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Abstract

This paper examines the incentives of CEOs in a large sample of nonprofit hospitals. The evidence suggests that the relations between financial performance (return on assets) and CEO turnover and compensation are as strong in nonprofit hospitals as in for-profit hospitals and other for-profit corporations. We find little evidence that nonprofit hospitals provide explicit incentives for their CEOs to focus on altruistic activities. The results add to the collective evidence that there is little distinction between the behaviors of nonprofit and for-profit hospitals. We provide some evidence that these similarities are due to competition in the marketplace, not identical objective functions.

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Brickley-Van Horn

1 INTRODUCTION

Nonprofit organizations are an important sector of the U.S. economy.[1] The number of nonprofits has more than tripled over the past 30 years from just over 300,000 in 1967 to nearly 1,000,000 organizations in 1998. Between 1980 and 1990 paid employment in the nonprofit sector grew by 41 percent, more than double the overall national employment growth rate. In 1990, total revenue from nonprofit organizations exceeded 10 percent of GNP. Nonprofit organizations play particularly important roles in health care, education, social services, and the arts. They are also a prominent feature in many other countries (Salamon and Anheier (1996)).

Despite the importance of nonprofit organizations in the economy little is known about the incentives within these organizations. There are at least two related unanswered questions that are particularly important.

First what are the objectives of the boards of directors of nonprofit organizations? Do they really pursue the social objectives that are used to justify their tax-exempt status (as assumed in Newhouse (1970)) or do they focus on other objectives? For example, some observers have argued that reduced donations, increased dependence on commercial revenues, and increased competition have blurred the distinction between nonprofit and for-profit organizations (Weisbrod (1998)). Others (e.g., Pauly and Redisch (1973)) argue that

[1] The following statistics are from Weisbrod (1998) who summarizes a variety of studies that rely on IRS data as the primary source. These numbers understate the magnitude of nonprofit organizations in the United States since they do not include many religious organizations that are not required to file with the IRS.

nonprofit organizations seek to maximize the incomes of particular constituencies, such as physicians in nonprofit hospitals.

Second, do boards of directors of nonprofit organizations provide sufficient incentives to professional managers to achieve the board's objectives? Nonprofit organizations do not have owners who are legally entitled to the residual claims. Thus in contrast to for-profit organizations, there is the lack of high-powered ownership incentives, no external market for corporate control, and no derivative lawsuits. Additionally, given their presumably complex objective functions and hard to observe outputs, it is difficult to measure performance and to write meaningful incentive contracts (Dixit (1999) and Holmstrom and Milgrom (1991)). Some argue that these factors lead to significant agency problems in most nonprofit organizations.[2] Others argue that independent boards of directors, who represent donors and other important constituencies, provide meaningful control over professional managers (Fama and Jensen (1983a, 1983b)).

This study provides new evidence on these issues by examining the chief executive officer's (CEO) incentives in nonprofit hospitals. The empirical strategy is to estimate the relations between CEO turnover/compensation and various financial and nonfinancial performance measures.[3] Documenting significant relations between various performance measures and CEO turnover/compensation is consistent with the joint hypothesis that the boards of nonprofit hospitals care about these performance objectives and provide corresponding incentives to managers. As a benchmark, we compare CEO incentives in

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[2] For example, see Herzlinger (1996) The level of executive pay in nonprofit organizations (a potential sign of agency problems) is frequently criticized, e.g., see Havermann (1998) and Singletary (1993).

[3] Authors following a similar strategy in the empirical literature on for-profit firms include Blackwell, Brickley, and Weisbach (1994), Jensen and Murphy (1990), Murphy (1985), Warner, Watts, and Wruck (1988) and Weisbach (1988).

nonprofit hospitals with CEO incentives in a similar sample of for-profit hospitals and in publicly-traded firms from other industries (as reported in existing research).

Our principal findings are as follows. The evidence provides strong support for the hypothesis that nonprofit hospital boards care about profit (as measured by return on assets) and provide corresponding incentives to CEOs. The marginal incentives for increasing profits from threat of turnover and annual salary adjustments appear as strong in nonprofit hospitals as in for-profit organizations (ignoring stock option and ownership plans). We find little evidence that nonprofit boards provide explicit incentives to CEOs to focus on altruistic activities. The results add to the collective evidence that for-profit and nonprofit hospitals are similar in many dimensions. We provide some preliminary evidence that these similarities are due to competition in the marketplace, not similarities in the underlying objective functions of the boards.

There are at least two important caveats in interpreting evidence on the lack of altruistic incentives in nonprofit organizations. First, it is difficult to distinguish empirically among alternative models of the board's underlying objective function based on observed actions, such as the choice of compensation plans (Pauly (1987)). For instance, our theoretical analysis suggests that altruistic boards can find it optimal to provide low explicit incentives for altruism when their CEOs intrinsically care about these activities (to provide balanced incentives). Thus the observation that nonprofit CEOs do not have explicit incentives to provide altruism does not necessarily imply that nonprofit boards do not value altruism. Second, it is generally difficult to measure altruistic outputs and thus the tests in this and other studies potentially lack power in determining their importance.

Our study focuses solely on hospitals. There are many other types of nonprofit organizations (e.g., universities, social service agencies, charitable foundations, museums,

orchestras, and so on).[4] Significant work remains to develop a deeper understanding of the incentives in the broader set of nonprofit organizations. Nevertheless, based on revenues and employment, the health care sector is the most important component of the nonprofit sector and hospitals are the most important component of the health care sector.[5] Indeed the hospital sector is so large that it is important and interesting in its own right.

The paper is organized as follows: Section 2 reviews prior empirical work on incentives in the nonprofit sector; Section 3 presents a simple model that provides a framework for interpreting our results; Section 4 describes the sample; Section 5 contains the empirical results; Section 6 summarizes the findings and implications.

2 REVIEW OF PRIOR EMPIRICAL WORK

Given the importance of the nonprofit sector, there is surprisingly little empirical work on the incentives in nonprofit organizations. We are aware of five prior/contemporaneous papers on the topic.

Roomkin and Weisbrod (1999) compare the compensation of key employees in nonprofit and for-profit hospitals using a 1992 sample from a survey conducted by Hay Management Consultants. They find significant differences in the form of the pay contract between the two types of organizations. Most significantly, the compensation contracts of for-profit managers are more likely to include explicit performance-based bonuses. Survey data also suggests that when nonprofits pay performance-based bonuses they are more likely to use nonfinancial performance criteria than for-profits. One interpretation is that the

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[4] Hansmann (1987) classifies nonprofit organizations as donative or commercial and as mutual or entrepreneurial. Hospitals are a leading example of a commercial/entrepreneurial enterprise — the primary revenue is from selling marketable services (not donations) and the board of directors is self-perpetuating (rather than being elected by members of the organization).

underlying objectives of for-profits and nonprofit organizations are different — nonprofit organizations have a broader set of objectives than just maximizing profit. In addition, the pursuit of non-profit objectives may be more difficult to quantify and contract upon. Thus there are fewer explicit incentives in nonprofit organizations.

While the Roomkin and Weisbrod study provides a useful starting point, the results are relatively inconclusive. Nonprofit organizations are legally precluded from paying bonuses based solely on financial profit. Doing so implies that, in contrast to the legal definition of a nonprofit organization, the organization has a residual claimant. Thus if these organizations are interested in maximizing profit they are likely to search for alternative ways to motivate managers. They also have incentives to lie on surveys about their criteria for managerial bonuses. We examine two potential incentive devices that hospital boards might use in lieu of bonus payments: firing managers for poor performance and tying annual compensation adjustments to performance. Our experiment allows us to ascertain what factors nonprofit boards *actually consider* when making these choices versus what they say they do on a survey.

Edlendburg, et al (1999) analyze the governance structures of California hospitals. While their primary focus is on board structure, they present some evidence on CEO turnover. Their evidence is mixed, but suggests that different types of hospitals (e.g., government, religious, for-profit, and nonprofit) use different criteria in evaluating their CEOs. Interestingly, financial performance appears to be the most significant variable in explaining CEO turnover in nonprofit hospitals (relative to administrative expenses and uncompensated care).

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[5] Salamon (1999) reports that the health care sector absorbed close to 60 percent of all nonprofit revenues in 1996 and over 25 percent of all charitable contributions. Hospital care, with about 35% of the of total health care revenue, was the most important component in this sector.

Baber, Daniel and Roberts (1999) and Hallock (1998) use IRS 990 data to examine managerial compensation in a broad set of nonprofit organizations. Baber, et al using a sample of 271 charitable organizations, find that changes in top manager pay is related to changes in direct revenue to the organization's philanthropic objective. This finding suggests that managers have incentives to focus on these objectives and that accounting measures are used in assessing their performance. Hallock finds that the results of tying pay of nonprofit heads to performance in his sample are "not particularly robust."

Finally, Leone and Van Horn (1999) examine the role of earnings in nonprofit hospitals and the incentives of CEOs to engage in earnings management. They find that nonprofit CEOs manage reported earnings both upward and downward toward a target just above zero, and attribute these results to CEO career concerns, tax-exempt restrictions, and debt costs. Their empirical results support the importance of financial performance in nonprofit hospitals and resulting CEO behavior to manipulate reported earnings.

3 MODEL OF CEO INCENTIVES IN HOSPITALS

Without a theoretical framework it is difficult to interpret empirical evidence on the incentives in nonprofit organizations. This section provides a simple model of incentives in nonprofit hospitals based on the multitask principal/agent framework of Holmstrom and Milgrom (1991). We begin by specifying the preferences and actions of the CEO and the objectives of non-profit and for-profit hospital boards. Next we compare the "optimal" incentive-based contracts for CEOs in these organizations. Subsequently, we examine a number of extensions and summarize the empirical implications.

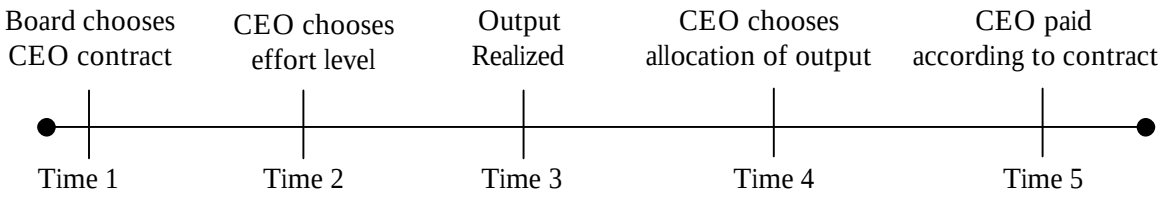
3.1 Basic Setup

Figure 1 displays the timing in our model. The hospital's board of directors first chooses a compensation plan for the chief executive officer (CEO). Subsequently, the CEO chooses his effort level; output is realized; the CEO chooses how to divide this output between reported profits and expenditures on altruistic objectives (such as charity care); the CEO is paid according to the contract (which can include profit and altruistic incentives).

The CEO is averse to both effort and risk. The CEO exerts effort, e, working at the hospital at a personal cost = $\frac{1}{2} ce^2$. The output of the hospital, Q, is given by $Q = e + \varepsilon_1$, where ε_1, is a normally distributed disturbance term with a zero mean and variance, v_1. The CEO has a negative exponential utility function, $U = -\exp[-r(w-\frac{1}{2} ce^2)]$, where w = the CEO's compensation and r = the CEO's coefficient of constant absolute risk aversion. When output is realized, the CEO chooses whether to report it as profits, π, or to expend part of it on another activity, Z, such as increased quantity of services, higher quality, or uncompensated care. Aside from the formal compensation plan, the CEO cannot capture any part of Q as increased personal income or perquisites. He also is unable to mislead the board through misreporting or fraud. A dollar spent on Z, reduces profits by a dollar: $Q = \pi + Z$.

The CEO observes Q, while the board cannot. After the CEO divides Q into π and Z, the board observes π without error since it is reported in audited financial statements. It is also able to make inferences about Z from the financial reports and monitoring. While, it cannot observe Z precisely, it is able to form an unbiased estimate of Z, $z = Z + \varepsilon_2$, where ε_2

Figure 1
Sequence of choices by board and CEO



is a normally distributed measurement error with a zero mean and variance, v_2.[6] Since the output and measurement errors are likely to be independent, we assume $Cov(\varepsilon_1, \varepsilon_2) = 0$. Both π and z are contractible and can be used in the CEO's compensation contract.

Even nonprofit boards are likely to value profits since they provide funds for investment, future philanthropic activities, perquisites, empire building, and so on.[7] It is commonly asserted that these boards also care about other factors, such as the quantity and quality of services, providing services to the medically indigent, prestige of the organization, and the incomes of particular constituencies (e.g., physicians). Indeed, the tax and legal privileges of nonprofit hospitals are typically justified by their alleged social objectives (e.g., providing charity care). Based on these considerations, we allow for hospital boards to care about both profits, π, and *Z*. For expositional purposes, we treat *Z* as a scalar and refer to it as "altruism." For any given output Q', the board has some allocation, π^*, Z^* that it views as optimal. The indirect utility function of the board, assuming the optimal allocation between π and *Z*, is $V = E(Q - w)$, the expectation of total output minus the CEO's compensation. We make the standard assumption that boards of for-profit hospitals care

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[6]Financial reports allow the board to draw some inferences about altruism. However, the information is not perfect. For example, under current accounting policies nonprofit managers report the amount of charity care in a footnote to the financial statements. However, the reported figure is somewhat arbitrary and subject to error (for example it depends on the prices managers use to value the services). Another social activity involves extending credit to financially troubled individuals (beyond the profit maximizing amount). This decision ultimately shows up as increased bad debt expense. However, it is not always easy for the board to separate charitable credit decisions from poor credit decisions or poor debt collection policies. The estimated expenses for activities such as community education are also reported in the footnotes to financial statements and are also subject to error.

[7] The term nonprofit does not mean that the organization cannot make a profit. It means that there is no owner who has rights to the residual profits. Profits in nonprofit organizations are called net surplus and are often a major source of funds for new capital investment (see Hoerger (1995)) Also surpluses retained in liquid assets provide a cushion against future negative operating performance. If a nonprofit organization earns very high profits, it might attract the attention of the IRS or make it less likely that patrons will donate to the organization. The possibility that the board values marginal profits negatively when profits are sufficiently high is allowed in our model and examined in our empirical work.

only about profits. Their objective function is the special case, V = E(π - w). Both types of boards are risk neutral in our basic model.

The CEO is compensated on reported profits and estimated Z (z) through a simple linear contract of the form:[8]

$$w = a + B_1 p + B_2 z \tag{1}$$

The board chooses the compensation contract to maximize joint surplus (combined certainty equivalent) subject to the CEO's participation and incentive compatibility constraints. The surplus can be shared in any manner through the appropriate transfer payments (a in the CEO's compensation contract). We assume that the board has sufficient cash reserves to pay the CEO his full compensation should he allocate all the output to Z and that the CEO faces no binding wealth constraint (for instance, the solution to the problem is within the range that does not require large initial wealth by the CEO).

3.2 Benchmark Case

Given the CEO's exponential utility function and linear compensation contract, the CEO has a certainty equivalent, CE, of:

$$CE = a + B_1 E(p) + B_2 E(z) - \tfrac{1}{2} c e^2 - \tfrac{1}{2} r \left(\sum_i B_i^2 v_i \right) \tag{2}$$

The CEO's certainty equivalent is the expected wage less the private cost of effort and a risk premium. Recalling that the expected output, E(Q), is equal to the effort exerted by the CEO, e, suppose the CEO expects to divide this output into π = (e – Z) and Z. Equation (2) can then be rewritten as:

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[8] Linear contracts are used in Holmstrom/Milgrom (1991), as well as in subsequent related literature, and have theoretical justification in Holmstrom/Milgrom (1987).

$$CE = a + B_1 E(e - Z) + B_2(Z) - \tfrac{1}{2}e^2 - \tfrac{1}{2}r\left(\sum_i B_i^2 v_i\right)$$
$$= a + B_1 e + (B_2 - B_1)Z - \tfrac{1}{2}e^2 - \tfrac{1}{2}r\left(\sum_i B_i^2 v_i\right) \qquad (3)$$

Equation (3) indicates that for any given effort level, whenever $B_1 > B_2$, the CEO will report all output as profits and provide no altruism. Conversely, when $B_2 > B_1$, the CEO will devote all output to altruism and report no profits. Thus, if the board wants positive amounts of both profits and altruism, it must set $B_1 = B_2$. This result is a version of what Milgrom/Roberts (1992) call the "equal compensation principle." With equal coefficients, the CEO is indifferent among alternative allocations of output. We assume that in this situation, the CEO will follow the board's instructions on how to allocate output. For example, if the board gives the CEO a schedule that indicates how he should allocate output between reported profits and altruism at different levels of output, there is no reason for the CEO to ignore this request. Indeed if the CEO thinks that the board might ultimately discover the actual expenditures on Z, he would have positive incentives to comply with the request (such concerns are outside the model). The board might want varying fractions of output to be spent on altruism as output changes. For example, if output is low the board might want most of the output reported as profits to help finance its basic investment; when output is high it might want a large fraction spent on altruism.

The optimal incentive coefficients in this environment are:[9]

$$B_1 = B_2 = \frac{1}{(1 + rc(v_1 + v_2))} \qquad (4)$$

[9] This expression is found by maximizing the combined certainty equivalent of the board and the CEO with respect to e after substituting $B_1 = B_2$ from the equal compensation principle and $ce = B_1$ (from the CEO's incentive compatibility constraint). See Milgrom/Roberts (1992), pp. 222-223.

The board uses higher incentives when the risk aversion of the CEO, the second derivative of the cost function (c), and the variances of the output and measurement errors are low. The risk aversion and variance effects reflect the costs of shifting risk from a risk neutral board to a risk averse CEO through the incentive compensation contract. The second derivative of the cost function relates to the benefits of increased incentives — fewer benefits are realized when the marginal cost of effort is steep since the CEO is less responsive to increased incentives. The straight salary, *a*, is chosen to meet the CEO's participation constraint (reservation utility).

The boards of for-profit hospitals care only about net profits in our model. For them, it is optimal to set B_2, the coefficient on z, equal to zero.[10] Since the optimal contract does not expose the CEO to the measurement error for Z, the optimal profit incentives, B_1, will be higher in for-profit than in nonprofit hospitals (*ceterus paribus*) — as indicated by setting $v_2 = 0$ in equation (4).

As in Holmstrom and Milgrom (1991), if the board is interested in multiple activities but cannot measure some of them (i.e., v_2 is large), it can be optimal to pay the CEO a straight salary. Direct monitoring can be used to motivate some minimal work effort. While the employee will not have very strong incentives to exert effort, he will have no obvious incentive to provide an unbalanced work effort. Roomkin and Weisbrod (1999) in their investigation of hospital CEOs essentially assume that the cost of measuring Z is very high and thus predict low incentives in nonprofit hospitals.

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[10]A zero weight is optimal since neither the for-profit board nor the CEO value altruism (in the benchmark case) and the measure is uninformative about effort (recall, $Cov(\varepsilon_1, \varepsilon_2) = 0$). In a multi-period setting, investment in altruism might produce future profits (for example, by creating good will). We ignore this consideration.

3.3 Extensions

The benchmark case predicts that profit incentives (B_1) will be lower in nonprofit organizations than in for-profit organizations. However, the difference does not have to be large depending on how precisely Z can be measured. The analysis further suggests that nonprofit CEOs will have higher explicit incentives than for-profit CEOs to focus on altruism ($B_2^{nonprofit} = B_1^{nonprofit} \geq B_2^{profit} = 0$). As we discuss below, several factors can work to reinforce or offset these predictions.

3.3.1 Altruistic Managers

There is some evidence that nonprofit organizations attract employees who derive utility from providing philanthropic services (Rawls, Ullrich, and Nelson (1975) and Weisbrod (1983)). In this case, there is a natural incentive for the CEOs of nonprofit hospitals to provide altruism that must be taken into account in designing the compensation scheme.

Suppose the CEO of a nonprofit hospital receives a dollar equivalent, B_3Z, of additional utility from providing altruism.[11] Adding this term to equation (3), implies that the board must now set $B_2 = (B_1 - B_3)$ to motivate the CEO to provide positive amounts of both altruism and profits. In contrast if $B_2 = B_1$, the CEO will use all the output to provide altruism. Interestingly, with altruistically-motivated CEOs, the explicit incentives in nonprofit organizations might actually focus more on profits than measures of altruism even if the board obtains significant utility from altruism (to restore balanced incentives). If B_3 is sufficiently large the board might even place a negative weight on altruism in the CEO's

[11] The CEOs might also care about profits since they may be used to provide future altruism. All that is necessary for our analysis is that the CEO obtains more utility from altruism during the current period than from profits. For instance, he might care more about altruism while he is CEO rather than future altruism provided during the tenure of other CEOs.

compensation plan. In contrast to Roomkin and Weisbrod (1999), our analysis suggests that altruistic boards might want to provide strong profit incentives to the CEO to offset intrinsic incentives even if they can't measure Z.

3.3.2 Differential Risk Aversion

It is possible that the two hospital sectors attract different types of CEOs in terms of risk aversion. For example, in our sample, the rate of CEO turnover is significantly higher in for-profit hospitals than in nonprofit hospitals. If being a CEO in the for-profit sector is perceived as riskier than being a CEO in the nonprofit sector, the for-profit sector will have to pay a compensating differential and will tend to attract less risk-averse CEOs. Equation (4) suggests that this effect will promote weaker incentives in the nonprofit sector.

Dixit (1999) argues that the assumption of risk neutrality is potentially less appropriate for a nonprofit board than for a for-profit board, since the risks of bad outcomes facing local nonprofit agencies are not easily diversified through capital markets. Increasing the risk aversion of the board promotes higher optimal incentive coefficients for the CEO due to risk sharing considerations. If Dixit's contention is correct, board risk aversion will work to increase the incentive coefficients for the CEOs in nonprofit organizations relative to for-profit organizations.

3.3.3 Career Concerns

Organizations can provide lower explicit incentives in the compensation plan when managers are concerned about how current performance affects their external labor market opportunities (Gibbons/Murphy (1992)). While career concerns might lower the explicit incentives in both for-profit and nonprofit hospitals, there can also be differential effects. For example, if career concerns are relatively more important in for-profit settings, these concerns will work to lower explicit incentives in for-profit relative to nonprofit hospitals.

3.3.4 Ineffective Boards

We assume that the boards of directors take an active role in choosing the compensation contract and monitoring output. Others argue that nonprofit organizations tend to be "captured" by professional managers and that incentives in these organizations are not very effective (e.g., Herzlinger (1996)). This argument suggests that CEOs will not be fired for poor performance (e.g., failure to breakeven) and will capture most of the rents in the organization (e.g., through higher salaries).

3.4 Implications of Model and Overview of the Results

Our model allows nonprofit hospital boards to care about both profits and altruism. Figure 2 compares the predictions from this model for four different underlying objective functions: 1) nonprofit boards care about both profits and altruism (balance incentives), 2) nonprofit boards only value profits, 3) nonprofit boards only value altruism, and 4) nonprofit boards don't value either profits or altruism (for instance they are ineffective and take little interest in the organization). The balanced incentive model is divided into the benchmark model and the extended model, which allows for altruistic CEOs, differential risk aversion, and career concerns.

In our empirical analysis, we estimate B_1 and B_2 for nonprofit boards by regressing CEO turnover/compensation on profits and measures of altruism. Our evidence is consistent with the hypotheses that $B_1^{nonprofit} = B_1^{profit} > 0$ and $B_2 = 0$. These findings allow us to reject the two models that assume boards of nonprofit organizations do not care about positive profits (they predict $B_1 = 0$) and the benchmark model that predicts that the profit incentives will be higher in for-profit organizations. The findings fail to distinguish between the extended version of the balanced-incentive model and profit maximization model. The profit maximization model specifically predicts that $B_1^{nonprofit} = B_1^{profit} > 0$ and $B_2 = 0$, while

Figure 2
Incentives in Nonprofit Hospitals

The table presents the empirical predictions from the theoretical model based on whether the nonprofit hospital board values profits and / or altruism. The coefficient B_1 corresponds to the profit incentive parameter in the CEO's compensation contract while B_2 is the incentive associated with altruistic objectives.

PROFITS \ ALTRUISM	Value	Do Not Value
Value	*Balanced Incentive Model* *A. Benchmark Model* $b_1 = b_2 \geq 0$ $b_1^{Profit} > b_1^{Nonprofit}$ *B. Extended Model* $b_1 \geq 0$ b_2 Indeterminate b_1^{Profit} vs. $b_1^{Nonprofit}$ Indeterminate	*Profit Maximization Model* $b_1 \geq 0$ $b_2 = 0$ $b_1^{Profit} = b_1^{Nonprofit}$
Do Not Value	*Altruisim Maximization Model* $b_1 = 0$ $b_2 \geq 0$	*Indifferent / Ineffective Model* $b_1 = 0$ $b_2 = 0$

similar incentive coefficients can be optimal under the extended version of the balanced incentive model (e.g., if managers are altruistic).

Additional evidence to distinguish between these two hypotheses can be obtained by comparing the outputs of for-profit and nonprofit hospitals. For instance, suppose that $B_1^{\text{nonprofit}} = B_1^{\text{for-profit}}$. In this case, our model implies that CEO effort and expected output will be the same for the two types of hospitals.[12] For-profit managers will report all the output as profit, while the nonprofit manager will divide the output between profit and altruism (based on the board's preferences). Thus the extended version of the balanced-incentives model predicts that profit will be lower and altruism will be higher in nonprofit hospitals than in for-profit hospitals (*ceterus paribus).*[13] The profit maximization hypothesis in contrast predicts similar outputs.

Existing research documents few significant differences in the outputs of nonprofit and for-profit hospitals. Thus the combined evidence in this and other studies suggests that both types of hospitals focus primarily on financial performance. This conclusion, however, is "local" in nature and does not necessarily imply that nonprofit hospitals maximize profits over all levels of output. There are at least two alternative hypotheses to explain the apparent similarities in outputs and incentives (James (1998)). First, nonprofit boards might value altruism but concentrate on financial performance and survival due to intense competition in the marketplace (and other forces that have reduced the available surplus for altruism, such as prospective payment systems and increased pressure from organized

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[12]Recall that if the nonprofit board cares about both profits and altruism that it will set the weight on profits equal to the sum of the explicit and intrinsic weights on altruism ($B_1 = (B_2 + B_3)$). Thus the objective function for both nonprofit and for-profit CEOs reduces to: Certainty equivalent $= a + B_1 e - \frac{1}{2} e^2 - 1/2r (\Sigma B_i^2 v_i)$.

purchasers). Second, nonprofit organizations might simply be "for-profits in disguise" (Weisbrod (1988)). Under this hypothesis the boards of both types of organizations strive to maximize profits and behave similarly independent of the level of surplus. Evidence on the incentives and outputs in less competitive markets where there are greater surpluses can help to distinguish between these alternatives. Our preliminary evidence that suggests the similarities are driven by competition.

4 DATA AND SAMPLE SELECTION

Our sample of nonprofit hospitals consists of 1,888 pooled observations of nonprofit hospitals over the fiscal years 1993-1995. To enter our sample, an observation has to meet the following criteria: 1) it must be a short-term acute-care hospital, which is not part of a hospital system, 2) it must be identifiable in the IRS Statistics of Income (SOI) 990 filings for US not-for profit hospitals, and 3) we must be able to match the hospital with data from the American Hospital Association's (AHA) Annual Survey of Hospitals.

Developing this sample is complicated by the fact that there is no common identification number between the AHA and IRS databases. Therefore, we rely on name matching and information such as address, telephone, and zip code. The IRS data reports firms with fiscal years beginning in a given year, while the AHA data reports firms with fiscal years ending in a given year (i.e., the 1995 AHA data contains firms with year end in 1995, while the 1995 IRS data contains firms with fiscal years that begin in 1995). We match the

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[13]Even if the nonprofit board cares only about profits, it might be efficient to pay the CEO by allowing him to spend some of the output on altruism. We, however, assume that CEOs prefer to receive marginal compensation in the form of a direct monetary payment rather than as additional expenditures on altruism (i.e., $B_3 < 1$). In this case, the efficient solution allocates no resources to altruism unless the board places value on it.

data accordingly. We are able to match about 60 percent of the short-term acute-care hospitals in the AHA database with hospitals in the IRS database.

Financial performance measures (e.g., return on assets (ROA)) are derived from the IRS data. CEO changes and hospital characteristics, such as the number of beds and nurses, are obtained from the AHA database. Information on the annual salary and bonus of the CEO is from the IRS 990 form, Part V. The electronic database provided by the IRS does not include the names of the officers. We assume that the CEO is the highest paid officer in the organization. We confirm that this is true for a set of hospitals for which we have the physical copy of the 990. Valid compensation data is available for a subsample of 1,295 observations. We are able to calculate percentage changes in compensation for CEOs who worked for two consecutive years in 714 cases.

ROA is a key measure in our analysis and is defined as "excess or deficit for the year" (line 18 of the 990 form) divided by "total assets" (line 59). IRS 990 data are known to contain some errors (See Herzlinger (1996)). These errors can produce extreme outliers (such as when total assets are reported as close to zero). To reduce the influence of these errors, we restrict the observations to those with ROAs between -.5 and .5 thereby eliminating five observations. In our analysis of percentage changes in CEO compensation we make a similar restriction for the percentage change in compensation and eliminate seven observations. These sample restrictions based on *explanatory variables* do not cause an obvious bias and are appropriate given the nature of the data. The results are robust to other reasonable inclusion criteria and are qualitatively similar when we use the full sample and employ nonparametric tests.

Table 1 presents descriptive statistics for our sample. The median hospital in our sample has approximately $47 million in assets and 186 beds. The median return on assets is

Table 1
Descriptive Statistics

The sample consists of 1,888 hospital-year observations for 1993-1995 from 900 different not-for-profit hospitals. The sample is restricted to short term acute care non-system hospitals that are present in both the IRS form 990 Part V and the American Hospial Association's Annual Survey of Hospitals. Financial information is drawn from the IRS form 990 filings for non-profit organizations. CEO compensation is available from the IRS form 990 Part V for a subset of hospitals. Mean MSA ROA is calculated excluding the focal hospital and restricted to MSAs having at least 3 hospitals for which we have financial data.

Variable Description	N	Mean	Median	Std. Dev.
Total Assets	1,888	$73,028,931	$47,016,293	$84,133,275
Licensed Beds	1,888	225	186	167
Return on Assets	1,888	4.33%	4.31%	5.43%
Mean ROA of hospital by MSA (a)	1,111	3.73%	3.62%	3.34%
CEO Compensation	1,295	$183,954	$160,925	$115,932
Percentage change in CEO compensation	714	7.39%	6.18%	18.79%
Revenue per patient day	1,888	$1,468	$1,404	$801
Nurses per patient day	1,888	0.00455	0.00437	0.00195
Percentage of total expenses accounted for by program service (b)	1,886	83.14%	86.12%	15.26%
Percentage of firm-year observations with CEO turnover	1,888	10.54%		
New England States	1,888	11.86%		
Mid Atlantic States	1,888	27.22%		
South Atlantic States	1,888	15.52%		
East North Central States	1,888	20.18%		
East South Central States	1,888	3.92%		
West North Central States	1,888	6.30%		
West South Central States	1,888	4.61%		
Mountain States	1,888	3.07%		
Pacific States	1,888	7.31%		
Year = 1993	1,888	37.66%		
Year =1994	1,888	33.42%		
Year = 1995	1,888	28.92%		

(a) For those hospitals which are located in an metropolitan service area (MSA), this is defined as the mean ROA of all other hospitals i the MSA excluding the focal hospital.

(b) This variable is the percentage of total expenses allocated toward patient delivery and is a measure of organizational efficiency.

4.31 percent, while the median ROA for other hospitals in the same MSA (for hospitals located in MSAs with at least three hospitals with financial data) is 3.62 percent. The lower ROA in MSAs might be expected given that there are more hospitals in MSAs and presumably a greater degree of competition. The median CEO receives about $161,000 in salary and bonus compensation and an annual increase in compensation of about 6 percent. CEO turnover occurs in 10.54 percent of the firm years (199 observations). The table also shows the distribution of sample hospitals across regions of the country and year. Information is provided on three variables that are used as measures of altruism in our subsequent analysis (described in more detail below), revenue per patient day, nurses per patient day and percent of total expenses that are direct program expenditures (as opposed to administrative overhead) hereafter referred to as program percentage. The median values of these variables are $1,404, .004 and 86.12 percent, respectively.

For our comparison of turnover incentives in nonprofit and for-profit hospitals, we rely on the Securities Data Corporation's (SDC) hospital database that contains financial data derived from Medicare cost reports for US hospitals. We continue to use data on CEO turnover from the AHA database. The SDC and AHA databases have sufficient overlap to provide just one year of data. Our sample for the comparative analysis consists of 75 for-profit hospitals and 1,056 nonprofit hospitals for a total of 1,131 observations from 1995.

5 EMPIRICAL FINDINGS

This section, is divided into four major subsections. We begin by examining the relations between turnover and performance in nonprofit and for-profit hospitals. Second we examine the relation between compensation and performance in nonprofit hospitals (we do not have compensation data for for-profit hospitals). Third, we discuss the implications of existing research that compares the outputs of for-profit and nonprofit hospitals. Finally,

we provide some evidence on whether the observed similarities in nonprofit and for-profit hospitals are driven by competition in the marketplace or similar underlying objective functions.

5.1 CEO Turnover and Financial Performance

Existing empirical work on CEO turnover in the corporate sector concentrates on the relation between turnover and financial performance. We begin by estimating similar models for CEOs of nonprofit hospitals. Next we add measures of altruism. Finally, we estimate models that compare the turnover-to-performance relations in nonprofit and for-profit hospitals.

Ideally, we would like to estimate an equation that predicts the probability that a manager is fired in a given period. Unfortunately, while our data collection process identifies separations of CEOs from hospitals, we have no way of telling whether the separation is voluntary or involuntary. We also do not have information on the personal characteristics of the CEO, such as his age. We therefore estimate equations that predict whether a CEO departs from a hospital, ignoring the reason for departure and the personal characteristics of the CEO. The problem of identifying the reason for departure is widespread in the management-turnover literature.[14] Studies of CEO turnover in other industries, however, report similar results using samples that do not condition on the reason for turnover (such as ours) and much smaller samples of probable firings (e.g., Warner, et al. (1988)). Our inability to differentiate between firings and voluntary separations, such as ordinary retirements, weakens our ability to measure a relation between poor performance and firing probabilities.

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[14] For example, Weisbach (1988) read *Wall Street Journal* articles for his sample of 286 CEO departures and found poor performance was cited in only nine cases. "Scandals" were cited in another four cases.

It does not cause a bias unless performance is correlated with omitted variables that are important in explaining voluntary separations (e.g., age in the case of retirements).

To estimate models that predict the probability of separations between CEOs and nonprofit hospitals, we pool observations across the years 1993-1995. We set the dependent variable equal to one if the CEO leaves the hospital during the year. We report results using return on assets (ROA) as the measure of financial performance. The results are similar using other standard accounting-based performance measures (such as return on equity, cash flow to assets, and sales margins). We focus on ROA in the final full year of employment of the manager ("lagged ROA" since it is in the year before the year of departure). We do not include the ROA in the year of departure because the reported performance in this year could be affected by the new hospital CEO. For example, a new CEO might take a "big bath" in the first year of office and blame it on the past CEO (see Murphy and Zimmerman (1993)). We refer to lagged ROA as ROA in the following discussion. We estimate models with longer lags in ROA (not reported). None of these additional lags are significant. We also estimate models with *changes* rather than *levels* of ROA. Since turnover and compensation are consistently related to the level, but not the change in ROA we focus on the results based on levels. Given that the dependent variable is dichotomous, we estimate the models using a logit specification.

Table 2 reports estimates of five logistic regression models for CEO turnover in nonprofit hospitals. The first model includes ROA as the sole explanatory variable, while the second model controls for hospital size, region of the country, and year. In both specifications, the coefficient on ROA is negative and significantly different from zero at the .05 level. The coefficients are similar in magnitude in both specifications. These results are

Table 2
Logistic Regression of CEO Turnover on ROA

The sample consists of 1,888 hospital-year observations for 1993-1995 from 900 different not-for-profit hospitals. The sample is restricted to short term acute care non-system hospitals that are present in both the IRS form 990 Part V and the American Hospial Association's Annual Survey of Hospitals. The CEO change variable is constructed from the American Hospial Association's Annual Survey of Hospitals. Financial information is drawn from the IRS form 990 filings for non-profit organizations. Mean MSA ROA is calculated excluding the focal hospital and restricted to MSAs having at least 3 hospitals for which we have financial data. Regional controls include a dummy variable corresponding to 1 of 9 regions of the US. Year controls include dummy variables for 1994 and 1995. Asymptotic t-statistics are in parentheses.

Description	Model 1		Model 2		Model 3		Model 4		Model 5	
Number of Observations	1888		1888		1888		1888		799	
Intercept	-2.043	***	-2.655	**	-1.983	***	-1.917	***	-3.060	
	(24.055)		(1.963)		(20.992)		(16.099)		(1.377)	
Lagged ROA	-2.483	**	-2.762	**	-3.341	**			-4.059	**
	(2.186)		(2.294)		(2.361)				(2.039)	
Square of lagged ROA					-6.527					
					(0.959)					
Lagged ROA positive							-5.037 (a)	**		
							(2.373)			
Lagged ROA negative							-0.273 (a)			
							(0.128)			
Lagged mean MSA ROA									-9.808	**
									(2.293)	
Log of Total Assets			0.053						0.118	
			(0.690)						(0.952)	
Regional Controls	N		Y		N		N		Y	
Year Controls	N		Y		N		N		Y	
Likelihood Ratio	4.630		24.271		7.116		6.988		24.090	
Pr > ChiSq	0.031		0.019		0.029		0.030		0.012	

*** Significant at .01 level, ** Significant at .05 level, * Significant at .10 level in 2-tailed tests

(a) Coefficients for ROA positive and ROA negative are not significantly different from one another.

consistent with the hypothesis that CEOs who do not perform well have a higher probability of being replaced.

In our model, managerial rewards are monotonically related to financial performance. Fear of increased scrutiny from tax authorities and the threat of decreased donations however, may cause the boards of nonprofit organizations to value marginal profits negatively as they become sufficiently large. Model 3 allows for a quadratic relation between turnover and profits. The coefficient on the squared term is not significant and has a negative point estimate (which is inconsistent with the argument that profit incentives decline as profits increase above some point). Model 4 contains two ROA variables. "ROA positive" is equal to ROA if ROA is greater than or equal to zero and is zero otherwise, while "ROA negative" is equal to ROA if ROA is negative and zero otherwise. This specification allows for different relations between turnover and ROA depending on whether ROA is positive or negative. In contrast to the prediction of declining incentives as profits become positive, "ROA positive" is highly significant and has a negative coefficient, while "ROA negative" has an insignificant, but positive coefficient. The coefficients are not significantly different from each other. This test lacks power since only 13 percent of the observations have negative ROA. We also estimate a piecewise linear model using the median value of ROA (4.3 percent) as the breakpoint. The marginal effect of ROA on CEO turnover above and below the median value of ROA is not statistically different from one another.

The analysis of Holmstrom (1982) suggests that it can be efficient to filter out common shocks from the evaluation of employee performance. Filtering common shocks can provide a more precise measure of the agent's actions and lower the costs of imposing risk on the agent. For example, basing the CEO's compensation on the performance

relative to some benchmark, such as the performance of other hospitals in similar circumstances, can provide incentives while exposing the CEO to fewer risk-increasing factors beyond his control. Alternatively, Aggarwal and Samwick (1999) argue that relative performance evaluation may not be used in imperfectly competitive markets because of the desire to soften competition among rival firms. In concentrated markets (such as most local hospital markets) it can be optimal for the board to give the CEO rewards that are tied positively to the performance of other firms in the same industry (opposite the relative performance predictions). Aggarwal and Samwick present empirical support for this prediction.

To examine these alternatives empirically, we estimate Model 5 in Table 2. This model includes the mean ROA for other hospitals operating in the same metropolitan area (MSA). We estimate this model using the subsample of hospitals that are located in MSAs for which there were at least 2 other hospitals with available financial data in our sample. The relative performance arguments predict a positive coefficient on the benchmark variable — holding own performance constant, turnover is more likely the better is the performance of the benchmark hospitals (since it is more likely that the CEO received a positive random shock to output). The Aggarwal and Samwick arguments predict the opposite — managers are rewarded when rival firms do well and thus are less likely to be fired. The results are consistent with Aggarwal and Samwick. The coefficient on the benchmark ROA is negative and significant at the .05 level.

Table 3 compares the actual rates of turnover with the predicted rates from Model 1 of Table 2 by ROA decile. Mean ROA ranges from –0.059 in the first decile to 0.141 in the tenth decile. The predicted probability of CEO turnover monotonically declines over the deciles from 0.132 in the first decile to 0.085 in the tenth decile. CEOs in the worst decile of

Table 3

Probability of a top management change

The table contains the implied probability of CEO turnover in our sample of 900 not-for-profit hospitals for the period 1993-1995 by ROA decile. We compute the mean ROA, mean predicted turnover rate and actual rate of turnover over the 188 firm year observations comprising each decile. The table also tests whether the predicted turnover rate is the same over all deciles as well as whether the predicted turnover rate is the same in the lowest and highest declies of ROA

Decile	Mean ROA	Mean Predicted turnover rate	Actual Turnover Rate	Actual number of changes
1	-0.059	0.132	0.138	26
2	0.003	0.114	0.158	30
3	0.017	0.110	0.123	23
4	0.028	0.108	0.095	18
5	0.038	0.106	0.079	15
6	0.046	0.104	0.074	14
7	0.055	0.101	0.105	20
8	0.066	0.099	0.112	21
9	0.083	0.095	0.106	20
10	0.141	0.085	0.063	12

	χ^2-statistic
H_0 (1,2,3,... 10):	15.3 [a]
H_0 (1=10):	5.7 [b]

[a] Null hypothesis is rejected at the 0.10 level.

[b] Null hypothesis is rejected at the 0.05 level.

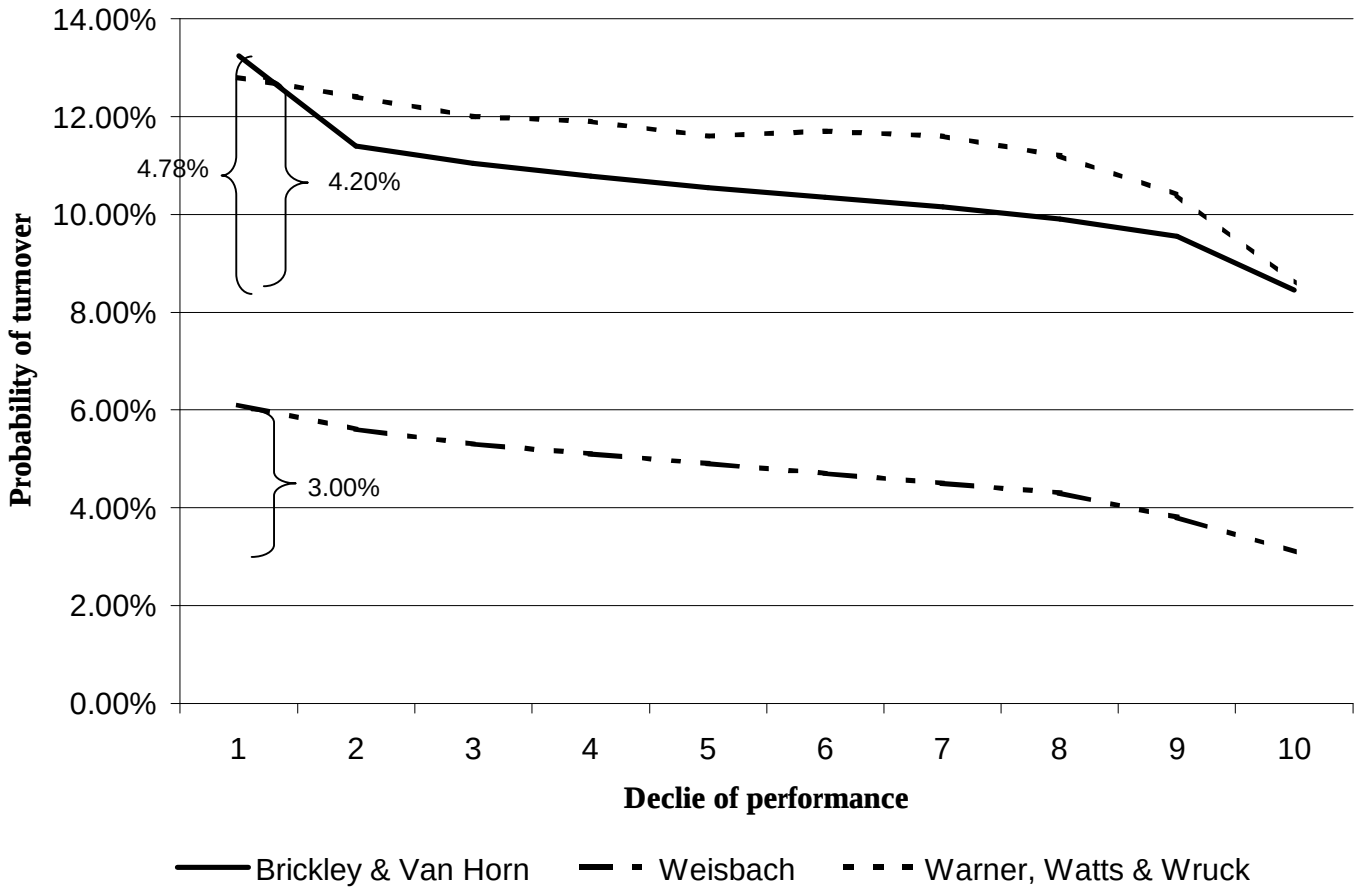
performance are predicted to be 1.56 times more likely to turnover compared with CEOs in the best decile of ROA performance. It appears that extreme levels of performance contibute most significantly to the likelihood of CEO turnover. The actual rates of turnover in the third to ninth deciles do not vary significantly and the relation between ROA and actual turnover is not monotonic over this intermediate range of performance.

Consistent with the predictions from the logit model, the first and last deciles of performance have the highest and lowest actual turnover rates of 0.138 and 0.063 , respectively, and the difference is statistically significant (χ^2 =5.7, significant at the 0.05 level). The rank order correlation coefficient between the predicted probabilities and the turnover dummy variable is 0.063 (p-value=0.006), supporting the predictive power of the model and the general validity of the logit specification.

Figure 3 uses Model 1 and plots the predicted probabilities of CEO turnover by ROA decile. We also plot the performance-turnover relations from Warner et al (1988) and Weisbach's (1988) studies of the turnover –performance relation in the corporate sector. The figure shows moving from the lowest to the highest decile of performance in our sample results in a 4.78 percent reduction in the probability of CEO turnover. Interestingly, the economic significance of the turnover-to-performance relation in these nonprofit hospitals is remarkably similar to the previously documented relations for for-profit CEOs across a broad range of other industries. For example, Warner, et al. (1988) estimate that the probabilities of a top management change in a sample of large publicly traded firms varies from 12.8 percent for a firm in the bottom decile of returns to 8.6 percent for a firm in the top decile (4.2 percent decline). Weisbach (1988) for a similar sample that excludes CEOs ages 64, 65, 66, estimates that the comparable probabilities range from 6.1 percent to 3.1 percent from the highest to lowest decile (three percent decline).

Figure 3
Comparison of the implied probability of CEO turnover

The figure plots the implied probability of CEO turnover for Brickley / Van Horn (BV), Weisbach JFE 1988 and Warner, Watts & Wruck JFE 1988 (WWW) for deciles of performance. The mean implied probability of CEO turnover is calculated by decile of ROA. Performance in BV is non-profit hospital ROA for 900 hospitals. Performance in Weisbach is the market adjusted stock return for 367 NYSE firms from 1974 to 1983 excluding CEOs ages 64-66. Performance in WWW is annual stock return for a random sample of 269 CRSP firms for the period 1963-1978.



5.1.1 CEO Turnover and Altruism

Altruistic boards do not necessarily fully exploit market power. Thus if boards pursue altruism: 1) price will tend to be lower and output higher than in the profit maximizing case, 2) quality of care might also be higher, and 3) a portion of the potential profits will be distributed as uncompensated care (or possibly used to subsidize community education, research, and so on).

Measuring quantity, quality, and the amount of uncompensated care is problematic and plagues the extensive literature on nonprofit hospitals (see Sloan (1998)). Nevertheless, there are some standard, although admittedly crude, proxies for these variables that are commonly used in both the popular and academic literatures on health care and nonprofit organizations. Our data sources allow us to construct three such measures for the quantity and quality of care provided by the hospital. Consistent with our ROA analysis, we use the first lag of each of these variables to explain CEO turnover. Unfortunately, our data sources do not provide information on uncompensated care.

The first proxy variable is total revenue per patient day. Holding ROA constant altruistic boards will prefer low revenue-to-patient ratios (since they suggest lower prices and higher output). The second variable is total registered nurses per patient day. Presumably altruistic boards value a high ratio of nurses to patients (hospitals are frequently compared on this type of measure). The third is the ratio of direct program expenses to total expenses. A common measure of performance for nonprofit organizations is the percentage of resources that are devoted to program services rather than to administrative overhead. High ratios are viewed as desirable. Edlendburg, et. al. (1999) use a similar measure in their study of CEO turnover in California hospitals.

These variables are easily criticized since they do not control for differences in patient and case mix, differences in capital-to-labor ratios, and so on. Nevertheless it is interesting to see whether these common measures are related to CEO turnover in the data. Below, we provide additional evidence using a subsample for which we have more refined measures, such as case-mix adjusted staffing and expense rations.

Table 4 presents estimates of four logistic regression models. The first three include only one of the proxy variables, while the fourth model contains all three. While ROA continues to be significant in all models, none of the proxy variables are significant in any of the specifications. We also estimate model four with additional controls for region, year, and hospital size (not shown in the table). Again ROA is highly significant and the proxy variables are not. We estimate models with *changes* in the quality and quantity proxies as the explanatory variables (turnover might be related to changes in altruism rather than to the levels). Again ROA matters and the proxy variables do not.

Table 4 provides no evidence that nonprofit boards provide CEOs incentives to care about more than bottom line profits. This evidence, however, does not necessarily imply that the boards of these hospitals are not altruistic. First, as we have discussed the proxy variables are relatively crude and might not capture the altruistic factors considered by nonprofit boards. Second, our model suggests that altruistic boards might explicitly compensate the CEO only on profits (and not on altruism) to offset intrinsic incentives.

5.1.2 Comparison of Turnover Incentives in Nonprofit and For-Profit Hospitals

We have one year of data (1995), which allows us to compare the turnover-to performance relations in nonprofit and for-profit hospitals. The financial data is from the Securities Data Corporation database of Medicare cost reports. We continue to obtain information on CEO turnover from AHA's Annual Survey of Hospitals.

Table 4
Logistic Regression of CEO Turnover & Altruism Proxy Variables

The sample consists of 1,888 hospital-year observations for 1993-1995 from 900 different not-for-profit hospitals. The sample is restricted to short term acute care non-system hospitals that are present in both the IRS form 990 Part V and the American Hospial Association's Annual Survey of Hospitals. The CEO change variable is constructed from the American Hospial Association's Annual Survey of Hospitals. Financial information is drawn from the IRS form 990 filings for non-profit organizations. Regional controls include a dummy variable corresponding to 1 of 9 regions of the US. Year controls include dummy variables for 1994 and 1995. Asymptotic t-statistics are in parentheses.

Description	Model 1		Model 2		Model 3		Model 4	
Number of Observations	1888		1888		1888		1888	
Intercept	-2.000	***	-2.125	***	-1.711	***	-3.053	**
	(12.467)		(10.741)		(4.509)		(2.059)	
Lagged ROA	-2.460	**	-2.488	**	-2.533	**	-2.843	**
	(2.165)		(2.178)		(2.239)		(2.330)	
Lagged Revenue per patient day	0.000						-0.230	
	(0.317)						(0.480)	
Lagged nurses per patient day			19.136				0.000	
			(0.460)				(0.671)	
lagged prog.serv exp %					-0.405		32.099	
					(0.902)		(0.626)	
Log of Total Assets							0.086	
							(1.032)	
Regional Controls	N		N		N		Y	
Year Controls	N		N		N		Y	
Likelihood Ratio	4.731		4.841		5.475		25.422	
Pr > ChiSq	0.094		0.089		0.065		0.045	

*** Significant at .01 level, ** Significant at .05 level, * Significant at .10 level in 2-tailed tests.

Table 5 presents estimates of four logistic regression models. The first focuses on lagged ROA (1994) as the sole performance measure. The dependent variable is equal to one if the CEO left the firm in 1995. Explanatory variables include ROA, a dummy variable equal to one if the hospital is a for-profit, and an interaction variable between ROA and the for-profit dummy variable. The coefficient on ROA is negative and has a p-value of slightly more than .10. While the for-profit dummy variable is marginally significant, indicating higher average turnover in for-profit hospitals, the coefficient on the interaction term is insignificant. Moreover, the positive point estimate for the interaction variable is in the direction of weaker profit incentives in for-profit hospitals. The other three models include a case-mix adjusted proxy for altruism and an associated interaction term. In no case are any of these variables or their interaction terms significant. ROA continues to be marginally significant in the models.

The results in Table 5 continue to reinforce the comparisons with existing research on CEOs from publicly traded firms — the turnover incentives in nonprofit hospitals appear similar to those found in the for-profit sector. It is important to note that our comparison relies on just one year of data with only 75 for-profit hospitals. Thus our tests do not have substantial power to detect differences in the incentives across the two types of organizations.

5.1.3 Sensitivity Checks

Ideally we would like to separate voluntary from involuntary turnover and estimate the models with involuntary turnover as the dependent variable. As discussed, it is difficult to separate involuntary from voluntary turnover. As one check we search the AHA database in the two years after each of the turnovers in the full sample to determine if the departing CEO takes a job at another hospital (in the population of for-profit and nonprofit hospitals).

Table 5
Logistic Regression: Comparison on For-profit and Non-profit Hospitals

The sample consists of 1,107 observations for 1995. The sample is restricted to short term acute care non-system hospitals for which financial information was available. The sample includes 75 for-profit hospitals. The CEO change variable is constructed from the American Hospial Association's Annual Survey of Hospitals. We obtain all other financial data from the Securities Data Corporation database of hospitals. This data is licensed from HCIA and drawn from Medicare cost reports. ROA is defined as operating revenue less operating expenses less dpereciation scaled by total assets. Asymptotic t-statistics are in parentheses

Description	Model 1		Model 2		Model 3		Model 4	
Number of Observations	1107		1107		1107		1107	
Intercept	-1.955	***	-1.868	***	-1.737	***	-2.531	***
	(12.796)		(7.487)		(5.730)		(6.116)	
For Profit CEO =1	0.686	*	0.958		1.596		1.257	
	(1.873)		(1.111)		(1.517)		(1.109)	
Lagged ROA	-1.869		-1.893	*	-2.120	*	-1.678	
	(1.592)		(1.609)		(1.749)		(1.441)	
Lagged ROA * For-profit	0.911		0.856		0.298		0.721	
	(0.440)		(0.409)		(0.130)		(0.342)	
Case-mix adj. Gross revenue per adjusted day (000s)			-0.060					
			(0.428)					
FP * Case-mix adj. Gross revenue per adjusted day (000s)			-0.160					
			(0.315)					
Case-mix adjusted expense per adjusted day (000s)					-0.050			
					(0.796)			
FP * Case-mix adjusted expense per adjusted day (000s)					-0.210			
					(0.869)			
Administrative expense percentage							0.045	
							(1.516)	
FP * Administrative expense percentage							-0.045	
							(0.678)	
Likelihood Ratio	8.758		9.401		11.799		10.965	
Pr > ChiSq	0.033		0.094		0.038		0.052	

*** Significant at .01 level, ** Significant at .05 level, * Significant at .10 level in 2-tailed tests

We are able to identify 47 CEOs who take jobs at other hospitals. Presumably these CEOs are more likely to have left voluntarily than CEOs who disappear from the database. We classify all CEOs who take a job at another hospital as voluntary and the remainder as involuntary. The estimated models using the "more refined" classification are virtually identical to those for the "less refined" classification. As an additional check, we repeat the analysis classifying only those CEOs who take jobs at larger hospitals as voluntary. Again the results are similar to the less refined classification.[15]

Another concern relates to whether the error terms in the pooled sample are independent across time and individual hospitals. We estimate a random effects model which allows for year and hospital random effects. ROA continues to be significant at the .09 level. As another check, we estimate the basic model between turnover and ROA for each individual year in the sample period. In each year, the sign on the coefficient for ROA is negative. The coefficient is significant at the .01 level in 1994 and insignificant at conventional levels for the other two years. The coefficients are not significantly different across the years.

Finally we estimate turnover to performance relations for a smaller subset of nonprofit hospitals contained in the Van Kampen Merrit database, which includes approximately 1,000 nonprofit hospitals that sought debt financing between 1988 and 1996. We focus the analysis for years outside our 1993-1995-sample period. The results are remarkably similar both in terms of the statistical and economic significance of ROA in explaining turnover. Again the altruism variables add no explanatory power.

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[15] To provide evidence on the importance of career concerns, we also examine whether managers who take jobs at larger hospitals perform well on the job before they change firms (ROA). While the results are somewhat suggestive the results are not significant. These tests lack power given the sample size.

5.2 CEO Compensation and Performance

The evidence on CEO turnover suggests that the boards of nonprofit hospitals care about profits and provide corresponding incentives to CEOs. One limitation of this analysis is that we are unable to separate voluntary from involuntary turnover. While this limitation is potentially more an issue of power than bias, it potentially confounds the interpretation of the results. To provide additional evidence on the incentives of CEOs in nonprofit hospitals, we examine the relation between annual changes in salary/bonus and performance. Presumably if nonprofit boards care about financial performance it will show up in the annual compensation decisions as well as in CEO turnover.

Salary and bonus changes might be related to either contemporaneous or lagged financial performance. For example, firms often base annual bonuses on the current year's performance and accrue them in the current period. Alternatively, raises showing up in a given year are likely to be based on the previous year's performance. We estimate models with both contemporaneous and lagged ROA. Contemporaneous ROA is consistently significant, while the lagged ROA is not. In the paper, we report results without the lag.

Table 6 presents the estimates of five OLS regression models, in which the dependent variable is the percentage change in CEO compensation. To be included in this analysis, the CEO has to have been with the firm for two consecutive years. Also compensation data has to be available for the CEO from the IRS 990 filings. The first model includes contemporaneous ROA as the sole explanatory variable. The coefficient is positive and significant at the .05 level. The difference in mean ROA between the first and tenth decile is about .20. Thus the coefficient of .304 suggests that the expected increase in pay will be approximately six percent higher as the CEO moves from the bottom decile to the top decile of performers (the average raise is about seven percent). A six percent raise

Table 6
OLS Regression of Percentage Change in CEO Compensation on ROA

The sample consists of 713 hospital-year observations for 1993-1995 from 456 different not-for-profit hospitals. The sample is restricted to short term acute care non-system hospitals for which CEO compensation is available from the IRS form 990 Part V. The CEO change variable is constructed from the American Hospial Association's Annual Survey of Hospitals. Financial information is drawn from the IRS form 990 filings for non-profit organizations. Mean MSA ROA is calculated excluding the focal hospital and restricted to MSAs having at least 3 hospitals for which we have financial data. Regional controls include a dummy variable corresponding to 1 of 9 regions of the US. Year controls include dummy variables for 1994 and 1995. T-statistics are in parentheses

Description	Model 1		Model 2		Model 3		Model 4		Model 5
Number of Observations	713		713		713		713		451
Intercept	0.059	***	0.087		0.059	***	0.066	***	0.037
	(6.140)		(0.570)		(6.090)		(7.090)		(0.190)
Return on Assets	0.304	**	0.296	**	0.359	**			0.201
	(2.170)		(2.040)		(2.040)				(1.150)
Square of ROA					-0.477				
					-(0.520)				
ROA positive							0.191		
							(1.290)		
ROA negative							-0.227		
							-(0.810)		
Mean MSA ROA									0.043
									(0.150)
Log of Total Assets			0.000						0.002
			-(0.030)						(0.160)
Regional Controls	N		Y		N		N		Y
Year Controls	N		Y		N		N		Y
R-Squared	0.007		0.016		0.007		0.003		0.018

*** Significant at .01 level, ** Significant at .05 level, * Significant at .10 level in 2 tailed-tests

on the median compensation of $161,000 is $9,660. Given that compensations increases tend to be sticky and form the basis of future wage increases, the present value to the CEO is likely to be significantly greater than $9,660.

The second model controls for hospital size, year and region. The results are highly robust to these controls. Models three and four allow for nonlinear relations between compensation and ROA. These models do not support the hypothesis that nonlinearities (at least as modeled) are important. Finally, model 5 restricts attention to observations in MSAs and includes the mean return for other hospitals in the same MSA as an additional variable. The model also controls for region, size, and year. While the coefficient on ROA is of comparable magnitude to the first model it is no longer significant at conventional levels. The smaller sample size and correlation between own and MSA ROA reduce the power of the experiment. The model provides no evidence in support of the relative performance hypothesis.

Table 7 presents the estimates of four OLS regression models, which include both ROA and our proxies for altruism. The models continue to provide strong support for the hypothesis that only ROA matters. In no case are any of the altruism variables significant. Overall the results are very consistent with the turnover regressions. Both turnover and compensation are significantly related to financial performance, while neither is related to common measures of altruism. Similar results hold using changes in the altruism variables rather than levels

We are unable to compare the relations between salary changes and performance in for-profit and nonprofit hospitals because we do not have compensation data for for-profit hospital CEOs. We can compare our results to the findings of Jensen and Murphy (1990) for CEOs of large publicly traded firms. Jensen and Murphy regress the *level* of CEO salary

Table 7

OLS Regression of Percentage Change in CEO Compensation on ROA & Altruism Proxy Variables

The sample consists of 713 hospital-year observations for 1993-1995 from 456 different not-for-profit hospitals. The sample is restricted to short term acute care non-system hospitals for which CEO compensation is available from the IRS form 990 Part V. The CEO change variable is constructed from the American Hospial Association's Annual Survey of Hospitals. Financial information is drawn from the IRS form 990 filings for non-profit organizations. Regional controls include a dummy variable corresponding to 1 of 9 regions of the US. Year controls include dummy variables for 1994 and 1995. T-statistics are in parentheses

Description	Model 1		Model 2		Model 3		Model 4	
Number of Observations	713		713		713		713	
Intercept	0.049	***	0.051	***	0.058		0.097	
	(2.870)		(2.580)		(1.200)		(0.580)	
Return on Assets	0.300	**	0.300	**	0.304	**	0.296	**
	(2.140)		(2.140)		(2.170)		(2.040)	
Revenue per patient day (000s)	0.007						0.008	
	(0.750)						(0.720)	
Nurses per patient day			1.873				0.771	
			(0.510)				(0.160)	
Prog.serv exp %					0.002		0.007	
					(0.040)		(0.110)	
Log of Total Assets							-0.002	
							-(0.240)	
Regional Controls	N		N		N		Y	
Year Controls	N		N		N		Y	
R-Squared	0.007		0.007		0.007		0.017	

*** Significant at .01 level, ** Significant at .05 level, * Significant at .10 level in 2 tailed-tests

changes on the level of accounting profits. Their estimates suggest that the typical CEO receives 17.4 cents in increased pay (salary and bonus) for each $1,000 increase in accounting profits. When we estimate our basic model using levels of the pay change and accounting profits, we find that the coefficient on accounting profits is significant at the .05 level. Our point estimate suggests that the typical hospital CEO receives 56 cents in increased pay for every $1,000 increase in accounting profits. Similar to the results for CEO turnover, the relation between CEO pay and performance appears at least as strong in nonprofit hospitals as for CEOs from the profit sector.

In both our data and in Jensen and Murphy (1990) the extremely low R-squareds suggest that there are many other factors that affect differences in the change of pay than just financial performance. Jensen and Murphy argue that the incentives in the for-profit sector are too weak to be consistent with agency theory. Others have provided theoretical disputes to this claim (see for example, Haubrich (1994)).

Our study focuses on turnover and compensation incentives. Some organizations provide additional incentives through stock options and stock ownership plans. Nonprofit organizations obviously do not have stock-based plans. These plans are also likely to be unimportant in small for-profit acute care hospitals. Stock-based plans, however, potentially increase the incentives for CEOs from the general corporate sector to focus on financial performance relative to CEOs in the hospital sector.

5.3 Allocation of Output

Our empirical evidence provides strong empirical support for the notion that nonprofit boards care about profits and provide corresponding incentives to CEOs. The evidence, however, does not provide definitive insights into whether they also care about altruism. The failure to document any significant relation between CEO

turnover/compensation and altruism could be due to at least two reasons. First, our proxy variables for altruism are crude. Second, if the CEO is intrinsically altruistic the optimal weight on these measures might be zero or even negative. Our model, however, suggests that if nonprofit boards care about altruism the allocation of output will vary between nonprofit and for-profit hospitals. The nonprofits will report lower profits and allocate more of the output to altruism (*ceterus paribus*).

Comparing the outputs of the two types of organizations is complicated and beyond the scope of this paper. There is an extensive literature on this topic. Sloan (1998) provides a review of the more recent research in this area. Researchers interested in the relative outputs of the two types of hospitals are confronted with the same basic problem as in this study — it is difficult to find good measures of outputs such as quantity, quality and charity care. Also researchers are confronted with a variety of econometric issues (selection biases, proper controls, etc.). Overall, the evidence is mixed and somewhat inconclusive. Nonprofit hospitals have consistently reported positive profits, which in some years have been higher than the profits reported by for-profit hospitals. Moreover, the general result seems to be that there is not much of a difference between for-profit and private nonprofit hospitals in the provision of uncompensated care, in quality of care, and in the adoption of technology (Sloan (1998)). One interpretation of the collective evidence in this paper and other existing research is that the boards of nonprofit hospitals and for-profit hospitals focus primarily on profits over the relevant range of output.

5.4 Additional evidence

There are at least two competing hypotheses to explain the apparent similarities among nonprofit and for-profit hospitals. The "competition hypothesis" argues that increased

competition has forced both types of organizations to focus on profits and survival (i.e., there is little available surplus for altruism). In contrast, the "for-profits-in-disguise" hypothesis argues that the two organizations have similar underlying objective functions (Weisbrod (1988) and James (1998)).

Under the competition hypothesis, nonprofit organizations with market power will use profits from privately insured patients to subsidize charity care and other activities (see Phelps (1986)). Evidence exists that this type of cross-subsidization occurs (e.g., Dranove (1988)). Nevertheless, the overall evidence is not very supportive of the hypothesis (see Morrisey (1994)).

To provide additional evidence on this issue, we examine whether CEO incentives to engage in altruistic activities vary between concentrated and unconcentrated markets. The competition hypothesis suggests that CEOs in competitive markets will have incentives to focus primarily on financial performance, while CEOs in concentrated, less competitive markets will have greater incentives to focus on altruism. The for-profits-in-disguise hypothesis suggests no difference in incentives.

We calculate a Herfindahl-Hirschman Index (HHI) for each MSA in the United States containing one of our sample hospitals. The HHI is calculated as the sum of the squared market shares of total annual admissions for all hospitals in the MSA multiplied by 10,000. We include only short-term, acute care, nongovernmental hospitals in the calculation. The median HHI for the hospitals in our sample is approximately 1,200. An HHI of 1,000 is a threshold value where the Department of Justice traditionally begins to take a somewhat

more serious look at the anticompetitive effects of proposed mergers (see Scherer/Ross(1990)).[16]

Table 8 presents estimates of three logistic regression models. In each model, the dependent variable is a dummy equal to one if a CEO turnover occurs during the year. Explanatory variables include lagged ROA, a dummy equal to one if the HHI is above the median value of 1,200, a lagged altruistic proxy variable, and an interaction between the HHI dummy and the altruistic performance variable. We use a discrete variable to measure market power because the raw HHI is highly skewed. Similar results hold when we use an HHI threshold of 1,500. We are particularly interested in whether the interaction variables are significantly different from zero. The competition hypothesis suggests that the interaction terms will be negative (more altruism lowers the likelihood of turnover in concentrated markets relative to the effects in unconcentrated markets), while the competing hypothesis suggests insignificant coefficients. We also estimate models which interact the HHI dummy with ROA. Since this interaction is always insignificant we do not report these results in the paper.

Model 1, which focuses on nurses per patient day, is consistent with the competition hypothesis. The coefficient for the base proxy variable is positive and significant at the .05 level suggesting that mangers are penalized in more competitive markets for increasing the nursing staff. Such a penalty might be included in the incentive contract to offset natural incentives to have a large staff or provide too high of quality of care. Interestingly, the coefficient on the interaction term is negative and significant at the .05 level. This result suggess that relative incentives are higher in concentrated markets to increase the nursing

[16] An MSA often constitutes a relatively large geographic area. Since hospitals are likely to have some market power due to spatial considerations, an HHI of 1000 potentially implies more market power in hospitals than

Table 8

Logistic Regression of CEO Turnover & The Effect of Market Concentration on Altruism Proxy Variables

The sample consists of 1,294 hospital-year observations for 1993-1995 not-for-profit hospitals residing in an MSA. The sample is restricted to short term acute care non-system hospitals that are present in both the IRS form 990 Part V and the American Hospial Association's Annual Survey of Hospitals. Using data from the AHA we calculate the Herschman-Herfindahl Index (HHI) by MSA by year based on total admissions for short term acute care, non-government hospitals. We then define a categorical variable HHI High if the MSA HHI is greater than .10. This dummy variable is interacted with the altrusim proxy variables.

Description	Model 1		Model 2		Model 3	
Number of Observations	1294		1294		1294	
Intercept	-2.263	***	-2.898	***	-1.658	**
	(8.018)		(7.050)		(2.462)	
Lagged ROA	-3.395	**	-3.975	**	-3.400	**
	(2.236)		(2.515)		(2.250)	
HHI High dummy = 1	0.728	*	1.223	**	0.309	
	(1.921)		(2.278)		(0.368)	
Lagged Revenue per patient day	0.000					
	(0.948)					
HHI High * Lagged Revenue per patient day	0.000	*				
	(1.722)					
Lagged nurses per patient day			203.900	**		
			(2.315)			
HHI High * Lagged nurses per patient day			-244.900	**		
			(2.137)			
Lagged prog.serv exp %					-0.456	
					(0.566)	
HHI High * Lagged prog.serv exp %					-0.205	
					(0.203)	
Likelihood Ratio	8.393		10.792		6.705	
Pr > ChiSq	0.078		0.029		0.152	

*** Significant at .01 level, ** Significant at .05 level, * Significant at .10 level in 2-tailed tests.

staff. The interaction terms for the other two models are insignificant and thus are consistent with the for-profits-in-disguise hypothesis.

Table 8 suggests that the incentives of CEOs to hire nurses are greater in concentrated than unconcentrated markets. Presumably these incentives will motivate CEOs in concentrated markets to hire larger nursing staffs. Table 9 estimates three OLS regression models. The dependent variables are the respective altruism proxy variables. Explanatory variables include the HHI dummy variable and controls for bed size, region, and year. Consistent with the estimated incentives in Table 8, the coefficient on the HHI dummy is positive and highly significant in the nurses-per-patient model and insignificant in the other two models.

These results provide some support for the competition hypothesis — incentives and outputs (at least in terms of the nursing staff size) appear to vary depending on the concentration of the market. Unfortunately, our data does not allow for more powerful controls. For example, nursing staff sizes might be affected by omitted variables that are correlated with the HHI. Also when we repeat the analysis using compensation changes as the dependent variable in the table 8 regressions none of the interaction terms are significant. Additional research is needed to distinguish more convincingly between the competing hypotheses.

6 CONCLUSIONS

This study provides evidence that the boards of nonprofit hospitals care about profits and provide corresponding incentives to CEOs. The marginal effects of financial performance on CEO turnover and salary/bonus compensation appear as strong in

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in many manufacturing industries.

Table 9
OLS Regression of Altruism Variables on Market Concentration

The sample consists of 1,294 hospital-year observations for 1993-1995 not-for-profit hospitals residing in an MSA. The sample is restricted to short term acute care non-system hospitals that are present in both the IRS form 990 Part V and the American Hospial Association's Annual Survey of Hospitals. Using data from the AHA we calculate the Herschman-Herfindahl Index (HHI) by MSA by year based on total admissions for short term acute care, non-government hospitals. We then define a categorical variable HHI High if the MSA HHI is greater than .10. T-statistics are in parentheses.

Description	**Model 1**		**Model 2**		**Model 3**	
Dependent Variable	Revenue per patient day		Nurses per patient day		Program Percentage	
Observations	1,294		1,294		1,294	
Intercept	-4200.146	***	0.00455	***	0.26905	***
	-(11.320)		(5.580)		(3.140)	
Log of Total Assets	327.87302	***	-0.00002		0.03049	***
	(16.250)		-(0.350)		(6.540)	
HHI High Dummy=1	-28.46576		0.00033	***	-0.00299	
	-(0.730)		(3.830)		-(0.330)	
Regional Controls	Y		Y		Y	
Year Controls	Y		Y		Y	
R-squared	0.294		0.181		0.059	

*** Significant at .01 level, ** Significant at .05 level, * Significant at .10 level in 2 tailed-tests

nonprofit hospitals as in for-profit hospitals and in the general corporate sector. We find no evidence that CEOs of nonprofit hospitals have explicit incentives to focus on altruistic activities.

Our theoretical analysis suggests that these results do not necessarily imply that nonprofit boards only pursue profits. Altruistic boards might place little or even negative weights on altruism in the CEO's compensation plan to restore balanced incentives (if nonprofit CEOs intrinsically care about altruism as some studies suggest). Also our proxies for altruism are not very good.

Our study focuses on organizational incentives. Research on the outputs of nonprofit hospitals provides additional evidence to distinguish between the alternatives of whether nonprofit boards pursue profits or both profits and altruism. The overall evidence seems to point to the first alternative — the boards primarily pursue profits (at least over the current range of output). Our preliminary evidence suggests that nonprofit hospitals tend to be similar to for-profit hospitals due to competition, not identical underlying objective functions.

While this study provides new insights into the incentives in nonprofit organizations, it concentrates on just one important component of the nonprofit sector. More work remains before we will have a deeper understanding of the incentives in a broader range of nonprofit organizations (universities, social service agencies, museums, etc.).

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