization behavior entirely through the incentives offered to the top executive—incentives that reflect unobservable organization goals. *Case B*: For these outputs, addition of the compensation variables caused the coefficient on institutional form to decrease absolutely but to remain significant (at .10 or better). Institutional form appears to affect organization behavior only partially through managerial incentives. *Case C*: For these outputs, addition of the compensation variables did not reduce the coefficient on institutional form, and it remained statistically significant. Institutional form affects organization behavior entirely through mechanisms other than the set of compensation structure variables; none of the output differences between for-profit and the other institutional forms is explained by these variables.

Case A characterizes 12 of the 33 outputs (36%) for *church-related* (religious) *nonprofit* organizations. For these 12 outputs there is no longer a significant difference between the probabilities of their being provided by a church-related and a for-profit hospital, once the compensation variables are added. The analogous findings for *secular nonprofits* apply to 12 of the 34 outputs (35%) that had previously been estimated to differ significantly from for-profits, and for *governmental* organizations, to 13 of the 28 outputs (46%) for which *government* form is significantly different (table 8, top panel). Overall, of the total of 95 output/institutional form differences that were significant without the compensation variables, 37 (39 percent) became statistically insignificant when those variables were added.

For these Case A output estimates, two alternative approaches were used to

calibrate the percentages of the equation 3 estimates that are explained by the three CEO reward structure variables in equation 4. One approach interprets insignificant coefficients as zero. This implies that *all* of the estimated effect of institutional form on a specified output is explained by the differential managerial rewards. The alternative approach disregards the insignificance of the institutional form dummies and uses their point estimates in determining the reduction in institutional-form effects attributable to the managerial reward variables. The latter approach is more conservative in providing a lower estimate of the importance of the compensation variables, but its conceptual foundation is weaker, given the lack of statistical significance.

Case B involves cases in which the estimated effect of institutional form decreased but remained significant, at the .10 level or better, when the compensation variables were added. The effect of the managerial reward variables was estimated as the percentage reduction in the absolute value of the institutional form coefficients. This case characterized 15 of the output equations for the church-related sector, 19 for the secular nonprofit sector, and 13 for the governmental sector (table 8, second panel).

In the case C output equations, when the compensation variables were added as regressors the coefficients on institutional form remained significant and did not decrease in absolute value. The compensation variables explained none of the effect of institutional form that had been estimated by equation 3. This characterized 6 of the 33 output equations for church-related hospitals, 3 of the 34 output equations for secular nonprofits, and 2 of the 28 output equations for governmental hospitals (table 7, third panel).

Finally, for each of the three institutional-form differences from the for-profits, the three cases were summed, weighting each of the average effects, cases A-C, by its relative frequency. Findings are as follows, using, alternatively, both approaches for case A coefficients, and are reported in table 8, bottom panel:

Church-related nonprofits (table 8, column 1). Of the total of 80 outputs there are 33 for which these nonprofits differed significantly (in equation 3) from for-profit hospitals in the likelihood of providing that output. For 12 of the 33 outputs (36%) the addition of the compensation variables (equation 4) caused this institutional form dummy to become insignificant -- Case A. Using the two alternative interpretations, either 100 percent of the originally estimated effect of institutional form, or the smaller percentage reduction in the coefficient on institutional form, is the basis for estimating the percentage reduction explained by the CEO incentives.

For an additional 15 of the 33 activities (45%) the compensation variables explained various reductions in the estimated effects of the religious institutional form, ranging from 3 percent to 50 percent, and averaging 21 percent -- Case B. For the remaining 6 activities (18%) the compensation variables explained none of the effect of institutional form as estimated from equation 3 -- Case C.

The weighted sum of these effects of the compensation variables, using the first interpretation for case A, for which an insignificant coefficient is treated as a zero, is: (.36 * 100%) + (.45 * 21%) + (.28 * 0%) = 45 percent, as shown in the last row, first column, of table 8. If the alternative evaluation procedure is used for Case A, the estimated percentage reductions associated with the inclusion of the compensation variables are

smaller, and the aggregate explanatory effect averages 25 percent.

Secular nonprofits. For this class of organizations, of the 34 outputs for which the estimates of equation 3 disclosed significant differences from for-profits, 12 became insignificant when the compensation variables were added. These Case A coefficient reductions were interpreted as explaining 100 percent of the estimated effect of this institutional form, or, in the alternative approach, an average reduction of 57 percent. Case B characterized 19 outputs, for which inclusion of the compensation variables led to a mean reduction of 27 percent in the estimated effect of the secular nonprofit institutional form. With the remaining 3 outputs, constituting Case C, addition of the compensation variables explained none of the estimated institutional-form effects. Thus, the estimated aggregate importance of the CEO compensation variables for this institutional form is the weighted sum of effects: (12/34 * 100%) + (19/34 * 27%) + (3/34 * 0%) = 50%, adopting the first approach for Case A, or 35% using the alternative, point estimate, method for Case A (table 8, column 2 of bottom panel).

Governmental. Among these hospitals, the compensation variables proved to be particularly important in capturing the mechanisms through which governmental hospitals influence output decisions differentially from their for-profit counterparts. As table 8 shows, there are 28 outputs, of the total of 80, for which governmental hospitals differed significantly from for-profit hospitals in the probability of being provided, and for 13 of the 28 outputs the governmental institutional-form variable became insignificant when the compensation variables were introduced (Case A). If the alternative, point estimate, approach, is adopted, the institutional form coefficients in those equations fell by an

average of 54 percent when the compensation variables were added. For an additional 13 of the 28 outputs the governmental-form coefficients decreased but remained significant, the mean reduction being 20% (Case B). For only 2 of the 28 outputs did the compensation variables have no effect in reducing the estimated effect of differential institutional form (Case C). The weighted sum reduction in the estimated differences between governmental and for-profit organizations, *cet. par.*, in the probabilities of offering specific services—that is explainable by the compensation variables is, thus, either: (13/28 * 100%) + (13/28 * 20%) + (2/28 * 0%) = 56% , or 34% using the point-estimate approach).[19] The following text table summarizes the findings:

Percentage of Effects of Institutional Form, Compared with Private Firms, Explained by the Three Compensation Variables

Institutional Form	Percentage Explained
Church	25-45
Secular	35-50
Government	34-56

In a variant of the model generating these estimates, the compensation variables are permitted to affect output choices differently across ownership forms. That is, ownership form is interacted with the compensation variables, thus allowing for the possibility that those variables have distinct effects across ownership forms, as well as effects that are constant across forms. Specifically, the model (4) equation, above, was modified by adding terms for the interactions of the compensation variables, S, with institutional forms, Z:

$$(5)\quad Y = 1(\alpha_3 + \beta_3 X + \gamma_3 Z + \delta_3 S + \theta Z*S + \varepsilon_3 \geq 0)$$

With this more-general formulation, the ability of the compensation variables to account for the influence of institutional forms can be re-estimated. Probit estimation reveals that the influence of compensation increases—substantially, under some formulations. Estimates of the explanatory power of the compensation variables, independently and interactively, were made under several alternative assumptions: that the responses to the compensation variables differ among institutional forms, or that the responses are the same among institutional forms, all organizations responding to compensation incentives as for-profits respond, as religious nonprofits respond, or as secular nonprofits respond.

Results, details of which are available from the author, disclose that this interaction model has increased explanatory power—substantially more in some formulations.[20] For religious nonprofits, the compensation variables, which were reported above to account for 45 percent of the differential service-output choices for this institutional form as compared with the for-profit (table 8, last row), accounts, in the interaction model, for 52-70 percent of the differential previously-estimated effect of this institutional form compared with for-profits. The lower-bound estimate is under the assumption that religious nonprofits respond to incentives as secular nonprofits respond, while the upper-bound estimate is under the assumption that the religious nonprofits respond to incentives as for-profits respond. (When the alternative method is used for evaluating the Case A service-outputs, the previous estimate of a 25 percent explanatory power for the compensation variables—table 8, second row from bottom—is estimated in the interaction model to explain 25-37 percent, both the lower and upper bounds again being the cases when responses are assumed to be those of secular nonprofits and for-profits, respectively.)

The estimated effects of the compensation variables in the interaction model is also increased for secular nonprofits. These variables, estimated in model (4) to explain 50 percent of the effects of this institutional form, are found to explain 55-84 percent in the

interaction model—55 percent when these nonprofits are assumed to respond to incentives in their own estimated way, 84 percent if they were to respond as religious nonprofits. (Using the alternative approach, the range of reduction is 40-52 percent, compared with the prior estimate of 35 percent in the non-interaction model, and the lower and upper bound cases are the same.)

The findings that the three compensation variables explain a substantial portion of the estimated effect of differential institutional form is quite robust to model specification. However, the substantially greater predictive value of the compensation variables in the interaction model shows not only that those variables differ across institutional forms but that they influence decisions differently across institutional forms.

Finally, it is instructive to examine the outputs for which the probabilities of being provided by for-profit hospitals and each of the three forms of not-for-profits were estimated, above, to be insignificantly different (table 4). For these 29 outputs, identified as R-goods, there are no differences in behavior to explain. Thus, it should be the case that adding the compensation variables to the estimation equations has no effect on the coefficients for the institutional form variables previously estimated. Within the framework of the two-good model these Revenue goods would not be differentially explainable by managerial incentives. We find, as expected, that adding the compensation variables has no effect. In table 4, columns 4-6 show that the addition of the compensation variables has no statistically significant effect on any of the three institutional-form variables (differential probabilities compared with for-profits) for any of the 29 outputs.

VI. Concluding Remarks

This paper examined two issues involving behavior of for-profit organizations relative to nonprofit (church-related and secular) and governmental organizations. First, a general two-good model of organization behavior for the not-for-profits was presented in

which the organization seeks to maximize profit from a profitable "revenue good," R, in order to finance maximization of output from a socially desirable but unprofitable "mission good," M. Such an organization would act as a profit maximizer in the R market as a necessary condition for being a successful maximizer in the M market. Profit-maximizing private firms would not operate in M markets since, by definition, they are unprofitable.

Thus, systematic and observable behavioral differences, as well as similarities, would be expected for not-for-profit and for-profit organizations in the same industry:

- *Similarities*: In R-good markets, not-for-profit organizations, pursuing the instrumental goal of maximizing profit from R goods, would act indistinguishably from for-profit firms--assuming that a good that was profitable for for-profit firms was also profitable for nonprofit and governmental providers.
- *Differences:* While for-profits and not-for-profits of all forms would seek to maximize profit from R-goods, if any form of not-for-profit sought to maximize unprofitable M goods, those organizations would provide more M-goods than would for-profit firms. Thus, private firms would be smaller, acting like private firms in profitable R-good markets but providing fewer, if any, unprofitable M goods.

We have found such output similarities and differences across institutional forms in the hospital industry. As hypothesized, many of the 80 forms of hospital outputs are *equally* likely to be provided by for-profit and not-for-profit hospitals—about 40 percent of the 80 outputs--and the vast majority of the other forms of output are significantly *less* likely to be provided by for-profits. The two-good model implies also that there will be no outputs that are significantly *more* likely to be provided by for-profits, assuming that profitable and unprofitable outputs are separable. The empirical findings, however, disclosed some, although few, such outputs. These are consistent with the model if the M and R goods are not independent, with added output of particular R-goods exerting a negative direct effect on mission.

The second goal of the paper is to peer inside the "black box" of "institutional form": If institutional forms behave differently, as has been observed, what are the mechanisms through which those differences are brought about? What is it about an organization's legal form that influences its economic behavior? The paper focused on observable managerial incentives, as reflections of unobservable organization objective functions, and which vary among organizations. An organization pursuing only maximum profitability, for example, would structure its CEO's job and incentives so as to achieve that end, while an organization with a broader mission would establish a different reward structure. If the organization's objective function included goals that were costly to monitor, it would provide weaker incentives—compensation being tied less to observable measures. Thus, if profitability was easier to observe and measure than a mission such as helping the poor (in a hospital), producing socially valuable basic research (in a university), or preserving cultural heritage (in a museum), the relative importance of base salary and performance-based bonus, as well as the structuring of job responsibility for the CEO, would differ across institutional forms.

Empirical analysis of hospitals throughout the U.S. discloses that sizable fractions of the estimated effects of institutional form on outputs can, indeed, be explained by the differential CEO incentive structures they use. For nonprofit hospitals, church-related and secular nonprofit, as well as for governmental hospitals, at least 25 percent, and as much as much as 84 percent, of each institutional form's differential service outputs, as compared with private firms, can be explained by the use of differential managerial incentive structures and differential responses to those incentives, depending on the measure used.

Do private firms, nonprofit organizations, and governmental organizations behave differently? Yes, in some identifiable dimensions, no in others. The evidence reported here is consistent with a model in which organizations of diverse institutional forms behave indistinguishably in markets for generating profit—and quite differently in other markets.

The finding that much of the difference in output behavior across institutional forms in the hospital industry can be explained by observable managerial reward structures advances understanding of what it is about an organization's ownership form that leads to behavioral differences. Extension of this methodology to other institutionally mixed industries would be useful to determine the generalizability of the links between unobservable organizational objective functions and their reflection in observable managerial incentives, and between those incentives and organization behavior.

References

Alchian, Armen and Harold Demsetz. 1972. "Production, information costs, and economic organization." *American Economic Review*. 62:777-795.

American Hospital Association 1992. *AHA Guide to the Health Care Field* (Chicago: American Hospital Association).

Ballou, Jeffrey and Burton A. Weisbrod 2003. "Managerial Rewards and the Behavior of For-Profit, Governmental, and Nonprofit Organizations: Evidence from the Hospital Industry," *J. Public Economics,* October: 1895-1920.

Bok, Derek 2003. *Universities in the Marketplace* (Princeton, NJ: Princeton University Press).

Caves, Douglas W. and Laurits R. Christensen 1980. "The Relative Efficiency of Public and Private Firms in a Competitive Environment: The Case of Canadian Railroads," *J.Political Economy* 88: 958-976.

Chaves, Mark 2003. "Debunking the Assumptions Behind Charitable Choice," *Stanford Social Innovation Review* 1 (2): 28-36.

Colombo, John D. 2002. "Commercial Activity and Charitable Tax Exemption," *William and Mary Law Review* 44 (2): 487-567.

Davies, David 1971. "The Efficiency of Public versus Private Firms: The Case of Australia's Two Airlines" *J. Law and Economics* (April): 149-165.

Devereux, P.J. et. al. 2002. "Comparison of Mortality Between Private For-Profit and Private Not-For-Profit Hemodialysis Centers," *J. American Medical Association* 288 (19):

2449-2457.

Erus, Burcay and Burton A. Weisbrod 2003. "Inferring Nonprofit Organization Objective Function from Compensation Structure: The "Mixed" Hospital Industry," in *The Governance of Not-for-Profit Firms,* ed. Edward Glaeser (Chicago: The University of Chicago Press): 117-142.

Golden, Daniel 2003. "For Groton Grads, Academics Aren't Only Keys to Ivies," *Wall Street Journal,* April 25: A1, 2.

Goodstein, Laurie 2000. "Churches Are Wary Of Government Aid To Assist the Needy," *New York Times*, October 17, 2000: A1, A25.

Holstrom, Bengt, and Paul Milgrom. 1991. "Multitask Principal Agent Analyses: Incentive Contracts, Asset Ownership, and Job Design." *Journal of Law, Economics, and Organization* 7: 24-52.

James, Estelle 1983. "How Non-profits Grow: a Model," *J. Policy Analysis and Management*. (Spring): 350-365.

Levinson, R.B. 1985. "Okeechobee: An Evaluation of Privatization in Corrections." *Prison Journal*, Vol. 65: 75-94.

Logan, C.H. 1992. "Well Kept: Comparing Quality of Confinement in Private and Public Prisons." *Journal of Law and Criminology*, Vol. 83: 577-613.

Logan, C.H. 1996. "Public vs. Private Prison Management: A Case Comparison." *Criminal Justice Review*, Vol. 21: 62-85.

Lowry, Robert C. 1997. "The Private Production of Public Goods: Organizational Maintenance, Managers' Objectives, and Collective Goals." *American Political Science Review* 91 (2, June): 308-323.

Newhouse, Joseph P. 1970. "Towards a Theory of Nonprofit Institutions: An Economic Model of a Hospital". *American Economic Review* 60(1):64-74.

Nicholson, Sean et al. 2000. "Measuring Community Benefits Provided by For-Profit and Nonprofit Hospitals," *Health Affairs*, November-December.

Roomkin, Myron J., Burton A. Weisbrod. 1999. "Managerial Compensation and Incentives in For-Profit and Nonprofit Hospitals." *Journal of Law, Economics and Organization* 15: 750-781.

Savas, E.S. 1977. “Policy Analysis for Local Government: Public vs. Private Refuse Collection,” *Policy Analysis.* Winter: 49-74.

Schiff, Jerald and Burton A. Weisbrod. 1991. “Competition Between For-Profit and Nonprofit Organizations in Commercial Markets.” *Annals of Public and Cooperative Economics* 62(4): 619-639.

Schlesinger, Mark and Robert Dorwart 1984. “Ownership and Mental Health Services: A Reappraisal of the Shift Toward Privately Owned Facilities.” *New England Journal of Medicine* 311:959-65.

Segal, Lewis and Burton A. Weisbrod. 1998. ““Interdependence of Commercial and Donative Revenues” Chapter 6 in Weisbrod 1998a, 105-27.

Sinitsyn, Maxim and Burton A. Weisbrod 2004. “Behavior of Nonprofit Organizations in For-Profit Markets,” working paper, Northwestern University, Department of Economics.

Smith, Steven Rathgeb, and Michael Lipsky 1993. *Nonprofits for Hire: The Welfare State in the Age of Contracting.* Cambridge: Harvard University Press.

Steinberg, Richard 1986. “The revealed objective functions of nonprofit firms,” *Rand Journal of Economics*, 17 (4, winter): 508-526.

Steinberg, Richard and Burton A. Weisbrod 2003. “Price Discrimination and Rationing by Nonprofit Organizations with Distributional Objectives,” working paper, Indiana University Purdue University-Indianapolis, Department of Economics, and Northwestern University, Department of Economics.

Weisbrod, ed. 1998. *To Profit or Not to Profit: the Commercial Transformation of the Nonprofit Sector* (Cambridge, MA: Harvard University Press).

Weisbrod 1998a. Chapter 3 in Weisbrod, *To Profit or Not to Profit: the Commercial Transformation of the Nonprofit Sector* (New York: Cambridge University Press).

Weisbrod, Burton A., 1998b. “Institutional Form and Organizational Behavior.” In *Private Action and the Public Good,* ed. Walter W. Powell and Elisabeth S. Clemens, 124-133. New Haven and London: Yale University Press.

Weisbrod, Burton A. and Nestor Dominguez 1986. “Demand for Collective Goods in Private Nonprofit Markets: Can Fundraising Expenditures Help Overcome Free-Rider Behavior?” *J.Public Economics* 30 (June): 83-95.

Wholey, Douglas R., Jon B. Christianson, John Engberg, Cindy Bryce. 1997. "HMO Market Structure and Performance, 1985 to 1995." Health Affairs 16(6): 75-84.

Worth, Robert F. 2003 "Law School's Dean Tells Students, 'I Object'," *New York Times*, April26: A1, 17.

Notes

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[1] Security at the federal government's Los Alamos Research Laboratories, for example, has been contracted out to the University of California-Berkeley, which, while formally a state governmental organization, may be thought of as a nonprofit organization that receives some of its revenue from the State of California.

[2] Research on institutional choice, the role of government, the desirability of privatization, and the efficient role for private nonprofit organizations, religious or secular, have typically not distinguished between the use of a particular form of institution to *produce* a particular good and its use to *finance* that production. The two are separable, however. Government can, and does, finance or subsidize production that occurs in other institutional forms: in private firms (e.g., defense contractors, private jails, and for-profit hospital and nursing home services paid for by Medicare and Medicaid), and in religious and secular nonprofit organizations (e.g., hospitals and nursing homes, universities, art museums, and social services—on the latter see Smith and Lipsky 1993). Analysis of these inter-form relationships, however, is beyond the scope of this paper.

[3] Under the Welfare Reform Act of 1996, "faith-based" religious organizations have been encouraged to contract with federal agencies to provide a variety of social welfare service that had previously been provided either by governmental agencies or secular nonprofit organizations. (For a recent account of churches' involvements in federally-funded programs under the Welfare Reform Act see Goodstein 2000.)

[4] Differential constraints may exist in a variety of forms, such as the supply of volunteer labor. If the supply were greater to religious nonprofits than to for-profit organizations, then CEOs in the two forms of organization would be encouraged to respond differently to an exogenous increase in demand, at least in terms of purchases of capital inputs and

paid labor as substitutes for volunteer labor. However, that would not imply differential compensation contracts, any more than would any other differential in relative input prices—unless the use of volunteers was, itself, an argument in the organization's objective function.

[5] If generating profit from good R required action that undermined organization utility—e..g., if production of good R entered the objective function directly and negatively, even while it generated revenue--the organization would produce less R-good than would be profit maximizing (Segal and Weisbrod 1998).

[6] Moreover, nonprofits would not produce more of any R-good than is produced by private firms, since those firms would select the profit maximizing rate of output, and a nonprofit could not do better. This, however, is not testable with the available data.

[7] The contribution of additional R-good to real profit can be expected to exceed its contribution to the profit reported to the IRS insofar as cost accounting practices permit tax-reducing measures. Thus, it is understandable that approximately half of all nonprofits that engage in "unrelated" business activity report profit that is ≥ 0 (Sinitsyn and Weisbrod 2004).

[8] There is, of course, a long run trade-off, since additional time devoted to fundraising increases output of future public service programming, through the budget constraint, even while it decreases that program time in the short run.

[9] For a recent account of some universities' apparent marginal choices between admitting students who are more likely to be profitable, because of family donations, and students who would otherwise be admitted, see Golden 2003. Another trade-off at a university, involving a decision by the Dean of the New York University Law School to prevent the graduation class from making an award at graduation to a controversial lawyer because of the financial consequences, is described in Worth 2003. The graduation award, involving student freedom, appeared to be a contributor to the Law School's Mission, but it was foregone because of its expected negative impact on the budget.

[10] The latter assumption, while broadly appealing, may not be valid. It would not be if, for example, systematically different geographic locations across hospitals of specific institutional forms were associated with systematically different health insurance payment structures to hospitals, so that a particular hospital service could be profitable when covered by insurance but not otherwise.

[11] It should be noted that the NDC does not preclude, let alone restrict, use of performance-based bonuses in general. What are restricted are payments tied to organization profitability.

[12] The long run goal is to distinguish between the influence on output of differential objective functions, and the influence of distinct constraints. If organizations of different institutional forms behaved differently only because constraints varied, while objective functions were the same, we would expect executives to be confronted with essentially the same conditional reward structures. For example, if both nonprofits and for-profits were profit maximizers—this being possible for nonprofits if enforcement of the nondistribution constraint (NDC) is sufficiently weak so that nonprofits could be modeled as "for-profit-firms-in-disguise" (Weisbrod 1988), then CEOs in both kinds of organizations would be presented with the same incentives and reward structures. Both would be rewarded for increasing profit. If, however, the NDC is at least partially enforced, reward structures would differ because nonprofit and governmental organizations would be required to compensate CEOs without basing compensation explicitly on profitability. Insofar as organization objective functions and managerial reward structures are linked, differential but unobserved objective functions can be inferred from observable reward structures.

Note that the NDC limits the rewarding of profit, but it does not limit a nonprofit organization from rewarding "performance" in other dimensions such as output quality, serving the poor, or engaging in basic research—all of which are, arguably, socially desirable but privately unprofitable. A bonus may be paid, lawfully, on the basis of any such variable. Thus, if organizations of one institutional form make less use of performance-based bonuses, that would imply that their CEOs were confronted not simply with different incentives but with weaker incentives to maximize provision of any observable behavior. Insofar as the maximand of profit is easier to observe and, hence, to reward, for-profit organizations would make greater use of bonus compensation if other forms of organization pursued broader, less-easily observable, goals.

[13] The model is one in which an indicator variable, $Y^* = \beta_1 + \beta_1 X + \beta_1 Z + \beta_1$, is calculated, and $Y = 1$ if $Y^* \geq 0$ and $Y = 0$ otherwise.

[14] The MSA size definitions are:
0: Non metropolitan area; 1:Under 100,000 population; 2: 100,000 to 250,000;
3: 250,000 to 500,000; 4: 500,000 to 1 million; 5: 1- 2.5 million; 6: over 2.5 million.

15 Wholey et. al.1997.

[16] For a limited analysis of differential fringe benefits among institutional forms of hospitals, but with only the presence or absence of a particular form of benefit being measured, not its value or cost, see Ballou and Weisbrod 2003.

[17] The number of admissions was also considered as an alternative measure of size. Results were little affected.

[18] Similar computations have been made for the population of all AHA hospitals, not simply those for which Hay data on CEO compensation are available. Patterns are broadly similar, but more of the estimated institutional-form coefficients are significant for the full sample. For example, in the Hay-sample hospitals, 19 services are significantly more likely to be provided at all three forms of nonprofit and governmental hospitals as compared with for-profit hospitals, *cet. par.*, while the same analysis for all AHA hospitals discloses 25 such services. Seventeen services are common to the two lists. Examples of those 17 services, for which findings are consistent across the entire AHA hospital group and the subset of Hay Group hospitals, and across ownership forms (religious nonprofit, secular nonprofit, and government), are emergency department, health sciences library, home health services, hospice, patient education, respite care, and speech therapy services. The focus of the present paper on the Hay-sample hospitals results from the goal of identifying the effects of CEO compensation variables, data for which are available only for the Hay sample of hospitals.

[19] The effects of the three compensation variables can be decomposed to determine the effect of each, under the assumption that each operates independently—an assumption that, however, is unlikely to be valid. The exclusion of Job Points, for example, thus redefining "compensation" to encompass only monetary compensation and its distribution between base salary and bonus, reduces the estimated effects of compensation variables by some 10 percent (not percentage points) for church nonprofits, but by generally more for secular nonprofit (about 20 percent), and for governmental hospitals (4-40 percent). Compare the bottom panels of tables 8-9. The importance of Job Points in accounting for behavioral differences compared with for-profits is especially great for Governmental hospitals.

[20] These estimates omit governmental hospitals because with the addition of the interaction terms there were insufficient observations for governmental hospitals that offered a bonus.

Table 1: Hospital services

Adult daycare program
General inpatient care for AIDS/ARC
Specialized outpatient program/AIDS
AIDS/ARC unit
Alcohol/chem dependency inpatient unit
Alcohol/chem dependency outpatient unit
Alzheimer's diagnostic/assessment service
Angioplasty
Arthritis treatment center
Hospital auxiliary
Blood bank
Birthing room/LDRP room
Burn care unit
Non-invasive cardiac assessment
Cardiac intensive care unit
Cardiac rehabilitation program
Cardiac catherization unit
Chronic obstrusive pulmonary services
Community health promotion
CT scanner
Diagnostic radioisotope facility
Emergency department
Emergency response (geriatric)
Emergency department social work services
Extracorporeal shock wave lithotripter
Fitness center
Genetic counseling/screen services
Geriatric acute care unit
Geriatric clinic
Comprehensive geriatric assessment
Hemodialysis
Histopathology laboratory
Health sciences library
Home health services
Hospice
Medical/surgical or other intensive care unit
Megavoltage radiation therapy
Magnetic resonance imaging
Neonatal intensive care unit
Obstetrics unit
Occupational health services
Open heart surgery
Organized outpatient department
Outpatient social work services
Outpatient surgery services
Orthopedic surgery
Occupational therapy services
Organ/tissue transplant
Patient education
Patient representation services
Pediatric inpatient unit
Psychiatric child/adolescent services
Psychiatric education services
Psychiatric emergency services
Psychiatric geriatric services
Psychiatric inpatient unit
Psychiatric consultation-liason services
Psychiatric outpatient services
Psychiatric partial hospitalization program
Physical therapy services
Radioactive implants
Recreational therapy services
Rehabilitation inpatient unit
Rehabilitation outpatient unit
Reproductive health services
Respite care
Respiratory therapy services
Senior membership program
Skilled nursing unit
Organized social work services
Speech therapy services
Single photon emission computerized tom.
Sports medicine clinic/services
Therapeutic radioisotope therapy
Trauma center
Ultrasound
Volunteer services department
Women's health center/services
Worksite health promotion
X-ray radiation therapy

Table 2: Summary statistics

	For-Profit	Government	Secular	Church
Beds (mean number)	163	306	276	271
	(82)	(217)	(181)	(155)
MSA size&	3.23	2.52	3.49	3.09
	(2.30)	(2.11)	(2.20)	(2.12)
Teaching hospital*	0.01	0.25	0.11	0.07
	(0.08)	(0.44)	(0.32)	(0.25)
1-HHI^	0.57	0.43	0.57	0.57
	(0.33)	(0.35)	(0.32)	(0.31)
HMO Penetration Rate	0.12	0.12	0.17	0.16
	(0.11)	(0.13)	(0.13)	(0.13)
Total compensation ($000)	146	132	152	148
	(62)	(56)	(59)	(53)
Job points	1229	1814	1640	1549
	(210)	(738)	(513)	(409)
Bonus/Base salary	0.42	0.04	0.07	0.05
	(0.31)	(0.11)	(0.10)	(0.10)
Number of hospitals	141	51	251	108
Number offering bonus	135	12	128	45

Standard Deviations in parentheses.

& Ranges from 0 to 6 representing from non-metropolitan area to areas with more than 2.5 million population

* This is a dummy variable for teaching hospitals. Thus, the mean numbers indicate the proportion of teaching hospitals.

^ HHI: Herfindahl Index

Table 3: Differences between for-profit (FP) and other—nonprofit (NP) and governmental—hospitals in services offered

Services equally likely to be offered by all types of hospitals *	***Services more likely to be offered by NP and governmental than by FP hospitals****	***Services more likely to be offered by two types of hospitals than by FP hospitals****	***Services more likely to be offered by only one type of hospital than by FP hospitals****
-1	-2	-3	-4
AIDS/ARC unit	Birthing room/LDRP room	**Church and secular**	**Church**
Arthritis treatment center	Emergency department	Adult daycare program	Alcohol/chem dep. outp. unit
Blood bank	Emerg. Dept. Soc. Work serv.	Cardiac rehabilitation prog.	Alz. Diag./assessm. serv.
Burn care unit	Emerg. response (geriatric)	Occupational therapy serv.	Organized outpatient dept.
Cardiac intensive care unit	Gen. inp. care for AIDS/ARC	Psychiatric education serv.	Psychiatric child/adol. serv.
Comp. Geriatric assesm.	Health sciences library	Recreational therapy serv.	Psychiatric outpatient serv.
CT scanner	Home health services	Trauma center	Rehabilitation inpatient unit
Diag. Radioisotope facility	Hospice	Worksite health promotion	
Fitness center	Hospital auxiliary		**Secular**
Genetic couns./screen serv.	Megavoltage radiation th.	**Church and government**	Hemodialysis
Geriatric acute care unit	Occupational health services	Community health promotion	Psychiatric geriatric services
Geriatric clinic	Outpatient social work serv.		Sports medicine clinic/serv.
Histopathology laboratory	Patient education	**Secular and government**	
Med./surg. Int. Care unit	Physical therapy services	Obstetrics unit	**Government**
Neonatal intensive care unit	Psyc. consultation-liason serv.	Organized social work serv.	Chronic obstrusive pulm. serv.
Non-inv. Cardiac assessment	Psychiatric emergency serv.	Pediatric inpatient unit	Magnetic resonance imaging
Orthopedic surgery	Rehabilitation outpatient unit	Single photon emission comp.	Spec. Outpatient prog./AIDS
Outpatient surgery	Respite care	Reproductive health serv.	
Patient representation serv.	Speech therapy services		***Services less likely to be offered by only one type of hospital than by FP hospitals****
Psychiatric inpatient unit		***Services less likely to be offered by two types of hospitals than by FP hospitals****	**Church**
Psychiatric partial hosp. prog.			Reproductive health services
Radioactive implants		**Church and secular**	
Respiratory therapy services	***Services less likely to be offered by NP and governmental than by FP hospitals****	Organ/tissue transplant	**Secular**
Skilled nursing unit			Cardiac catherization unit
Therapeutic radioisotope th.		**Secular and government**	Open heart surgery
Ultrasound		Senior membership program	
Volunteer services dept.	Angioplasty	Extracorporeal shock wave lith.	**Government**
Women's health center/serv.			Alc./chem dependency inp. unit
X-ray radiation therapy			

* At .10 significance level

Table 4: Effects of ownership form on service provision with and without compensation variables. Services for which nonprofit and governmental hospitals are not significantly different from for-profit hospitals when compensation variables are excluded (marginal probabilities calculated from probit estimates)

	Without compensation variables			With compensation variables		
	(1)	(2)	(3)	(4)	(5)	(6)
Services	**Church**	**Secular**	**Gov**	**Church**	**Secular**	**Gov**
AIDS/ARC unit	0.00	0.00	0.02	0.00	0.00	0.01
	(0.00)	(0.00)	(0.03)	(0.00)	(0.00)	(0.02)
Arthritis treatment	0.03	0.02	0.13	0.00	-0.01	0.08
center	(0.05)	(0.04)	(0.08)	(0.05)	(0.04)	(0.08)
Blood bank	-0.10	-0.04	-0.05	-0.05	0.00	0.02
	(0.06)	(0.05)	(0.08)	(0.07)	(0.06)	(0.08)
Burn care unit	0.00	0.00	0.01	0.02	0.01	0.03
	(0.02)	(0.01)	(0.03)	(0.03)	(0.02)	(0.06)
Cardiac intensive	-0.02	0.00	-0.08	-0.05	-0.03	-0.10
care unit	(0.06)	(0.06)	(0.07)	(0.07)	(0.07)	(0.07)
Comprehensive	0.03	0.05	0.00	0.01	0.04	-0.01
Geriatric assessment	(0.06)	(0.05)	(0.08)	(0.07)	(0.06)	(0.08)
CT scanner	0.00	0.00	0.01	0.00	-0.01	0.01
	(0.03)	(0.02)	(0.03)	(0.03)	(0.03)	(0.04)
Diagnostic	-0.01	0.01	0.03	-0.04	-0.03	0.00
Radioisotope facility	(0.04)	(0.03)	(0.05)	(0.05)	(0.04)	(0.06)
Fitness center	0.03	-0.01	-0.04	0.02	-0.05	-0.09
	(0.06)	(0.05)	(0.06)	(0.07)	(0.06)	(0.06)
Genetic counseling	0.04	0.05	0.11	0.00	0.00	0.00
/screening services	(0.05)	(0.04)	(0.09)	(0.04)	(0.04)	(0.05)
Geriatric acute	0.03	0.04	0.06	-0.02	0.00	0.02
care unit	(0.05)	(0.04)	(0.07)	(0.04)	(0.04)	(0.06)
Geriatric clinic	0.07	0.04	0.09	0.01	-0.01	0.00
	(0.05)	(0.03)	(0.08)	(0.04)	(0.03)	(0.04)
Histopathology	0.02	0.05	0.01	0.01	0.04	0.01
Laboratory	(0.04)	(0.03)	(0.05)	(0.05)	(0.04)	(0.06)
Medical/surgical or	0.01	0.01	0.01	0.01	0.01	0.00
other intensive care unit	(0.01)	(0.01)	(0.01)	(0.03)	(0.01)	(0.00)
Neonatal intensive	-0.03	0.00	0.10	0.02	0.01	0.03
care unit	(0.06)	(0.06)	(0.10)	(0.08)	(0.07)	(0.10)
Non-invasive	0.03	0.03	0.04	0.03	0.01	0.05
cardiac assessment	(0.04)	(0.04)	(0.05)	(0.05)	(0.05)	(0.05)
Orthopedic surgery	0.01	0.01	0.02	-0.01	-0.01	0.01
	(0.01)	(0.01)	(0.01)	(0.03)	(0.02)	(0.02)
Outpatient surgery	0.02	0.02	0.02	0.01	0.01	0.01
	(0.04)	(0.03)	(0.03)	(0.07)	(0.08)	(0.05)
Patient representation	0.02	0.02	0.07	-0.05	-0.07	0.01
	(0.06)	(0.05)	(0.08)	(0.08)	(0.07)	(0.09)
Psychiatric	0.02	0.01	0.10	-0.03	-0.05	0.08
inpatient unit	(0.07)	(0.06)	(0.10)	(0.09)	(0.08)	(0.11)
Psychiatric partial	0.10	0.02	0.00	0.08	-0.01	-0.02
hospitalization program	(0.07)	(0.05)	(0.07)	(0.08)	(0.06)	(0.08)
Radioactive implants	0.02	0.03	-0.07	-0.03	-0.05	-0.15
	(0.08)	(0.07)	(0.10)	(0.09)	(0.09)	(0.11)

Standard errors are in parentheses.

F test statistic for difference between secular nonprofit, religious nonprofit or public ownership types

***, **, and * indicate significance at 1%, 5%, and 10% levels respectively.

Log Number of beds, MSA Size, Teaching Hospital dummy, Competition (1-HHI), and HMO Penetration Rate were used in regressions but their coefficients are omitted here.

Table 4 (cont.): Effects of ownership form on service provision with and without compensation variables. Services for which nonprofit and governmental hospitals are not significantly different from for-profit hospitals when compensation variables are excluded (marginal probabilities calculated from probit estimates)

	Without compensation variables			With compensation variables		
	(1)	(2)	(3)	(4)	(5)	(6)
Services	**Church**	**Secular**	**Gov**	**Church**	**Secular**	**Gov**
Respiratory therapy services	-0.01	0.00	0.00	-0.01	-0.01	0.00
	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.00)
Skilled nursing unit	0.03	0.01	0.02	0.13	0.14 **	0.17
	(0.06)	(0.05)	(0.08)	(0.08)	(0.07)	(0.11)
Therapeutic radioisotope therapy	0.05	0.09	0.03	-0.07	-0.04	-0.08
	(0.08)	(0.07)	(0.11)	(0.09)	(0.09)	(0.11)
Ultrasound	0.00	0.01	-0.01	-0.03	-0.01	-0.02
	(0.02)	(0.02)	(0.03)	(0.03)	(0.02)	(0.04)
Volunteer services department	0.02	0.05	0.01	0.02	0.04	0.01
	(0.03)	(0.03)	(0.05)	(0.04)	(0.04)	(0.05)
Women's health center/services	-0.06	0.03	-0.04	-0.06	0.03	-0.04
	(0.07)	(0.06)	(0.09)	(0.08)	(0.07)	(0.10)
X-ray radiation therapy	0.08	0.03	0.00	-0.04	-0.10	-0.09
	(0.08)	(0.06)	(0.10)	(0.08)	(0.08)	(0.09)

Standard errors are in parentheses.

F test statistic for difference between secular nonprofit, religious nonprofit or public ownership types

***, **, and * indicate significance at 1%, 5%, and 10% levels respectively.

Log Number of beds, MSA Size, Teaching Hospital dummy, Competition (1-HHI), and HMO Penetration Rate were used in regressions but their coefficients are omitted here.

Table 5: Effects of ownership form on service provision with and without compensation variables. Services that all nonprofit and governmental hospitals are significantly more likely to provide than for-profit hospitals when compensation variables are omitted (marginal probabilities calculated from probit estimates)

	Without compensation variables			With compensation variables		
	(1)	(2)	(3)	(4)	(5)	(6)
Services	**Church**	**Secular**	**Gov**	**Church**	**Secular**	**Gov**
Birthing room	0.11 **	0.14 ***	0.12 **	0.07	0.09	0.06
/LDRP room	(0.04)	(0.04)	(0.05)	(0.06)	(0.06)	(0.07)
Emergency dept.	0.08 ***	0.07 ***	0.02 *	0.03	0.02	0.01
	(0.03)	(0.02)	(0.01)	(0.02)	(0.02)	(0.01)
Emergency dept.	0.37 ***	0.36 ***	0.28 ***	0.30 ***	0.25 ***	0.20 ***
social work services	(0.04)	(0.05)	(0.05)	(0.06)	(0.07)	(0.07)
Emergency response	0.32 ***	0.25 ***	0.19 **	0.17 *	0.11	0.05
(geriatric)	(0.07)	(0.06)	(0.09)	(0.09)	(0.08)	(0.11)
General inpatient care	0.11 ***	0.20 ***	0.13 ***	0.04	0.09 **	0.10 ***
for AIDS/ARC	(0.03)	(0.03)	(0.02)	(0.04)	(0.04)	(0.03)
Health sciences library	0.33 ***	0.36 ***	0.21 ***	0.23 ***	0.21 ***	0.08
	(0.04)	(0.05)	(0.06)	(0.07)	(0.07)	(0.10)
Home health services	0.46 ***	0.36 ***	0.38 ***	0.43 ***	0.31 ***	0.31 ***
	(0.06)	(0.06)	(0.08)	(0.08)	(0.08)	(0.10)
Hospice	0.47 ***	0.32 ***	0.38 ***	0.39 ***	0.24 ***	0.25 *
	(0.09)	(0.06)	(0.11)	(0.11)	(0.08)	(0.13)
Hospital auxiliary	0.16 ***	0.23 ***	0.13 ***	0.07 *	0.09 **	0.07
	(0.02)	(0.04)	(0.03)	(0.04)	(0.05)	(0.05)
Megavoltage radiation	0.16 *	0.15 **	0.19 *	0.04	0.03	0.08
therapy	(0.08)	(0.07)	(0.11)	(0.09)	(0.08)	(0.12)
Occupational health	0.15 **	0.17 ***	0.16 **	0.14 *	0.16 **	0.18 **
services	(0.06)	(0.05)	(0.07)	(0.07)	(0.07)	(0.08)
Outpatient social work	0.30 ***	0.27 ***	0.16 *	0.25 ***	0.20 ***	0.09
services	(0.05)	(0.06)	(0.08)	(0.07)	(0.07)	(0.10)
Patient education	0.03 **	0.04 **	0.03 **	0.02	0.03	0.02
	(0.01)	(0.02)	(0.01)	(0.02)	(0.02)	(0.02)
Physical therapy	0.09 ***	0.09 ***	0.08 ***	0.08 ***	0.06 **	0.07 ***
services	(0.02)	(0.03)	(0.02)	(0.02)	(0.03)	(0.02)
Psychiatric consultation	0.18 **	0.21 ***	0.14 *	0.12	0.14 *	0.07
-liason services	(0.07)	(0.06)	(0.10)	(0.09)	(0.08)	(0.12)
Psychiatric emergency	0.14 **	0.21 ***	0.25 ***	0.09	0.14 *	0.20 *
services	(0.07)	(0.06)	(0.09)	(0.09)	(0.08)	(0.11)
Rehabilitation outpatient	0.30 ***	0.27 ***	0.26 ***	0.17 **	0.09	0.16 *
unit	(0.05)	(0.05)	(0.05)	(0.07)	(0.07)	(0.08)
Respite care	0.17 **	0.15 ***	0.28 ***	0.15 *	0.14 **	0.26 **
	(0.07)	(0.04)	(0.10)	(0.08)	(0.06)	(0.12)
Speech therapy services	0.34 ***	0.32 ***	0.27 ***	0.33 ***	0.30 ***	0.24 ***
	(0.05)	(0.05)	(0.06)	(0.06)	(0.07)	(0.07)

Standard errors are in parentheses.

F test statistic for difference between secular nonprofit, religious nonprofit or public ownership types

***, **, and * indicate significance at 1%, 5%, and 10% levels respectively.

Log Number of beds, MSA Size, Teaching Hospital dummy, Competition (1-HHI), and HMO Penetration Rate were used in regressions but their coefficients are omitted here.

Table 6: Effects of ownership form on service provision with and without compensation variables. Services that some, but not all, of the ownership forms are significantly more likely to provide than for-profit hospitals when compensation variables are omitted (marginal probabilities calculated from probit estimates)

	Without compensation variables			With compensation variables		
	(1)	(2)	(3)	(4)	(5)	(6)
Services	**Church**	**Secular**	**Gov**	**Church**	**Secular**	**Gov**
Adult daycare program	0.16 *	0.13 ***	0.16	0.13	0.12 **	0.16
	(0.09)	(0.05)	(0.12)	(0.09)	(0.05)	(0.13)
Alcohol/chem dependency	0.24 ***	0.06	-0.05	0.21 **	0.03	-0.08
outpatient unit	(0.07)	(0.06)	(0.08)	(0.09)	(0.07)	(0.08)
Alzheimer's diagnostic/	0.12 *	0.06	0.07	0.09	0.03	0.06
assessment service	(0.07)	(0.04)	(0.08)	(0.07)	(0.05)	(0.08)
Chronic obstrusive	0.02	0.03	0.10 **	-0.01	-0.01	0.09 *
pulmonary services	(0.05)	(0.04)	(0.04)	(0.06)	(0.05)	(0.05)
Cardiac rehabilitation	0.18 ***	0.11 *	0.10	0.06	-0.04	-0.02
program	(0.06)	(0.06)	(0.08)	(0.08)	(0.08)	(0.11)
Community health	0.04 **	-0.01	0.05 *	0.04 *	-0.01	0.04
promotion	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)	(0.03)
Hemodialysis	-0.02	0.12 *	0.10	-0.02	0.10	0.05
	(0.07)	(0.06)	(0.10)	(0.09)	(0.08)	(0.12)
Magnetic resonance	0.09	0.05	0.18 *	0.03	-0.04	0.06
imaging	(0.07)	(0.06)	(0.10)	(0.09)	(0.08)	(0.11)
Obstetrics unit	0.06	0.13 ***	0.11 **	0.04	0.10 **	0.07
	(0.04)	(0.04)	(0.05)	(0.05)	(0.05)	(0.06)
Occupational therapy	0.10 **	0.12 **	0.09	0.12 **	0.13 **	0.11 *
services	(0.05)	(0.05)	(0.06)	(0.05)	(0.06)	(0.06)
Organized outpatient	0.06 **	-0.01	0.01	0.04	-0.05	0.00
department	(0.03)	(0.03)	(0.05)	(0.04)	(0.04)	(0.05)
Organized social work	0.02	0.06 ***	0.04 ***	0.02	0.05 **	0.04 ***
services	(0.02)	(0.02)	(0.01)	(0.02)	(0.02)	(0.01)
Pediatric inpatient	0.09	0.18 ***	0.27 ***	0.06	0.13 *	0.24 ***
unit	(0.06)	(0.05)	(0.06)	(0.08)	(0.07)	(0.07)
Psychiatric child/	0.14 *	0.07	0.12	0.06	-0.01	0.03
adolescent services	(0.07)	(0.06)	(0.10)	(0.08)	(0.07)	(0.10)
Psychiatric education	0.19 **	0.14 **	0.10	0.19 **	0.13	0.10
services	(0.08)	(0.06)	(0.10)	(0.09)	(0.08)	(0.11)
Psychiatric geriatric	0.10	0.14 **	0.09	-0.01	0.04	0.00
services	(0.08)	(0.06)	(0.10)	(0.08)	(0.08)	(0.10)

Standard errors are in parentheses.

F test statistic for difference between secular nonprofit, religious nonprofit or public ownership types

***, **, and * indicate significance at 1%, 5%, and 10% levels respectively.

Log Number of beds, MSA Size, Teaching Hospital dummy, Competition (1-HHI), and HMO Penetration Rate were used in regressions but their coefficients are omitted here.

Table 6 (cont.): Effects of ownership form on service provision with and without compensation variables. Services that some, but not all, of the ownership forms are significantly more likely to provide than for-profit hospitals when compensation variables are omitted (marginal probabilities calculated from probit estimates)

	Without compensation variables			With compensation variables		
	(1)	(2)	(3)	(4)	(5)	(6)
Services	**Church**	**Secular**	**Gov**	**Church**	**Secular**	**Gov**
Psychiatric outpatient services	0.14 *	0.08	0.00	0.14	0.07	0.00
	(0.07)	(0.06)	(0.08)	(0.09)	(0.07)	(0.10)
Recreational therapy services	0.16 **	0.19 ***	0.13	0.19 **	0.21 ***	0.14
	(0.07)	(0.06)	(0.10)	(0.09)	(0.08)	(0.11)
Rehabilitation inpatient unit	0.15 **	0.06	0.09	0.18 *	0.05	0.05
	(0.07)	(0.05)	(0.09)	(0.09)	(0.07)	(0.10)
Reproductive health services	-0.26 ***	0.23 ***	0.23 ***	-0.29 ***	0.18 **	0.19 *
	(0.07)	(0.06)	(0.08)	(0.08)	(0.08)	(0.10)
Single photon emission computerized tomography	0.06	0.13 **	0.27 ***	-0.11	-0.07	0.02
	(0.07)	(0.06)	(0.09)	(0.07)	(0.07)	(0.10)
Specialized outpatient program/AIDS	0.04	0.04	0.19 *	0.01	0.00	0.07
	(0.05)	(0.03)	(0.10)	(0.04)	(0.03)	(0.08)
Sports medicine clinic/ services	0.08	0.10 *	0.12	0.16 *	0.16 **	0.20 *
	(0.07)	(0.05)	(0.09)	(0.09)	(0.07)	(0.11)
Trauma center	0.15 **	0.13 **	0.10	0.15 *	0.09	0.06
	(0.07)	(0.05)	(0.09)	(0.09)	(0.07)	(0.10)
Worksite health promotion	0.25 ***	0.25 ***	0.05	0.18 ***	0.16 **	-0.03
	(0.05)	(0.05)	(0.08)	(0.07)	(0.07)	(0.10)

Standard errors are in parentheses.

F test statistic for difference between secular nonprofit, religious nonprofit or public ownership types

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Log Number of beds, MSA Size, Teaching Hospital dummy, Competition (1-HHI), and HMO Penetration Rate were used in regressions but their coefficients are omitted here.

Table 7: Effects of ownership form on service provision with and without compensation variables. Services that at least one of the ownership forms is significantly less likely to providei it than is a for-profit hospital, when compensation variables are omitted (marginal probabilities calculated from probit estimates)

	Without compensation variables			With compensation variables		
	(1)	(2)	(3)	(4)	(5)	(6)
Services	**Church**	**Secular**	**Gov**	**Church**	**Secular**	**Gov**
Alcohol/chem dependency	0.10	-0.02	-0.15 ***	0.16 *	0.03	-0.11 *
inpatient unit	(0.06)	(0.05)	(0.05)	(0.08)	(0.06)	(0.06)
Angioplasty	-0.13 **	-0.25 ***	-0.18 ***	-0.15 **	-0.33 ***	-0.25 ***
	(0.06)	(0.06)	(0.06)	(0.07)	(0.07)	(0.05)
Cardiac catherization	-0.13	-0.19 ***	-0.10	-0.10	-0.20 **	-0.08
unit	(0.08)	(0.07)	(0.12)	(0.10)	(0.09)	(0.14)
Extracorporeal shock	-0.04	-0.10 ***	-0.08 ***	-0.05	-0.12 ***	-0.10 ***
wave lithotripter	(0.03)	(0.04)	(0.03)	(0.04)	(0.04)	(0.02)
Open heart surgery	-0.04	-0.15 ***	-0.05	-0.05	-0.21 ***	-0.12 ***
	(0.05)	(0.05)	(0.07)	(0.06)	(0.06)	(0.04)
Organ/tissue transplant	-0.08 ***	-0.10 **	-0.06	-0.08 **	-0.11 **	-0.08 **
	(0.03)	(0.04)	(0.04)	(0.04)	(0.05)	(0.03)
Reproductive health	-0.26 ***	0.23 ***	0.23 ***	-0.29 ***	0.18 **	0.19 *
services	(0.07)	(0.06)	(0.08)	(0.08)	(0.08)	(0.10)
Senior membership	0.08	-0.12 **	-0.16 **	0.03	-0.17 **	-0.22 ***
program	(0.07)	(0.06)	(0.08)	(0.08)	(0.07)	(0.08)

Standard errors are in parentheses.

F test statistic for difference between secular nonprofit, religious nonprofit or public ownership types

***, **, and * indicate significance at 1%, 5%, and 10% levels respectively.

Log Number of beds, MSA Size, Teaching Hospital dummy, Competition (1-HHI), and HMO Penetration Rate were used in regressions but their coefficients are omitted here.

Table 8: Effect of compensation variables on institutional form coefficients

	Church	Secular	Gov
Number of observations where institutional form coefficients are significant when compensation measures are omited but insignificant when compensation measures are included	12	12	13
Average percent decrease in coefficient value for those observations	41	57	54
Number of observations where institutional form coefficients are significant when compensation measures are omitted but lower when compensation measures are included	15	19	13
Average percent decrease in coefficient value for those observations	21	27	20
Number of observations where institutional form coefficients are significant when compensation measures are omitted and higher when compensation measures are included	6	3	2

Average Percentage Decrease in Institutional Form Coefficients When Compensation Variables are Included

When coefficients are counted at their estimated values regardless of statistical significance	25	35	34
When statistically insignificant coefficients are counted as zero*	45	50	56

Note: Coefficients on the institutional form dummy variables refer to differences from for-profit hospitals in the probability of offering a particular service, with and without compensation measures included in the regression. Coefficients on institutional forms can be interpreted as differences from for-profit hospital in the probability of offering that specific service, at the mean level of other independent variables.

* This procedure implies that an institutional form coefficient that was estimated to become statistically insignificant when compensation variables were included as regressors in the estimation, decreased by 100 percent.

Table 9: Effect of compensation variables on institutional form coefficients (job points not included)

	Church	Secular	Gov
Number of observations where institutional form coefficients are significant when compensation measures are omited but insignificant when compensation measures are included	10	10	13
Average percent decrease in coefficient value for those observations	41	59	33
Number of observations where institutional form coefficients are significant when compensation measures are omitted but lower when compensation measures are included	15	17	10
Average percent decrease in coefficient value for those observations	24	20	12
Number of observations where institutional form coefficients are significant when compensation measures are omitted and higher when compensation measures are included	8	7	5

Average Percentage Decrease in Institutional Form Coefficients When Compensation Variables are Included

When coefficients are counted at their estimated values regardless of statistical significance	23	27	20
When statistically insignificant coefficients are counted as zero*	41	39	54

Note: Coefficients on the institutional form dummy variables refer to differences from for-profit hospitals in the probability of offering a particular service, with and without compensation measures included in the regression. Coefficients on institutional forms can be interpreted as differences from for-profit hospital in the probability of offering that specific service, at the mean level of other independent variables.

* This procedure implies that an institutional form coefficient that was estimated to become statistically insignificant when compensation variables were included as regressors in the estimation, decreased by 100 percent.