The Influence of Ownership and Compensation Practices on Charitable Activities*

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1. Introduction

The provision of charity care (i.e., patient care that is provided free or at reduced prices) is important for its societal value and as a nonprofit hospital objective. From a public good perspective, the economic significance of charity care is large. In 2011, nearly 5,000 community hospitals provided $41.1 billion in uncompensated care (charity care and bad debt) as part of the $759 billion total hospital economic output.[1] Charity care is an important part of nonprofit hospitals' value systems, which emphasize community benefits. Further, hospitals that provide high levels of charity care are subject to fewer institutional pressures including lower political costs and less regulatory scrutiny.

Because charity care is a significant nonprofit hospital objective, it is important to evaluate whether it is adversely affected by current compensation practices. Intensifying competitive pressures in the health sector have motivated both for-profit and nonprofit hospitals to adopt profit-based incentives in setting executive compensation (Lambert and Larcker 1995). Erus and Weisbrod (2003) show that the gap in strength of profit-based incentives between nonprofit and for-profit hospitals has narrowed over time, as competitive pressures have increased. Brickley and Van Horn (2002) and Eldenburg and Krishnan (2008) suggest that the strength of profit-based incentives within for-profit and nonprofit hospitals is relatively similar. This similarity could be problematic from a public good perspective because the use of profit-based incentives in nonprofit hospitals reduces incentives to provide charity care, which mechanically reduces hospital profits in the current period.

We expect that the strength of profit-based incentives should be negatively associated with charity care in for-profit hospitals because these incentives encourage managers to maximize hospital profitability by all means possible. Although profit-based incentives could encourage nonprofit hospitals to reduce charity care, institutional pressures from stakeholders such as donors and governing boards and profit distribution constraints inherent in the nonprofit setting, which likely mitigate this negative effect. Given these institutional pressures and constraints, we predict a less negative association between

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1. American Hospital Association website: http://www.aha.org/advocacy-issues/letter/2011/110308-let-hatton-dojftc.pdf, and http://www.aha.org/content/13/1-2013-uncompensated-care-fs.pdf.

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profit-based incentives and charity care among nonprofit hospitals relative to the for-profit hospitals. In summary, we expect that for-profit managers likely view charity care as a cost that should be minimized, whereas nonprofit managers consider it an objective that should be maximized or at least not minimized.

To study the effects of profit-based incentives on charity care, we analyze data from a sample of California hospitals from 1996 to 2006. We examine the relation between profit-based incentives and charity care, allowing it to vary by ownership type. Consistent with prior literature, we estimate the sensitivity of changes in the total management compensation to changes in the net income by hospitals to measure the profit-based incentives in place at a particular hospital (Eldenburg and Krishnan 2008; Krishnan, Yetman, and Yetman 2006). Then we estimate the association between charity care and the hospital-specific pay-for-performance sensitivities obtained in the first stage, while controlling for year effects as well as patient and hospital characteristics. We find a negative and significant association between pay-for-performance sensitivities and charity care within the for-profit hospitals but no significant association between these two variables in the nonprofit hospitals. These results suggest that linking the pay of managers to profitability does not appear to discourage charity care in nonprofit hospitals. Apparently, the institutional pressures associated with nonprofit ownership moderate the potential negative effects of profit-based incentives.

Our study adds to accounting research that analyzes the effects of management compensation practices on firm-specific outcomes. While prior studies document the use of profit-based compensation in nonprofit firms (Lambert and Larker 1995; Brickley and Van Horn 2002; Erus and Weisbrod 2003; Eldenburg and Krishnan 2008), to our knowledge, we are the first to examine the association between these incentives and charity care. Prior research within for-profit firms suggests that earnings-based compensation incentives influence managers' decisions (e.g., Healy and Kaplan 1985; Holthausen, Larcker, and Sloan 1995; Wallace 1997). Our research fills a gap in the compensation literature by providing empirical evidence that for-profit and nonprofit managers respond differently to similar profit-based incentives when making decisions about expenditures that affect their organizations' objectives differently.

Additionally, we contribute to an increasing stream of health economics research analyzing charity care in hospitals. Prior studies examine the economic determinants of charity care with limited success. For example, Frank and Salkever (1991) analyze charity care by private nonprofit hospitals and find little evidence of a "crowding out" effect by indigent care provided by other hospitals. Garmon (2006) finds no evidence that increased competition reduces charity care levels in hospitals. Kim, McCue, Thompson, and Hennum (2009) find that uncompensated care in California nonprofit hospitals is positively associated with free cash flow and negatively associated with debt levels. Our results add to this literature and suggest that hospitals' internal response to increased competition (the adoption of profit-based incentives) appears to have a different effect on charity care within for-profit and nonprofit hospitals.

The remainder of this paper is organized as follows: section 2 provides the institutional background and the development of our hypotheses; section 3 describes our data and relevant variables; the results are discussed in section 4; and section 5 provides the conclusions.

2. Literature review and hypotheses development

Literature review

Institutional background

In 1983, the regulatory and operating environment for hospitals changed significantly as insurers moved away from cost-based reimbursement toward volume-based or price-competitive payment schemes. The number of hospitals declined from 7,166 in

1981 to 6,247 in 1998. Harrison (2007) analyzes data from the AHA (American Hospital Association) between 1981 and 1998 and finds that increased competition led to mergers while weak productivity led to closures. Under cost-based (retrospective) reimbursement, the quality of top management was less important to hospital viability because insurers bore the brunt of any operating risk. After regulatory changes increased hospitals' financial risk, however, the quality of hospital managers became more important and many hospitals (both for-profit and nonprofit) began to use profit-based contracting.

Evidence of this shift is found in Lambert and Larcker (1995) who use Hay Group compensation survey data from 1,078 U.S. hospitals between 1983 and 1986 to analyze hospital response to the 1983 modification in Medicare payment from cost-based to volume-based. They find that those hospitals that were more inefficient prior to the reimbursement change in 1983 tended to institute bonuses that were a larger proportion of base salary after the change. Using hospital data from 1991 through 1995, Brickley and Van Horn (2002) examine the relationship between hospital profitability (i.e., ROA) and CEO turnover and compensation within for-profit and nonprofit hospitals. The authors provide evidence that the association between pay and financial performance is as strong in nonprofit hospitals as in for-profit hospitals and other for-profit corporations. The authors also examine whether CEO turnover in nonprofit hospitals is sensitive to several measures of nonprofit objectives (i.e., revenue per patient day, registered nurses per patient, and direct program expense to total expense). The authors find no significant associations between turnover and their proxies.

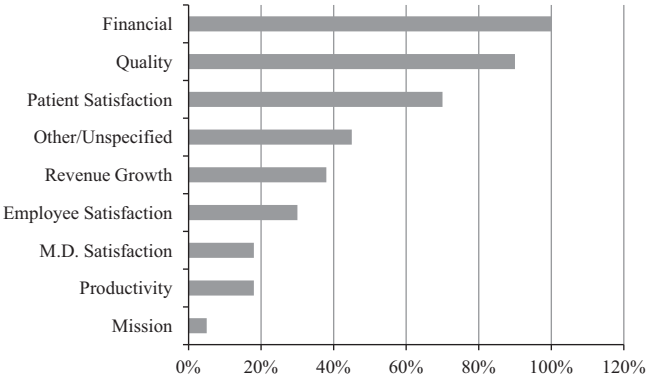
Using Hay Group survey data from 1992 and 1997, Erus and Weisbrod (2003) examine differences in compensation variables (base salary, bonus eligibility, bonus payment, and total compensation) across for-profit and nonprofit hospitals and find that the average hospital executive had a salary of $148,700 and received a bonus of $47,400, suggesting that bonuses represent a material portion of total compensation for top hospital executives. Their overall results suggest that for-profit hospitals provided stronger incentives for CEOs; however, the differences narrowed significantly between 1992 and 1997. In a more recent study, Eldenburg and Krishnan (2008) use data for California hospitals from 1990 to 2002 to calculate pay-for-performance sensitivities at the hospital level and find that both for-profit and nonprofit hospitals use financial performance-based compensation while government hospitals do not. They note that the association between hospital compensation and net income is statistically greater in for-profit hospitals relative to nonprofit hospitals during their sample period; however, the association between compensation and operating income is not significantly different across ownership groups.

This shift in compensation practices by nonprofit hospitals has not gone unchallenged. Prior to 1984, the IRS discouraged the use of profit-sharing in nonprofit organizations. However, the IRS issued a memorandum (GC 38283) in 1984 stating that nonprofit organizations could use incentive compensation plans that qualified as profit-sharing as long as the total compensation amount was not excessive (Groppe 1984).

In 2009, the IRS published a two-year study of 498 nonprofit hospitals' compensation and charity care practices. This report identified a disconnect between what the public considers reasonable compensation and what is permitted under tax law.[2] Additionally, Senator Charles Grassley, the ranking Republican on the Senate Finance Committee, introduced an amendment to the American Recovery and Reinvestment Act of 2009

2. Source: IRS Exempt organizations (TE/GE) Hospital Compliance Project Final Report. http://www.irs.gov/pub/irs-tege/frepthospproj.pdf.

Figure 1 Prevalence of performance measures used in incentive compensation at large nonprofit integrated delivery systems



Notes:

The figure shows the frequency of different performance measures used in executive compensation within large nonprofit integrated delivery systems and was provided to us by a large compensation consulting firm.

(H.R.1) that would require the Treasury department to study differences between nonprofit and for-profit hospitals regarding charity care and executive compensation.[3]

Although state and federal governments have increased their scrutiny of nonprofit organizations' compensation practices, a more competitive environment and greater cost pressures have increased nonprofit hospitals' willingness to use profit-based contracts to attract talented management teams (Research Notes in Healthcare Executive 2002). In a summary article of *Modern Healthcare's* 26th annual survey of nonprofit hospital compensation practices, Evans (2006) indicates that governing boards increasingly link executive pay with goals for financial performance. Carlson (2011, 28) discussed results from *Modern Healthcare's* 2011 survey and stated "Although 85 percent of hospitals have annual performance incentives for their executives, most are year-to-year goals such as financial performance and patient satisfaction."

Nonprofit hospital executive compensation agreements

To better understand the manner in which nonprofit hospital executives are compensated, we spoke with consultants from a national compensation consulting firm that specializes in nonprofit healthcare organizations. From our conversations, we learned that executive compensation contracts used in nonprofit hospitals vary considerably because they are tailor-made for each organization. However, several common features exist in these contracts. Performance measures typically include accounting income, clinical quality, and patient satisfaction.[4] Although measures such as employee satisfaction and productivity are also used, they are not as prevalent. Perhaps surprising, community benefit (including charity care) is rarely part of an annual incentive plan for nonprofit healthcare executives. Figure 1 (provided by nonprofit compensation consultants) presents the frequency of various performance measures used in nonprofit hospital compensation agreements.

3. Source: "Grassley Would Add Hospital Scrutiny to Stimulus Bill" Wall Street Journal, February 6, 2009. http://blogs.wsj.com/health/2009/02/06/grassley-would-add-hospital-scrutiny-to-stimulus-bill/.
4. For-profit hospitals also include both financial and nonfinancial measures in executive compensation contracts. For example, Tenet Healthcare contracts include the following nonfinancial measures: satisfaction measures for employees, patients, and physicians; employee retention; clinical quality; cost; and growth (Tenet Healthcare 2008, Proxy Statement, pp. 22–23).

The weights placed on each performance measure also vary. Measures of accounting income almost always carry the greatest weight. A recent survey of short-term incentive plans in nonprofit hospitals reports that the average weight of financial performance measures is 50 percent, while the average weight of quality measures is 20 percent within multihospital organizations.[5] In addition, because of the difficulty in justifying incentive awards when a hospital is not generating a surplus, plans generally follow the "no margin, no mission" rule, where no bonus is paid if financial performance goals are not met.[6] This feature is also known as a "circuit breaker" because it automatically discontinues the incentive plan during financially stressful times. Internal documents provided to us by a major compensation consulting firm report that about 80 to 90 percent of system hospitals use profit-based incentive plans, while between 60 and 70 percent of community hospitals appear to use such plans.

We also learned that incentive plans tend to be short-term in nature and that most performance evaluations take place annually. The performance-based contract usually sets a range of payouts around a specific performance goal. Goal setting tends to grow out of the planning process and is usually done looking backwards (i.e., setting goals that are improvements over last year's performance). Finally, most plans include a provision that allows the board to make changes in the plan and to modify the size of incentive awards.

We were surprised when we were told that charity care is *not* weighed in incentive plans and that accounting income is *not* adjusted to exclude charity care, as it represents an explicit part of the nonprofit hospital mission. When we interviewed nonprofit hospital CFOs and a top official at the Arizona Hospital Association, all confirmed the fact that nonprofit hospitals do not explicitly incentivize charity care. In section 4, we verify this issue empirically and find that executive pay is sensitive to financial performance (in both for-profits and nonprofits), but not sensitive to charity care in either nonprofit or for-profit hospitals, supporting our anecdotal information. These results are also consistent with Brickley and Van Horn (2002) who find that financial but not charitable performance is statistically related to changes in nonprofit hospital executive pay. Also consistent with charity care playing no role in nonprofit executive compensation, Kramer and Santerre (2010) regress the log of total CEO compensation for 35 CEOs from 29 nonprofit hospitals in Connecticut on uncompensated care (charity care plus bad debts) and find no significant association between compensation and charity care for the years 2000 and 2006.

Although we do not examine the reasons for this exclusion of charity care, we obtained several insights that potentially explain it. Nonprofit experts are quick to point out that incentivizing charity care would damage the long-term viability of the hospital. In a recent article titled "Should Hospital CEOs be Rewarded for Increasing Charity Care?" David Bjork, a Senior Vice President at Integrated Healthcare Strategies who specializes in designing executive compensation plans for nonprofit healthcare organizations, suggested that nonprofit hospital trustees "wouldn't consider intentionally increasing or decreasing pay in relation to uncompensated care [the sum of charity care and bad debts]".[7] According to David, "hospitals couldn't maintain their mission... if they preferred and pursued money-losing cases" and the idea that "[nonprofit hospital boards] should incent or reward CEOs for increasing uncompensated care or Medicaid volume is

5. Source: "Executive Pay and Quality: New Incentive Links" Integrated Healthcare Strategies 2008 http://www.ihstrategies.com/articles/29.pdf.
6. Source: "Rethinking Executive Pay: Responsible Governance in an Era of Healthcare Reform" Integrated Healthcare Strategies, November 2009. http://www.governanceinstitute.com/ResearchPublications/ResourceLibrary/tabid/185/ProductID/984/CategoryID/63/List/1/Level/a/Default.aspx?SortField=DateCreated%20DESC,DateCreated%20DESC.
7. Source: "Should Hospital CEOs be Rewarded for Increasing Charitable Care?" by David Bjork, Integrated Healthcare Strategies http://www.ihstrategies.com/articles/323.pdf.

preposterous and irresponsible." This view is consistent with Erus and Weisbrod (2003), who argue that hospitals must generate profits to fund their nonprofit missions.

Another view is that incentivizing charity care in nonprofit hospitals is an unnecessary practice. Dan Schleeter, also a Senior Vice President for Integrated Healthcare Strategies, wrote that "regularly having an annual goal to, for example, spend the allocated-budget for charity care... is probably not a valid goal since it is simply what executives should be doing anyway."[8] Along similar lines, when asked why charity care is not incentivized in executive plans, one local nonprofit hospital CFO we interviewed responded, "That's not a problem for these [nonprofit executives] guys. They'll do all the charity care they can." This is consistent with Hannsman (1980) who suggests that executives self-select into nonprofit organizations because they derive utility from the nonprofit function.

The above comments suggest that nonprofits need to encourage managers to allocate their time across two tasks: one that provides them with nonmonetary utility (providing charity care) and one that does not provide nonmonetary utility, but is important for long-run hospital viability (generating profits). Holmstrom and Milgrom (1991) develop a model that contrasts with earlier agency models because it considers a multitask environment and suggests that all work may not be unpleasant to workers. Therefore, incentives are needed to encourage employees to allocate appropriate time and effort among their various duties. Their framework suggests that providing incentives for one task can influence the manager's effort toward other tasks. If nonprofit boards are concerned that managers are focusing too much on nonprofit objectives, then more weight will be placed on financial performance and less or no weight on nonprofit objectives.

Charity care

Consistent with prior accounting research, we assume that charity care is a discretionary expenditure that is controllable by managers. For example, Leone and Van Horn (2005) examine earnings management behavior in nonprofit hospitals and use charity care as a proxy for discretionary spending. They find evidence that charity care levels increase as profits increase and decrease when losses are likely. Discretion arises because charity patients do not have to be admitted to the hospital for further treatment unless their illnesses are life-threatening. However, a portion of charity care is not discretionary because Medicare regulations require hospitals (regardless of ownership type) treating Medicare patients to provide emergency care to all patients without consideration of ability to pay.

Cunningham, Bazzoli, and Katz (2008) identify several discretionary actions taken by nonprofit hospitals to reduce charity care levels including restricting the number of nonemergency patients, developing referral agreements with other hospitals and outpatient care facilities, enforcing financial policies such as verifying income, and implementing cost-sharing agreements on a sliding scale with patients. We measure *Charity Care* as the unreimbursed revenue related to charitable activities (i.e., charges for patient treatment that is classified as charity care) scaled by gross revenue (gross patient charges). Our measure of charity care does not include bad debt expense. In 1990, the AICPA required charity care and bad debt to be reported separately because these two measures capture different expenses (Eldenburg and Vines 2004). Nonprofit hospital stakeholders view bad debt negatively because it implies weak collection practices, while charity care is viewed positively as serving the community benefit.

8. Source: "Community Benefit and the Executive Incentive Plan," by Dan Schleeter, Integrated Healthcare Strategies. http://www.ihstrategies.com/articles/294.pdf.

Hypotheses development

Profit-based incentives and charity care in for-profit hospitals

The role of managerial incentives in for-profit organizations is best explained within the context of agency theory. One of the key takeaways of this framework is that the principals (for-profit hospital owners) often provide agents (for-profit hospital managers) incentive compensation to decrease agency costs associated with moral hazard and adverse selection. Incentive contracts encourage effort (or minimize moral hazard) by shifting a portion of the firm's risk to the manager, thus reducing incentives to shirk (Jensen and Meckling 1976). Incentive contracts address adverse selection by serving as a selection mechanism where talented managers accept contracts that are too risky for low-skilled managers (Demski and Feltham 1979). These two objectives are not mutually exclusive; Lazear (2000) presents a theoretical model where incentives motivate both increased effort and also perform a sorting role.

The use of profit-based incentives in for-profit hospitals encourages managers to meet the organization's goal of maximizing profits through all possible actions, including reducing charity care to minimum levels. Variation in incentives across hospitals suggests that for-profit hospitals with the strongest profit-based incentives should also have the highest incentives to increase profits and to reduce charity care. Formally stated, our first hypothesis (in alternative form) is:

> HYPOTHESIS 1. *Pay-for-performance sensitivities are negatively associated with charity care in for-profit hospitals.*

Profit-based incentives and charity care in nonprofit hospitals

As mentioned earlier, competitive pressures have led an increasing number of nonprofit hospitals to adopt profit-based incentives (Lambert and Larcker 1995; Erus and Weisbrod 2003). Similar to its effect in for-profit organizations, profit-based compensation could also encourage nonprofit hospital managers to increase profitability and to reduce charity care. In either context (for-profit or nonprofit), administrators may respond creatively to increased demand for charity care to maintain current profitability margins. For example, Cunningham et al. (2008) suggest that some nonprofit hospitals have recently responded to additional charity care demands by modifying their payer mix through emphasis on profitable services such as obstetric care and geriatric care, upgrading facilities to attract additional insured patients, increasing marketing programs aimed at insured advantages such as broad specialty coverage or specialized services such as stroke centers.

Although profit-based incentives could encourage nonprofit hospitals to reduce charity care, institutional pressures and constraints inherent in the nonprofit setting likely mitigate this negative effect for the following reasons. First, managers working in nonprofit hospitals are subject to institutional pressures. Krishnan and Yetman (2011) suggest that these pressures take the form of normative constraints (norms, prescriptions, and social sanctions) imposed by patients, employees, donors, and other community members and regulative pressures imposed by external monitors. They examine the influence of normative constraints imposed by stakeholders on reporting decisions in nonprofit hospitals and find that hospitals with higher normative pressures shift costs to a greater extent to improve their program service ratios. In our setting, donors and community members likely expect hospitals' managers to provide adequate levels of charity care in exchange for donations and subsidies. In addition, this pressure can result from regulators (internal revenue ser-

vice, lawmakers, and community stakeholders) evaluating whether a hospital has provided sufficient charity care to deserve its tax-exempt status (Wall Street Journal 2004).

Second, nonprofit hospital managers face a nondistribution constraint. This constraint prohibits the distribution of any residual to internal or external stakeholders and helps to explain why nonprofit and for-profit hospitals may attract different types of managers. Hannsman (1980) focuses on the nondistribution constraint and suggests that it acts as a screen, attracting managers who are less willing to make trade-offs between financial rewards and nonprofit objectives since these objectives are also well aligned with their own personal preferences. In a similar vein, Rose-Ackerman (1996) suggests that the nondistribution constraint attracts employees who may accept less pay because the constraint offers greater certainty that their efforts will help achieve nonprofit objectives. Differences in employee preferences across for-profit and nonprofit hospitals suggest that nonprofit managers likely have a different perception about the trade-offs they are willing to make in response to profit-based incentives. Thus, we expect nonprofit managers to be less likely to increase hospital profits at the expense of nonprofit objectives, including charity care.

The presence of the nondistribution constraint also provides a link between motivating operating efficiency and meeting nonprofit objectives. When profits are gained by efficiencies motivated through profit-based incentives, managers can use these resources to fund nonprofit objectives such as charity care. Thus, the predicted negative association between profit-based incentives and charity care should diminish as nonprofit hospitals use profits to fund nonprofit objectives (including charity care). This is consistent with Erus and Weisbrod (2003), who model the nonprofit production function using only two goods—a mission good (M) that is socially desirable but unprofitable, and a revenue good (R) that finances the provision of M. According to the authors, a tightening in R should lead to the equivalent of higher profit-based incentives for the nonprofit. These incentives, in turn, help generate higher R that will be used to subsidize the provision of M, which remains relatively constant. In our setting, their model implies that the provision of charity care (M) might not be affected if nonprofit hospitals adopt profit-based incentives in response to increasing competitive pressures and use additional profits (R) to subsidize expenditures in charity care (M).

In summary, we expect the effect of profit-based incentives on charity care to be less negative among nonprofit hospitals relative to for-profit hospitals. Our second hypothesis (in alternative form) is:

HYPOTHESIS 2. *The association between pay-for-performance sensitivities and charity care is less negative in nonprofit hospitals relative to for-profit hospitals.*

3. Data, variables, and descriptive statistics

Data

We use acute care hospital data from the California Office of Statewide Health Planning and Development (OSHPD), a department in the Health and Human Services Agency that collects annual financial data from hospitals. Eliminating specialty, psychiatric, and rehabilitation hospitals, among others, increases consistency in the production functions and reimbursement schemes/rates across the sample. Other accounting researchers have also used these data (e.g., Soderstrom 1993; Krishnan 2005; Eldenburg and Krishnan 2003, 2008). We restrict the sample to hospitals classified as either for-profit or nonprofit that have standard reporting periods; mergers are eliminated because the number of months in the reporting period changes that year. This results in a sample of 2,753 hospital-years from 367 unique hospitals over the period 1996 to 2006. We require that hospitals not switch ownership types during our sample period, reducing the sample by 218

TABLE 1
Sample selection criteria

	No. of hospital-years	No. of unique hospitals	No. of nonprofit hospitals	No. of for-profit hospitals
Nonprofit and for-profit acute care hospitals	2,753	367	225	142
Drop hospitals with changes in ownership	218	24	17	7
Drop hospitals without necessary data to compute *P4P*	605	108	59	49
Drop hospitals without necessary control variables	336	58	17	41
Final sample	1,594	177	132	45

hospital-years (24 hospitals). Because we focus on the role of profit-based incentives, we limit our sample to hospitals with the data needed to calculate the profit-based incentives measure (defined in section 3). This requirement reduces the sample by 605 hospital-years (108 unique hospitals). In addition, we require data to calculate the control variables used in our multivariate analysis (defined in section 3), reducing the sample by another 336 hospital-years (58 hospitals).[9] These sample selection criteria result in a final sample of 1,594 hospital-years composed of 177 unique hospitals (132 nonprofits and 45 for-profits). Table 1 summarizes the steps in the sample selection process.

Measurement of profit-based incentives

The independent variable of interest in our study is the sensitivity of changes in the pay of hospital managers to the changes in hospital income. We follow Eldenburg and Krishnan (2008) and estimate hospital-specific pay-for-performance sensitivities using a changes model where the dependent and independent variables are expressed as changes in natural logs:[10]

$$\Delta ln(Pay_t) = \alpha_0 + \alpha_1 \Delta ln(Net\ Income_t) + \varepsilon_t, \quad (1)$$

and where $\Delta ln(Net\ Income_t)$ is the change in the natural log of *Net Income* and $\Delta \ln(Pay_t)$ is the change in the natural log of *Pay*.[11] *Net Income* is the sum of operating and nonoperating income and *Pay* is the sum (annually) of direct salaries, bonuses, and benefits of the top hospital administrators including the CEO, Medical Director, Nursing Director, and their assistants for most hospitals. Although the pay of CEOs as a single measure is not available in this data set, Lambert and Larcker (1995) find that compensation for the top five hospital administrators is similar in structure to that of the CEO. The coefficient α_1 on $\Delta ln(Net\ Income_t)$ measures the extent to which executive compensation varies with financial performance, and becomes our independent variable of interest in the second stage of the analysis. We refer to this pay-for-performance coefficient (α_1) as *P4P*.

9. We lose proportionately more for-profit hospitals because of lack of leverage data. Leverage reflects financing constraints and thus is an important control variable. However, within hospital networks, leverage in for-profit hospitals is more often reported at the corporate level rather than the individual hospital level. Our results hold when we include these hospitals and set the missing values to zero or substitute with the for-profit mean or median leverage.
10. Our results are also robust to using data that has not been log-transformed. We presented *P4P* based on the log model for comparability to past research (Eldenburg and Krishnan 2008).
11. Based on the Equation (1) parameters for the average hospital, we estimate that a 1 percent increase in *Net Income* corresponds to a 6.65 percent increase in managerial pay.

Empirical model

To test the two hypotheses that charity care and pay-for-performance sensitivities are (i) negatively related in for-profit hospitals and (ii) less negatively related in nonprofit hospitals, we examine the association between charity care and our hospital-specific pay-for-performance sensitivities to determine whether that association varies across ownership types. We use the following model to examine the association between *Charity Care* and *P4P* within for-profit and nonprofit hospitals:

$$Charity\ Care_{it} = \beta_0 + \beta_1 P4P_i + \beta_2 P4P * NP + \beta_3 NP + Controls_{it} + \varepsilon_{it}, \quad (2)$$

where *Charity Care* and *P4P* are defined in sections 2 and 3, respectively. *NP* is an indicator with a value of one for nonprofit and zero reflecting for-profit hospital observations. *Controls* are defined in section 3. In (2), the association between *P4P* and *Charity Care* among for-profit hospitals is β_1 and among nonprofits it is $\beta_1 + \beta_2$. Thus, Hypothesis 1 predicts $\beta_1 < 0$ and Hypothesis 2 predicts $\beta_2 > 0$.

Control variables

We include control variables that measure other known determinants of charity care to reduce concerns about correlated omitted variables. Because patient characteristics affect the demand for charity care, we include the following variables that reflect payer mix and severity of illness: *Proportion Medicare*, *Proportion Medi-Cal* (California's Medicaid plan), *Proportion Outpatients*, average *Length of Stay*, and *Casemix Index*. Medi-Cal is likely correlated with the economic conditions surrounding the hospital (Eldenburg and Krishnan 2008), and therefore acts as a control for factors related to the hospital's demographics and economic environment.[12] In California, patients must demonstrate financial need and show that they do not qualify for Medi-Cal to qualify for charity care. In this context, Medi-Cal can be informative about the demand for charity care because individuals who qualify for Medi-Cal (who do not receive charity) and uninsured/under-insured patients who do not qualify for Medi-Cal (who could receive charity care) are likely to visit the same hospitals. To control for location-specific determinants of charity care, we include a *Competition Index* (measured as 1/Herfindahl–Hirschman Index)[13] and indicators for whether the hospital operates in a rural location (*Rural_Ind*).[14]

We control for several hospital-specific characteristics including hospital size (*Total Assets*), proximity to its capacity (*Occupancy*), and teaching hospital status (*Teaching_Ind*) because these factors affect managers' abilities to offer charity care. We also control for the number of hospitals in the hospital's system. *Leverage* is added to control for differences in financial distress and capital structure. Because higher levels of *P4P* could motivate managers to achieve higher levels of profitability and higher profitability could allow managers to provide more charity care, we also include *Net Margin* as an additional control.

12. Medi-Cal proxies for economic conditions because it is a hospital-year measure of patients' financial need. We also considered county-level uninsured rates and city-level unemployment rates. In unreported tests, we find a low correlation between charity care and these two alternative variables, probably because financial need can vary widely within a city or county. However, when we include these two variables as additional controls, we continue to find similar results.

13. The Herfindahl–Hirschman Index is the sum of the squared market shares (expressed as proportions) of all the firms operating in the market, and provides a good measure of competitive intensity (Martin 1993). The higher the competition in a market, the higher is the value of the *Competition Index* (the reciprocal of the Herfindahl–Hirschman). In a monopoly market, the *Competition Index* is 1, while a market with two firms with 40 percent and 60 percent share will have a *Competition Index* of 1.92.

14. As an additional robustness test, we replicate our main analysis including per capita income in the hospital's location as an additional control. We reestimate our main specification of (2) and observe similar levels of significance on our variables of interest.

TABLE 2
Descriptive statistics

	All hospital-years N = 1,594			Nonprofit hospital-years N = 1,284			For-profit hospital-years N = 310		
	Mean	SD	Median	Mean	SD	Median	Mean	SD	Median
Charity Care	0.011	0.014	0.005	0.011	0.014	0.006	0.009	0.017	0.001
P4P	0.042	0.293	0.029	0.034	0.315	0.020	0.075	0.167	0.071
R^2 from *P4P* model	0.174	0.205	0.080	0.166	0.193	0.075	0.205	0.247	0.101
Proportion Medicare	0.441	0.146	0.447	0.450	0.137	0.452	0.400	0.173	0.427
Proportion Medi-Cal	0.222	0.171	0.166	0.204	0.149	0.157	0.298	0.229	0.258
Proportion Outpatients	0.292	0.142	0.271	0.291	0.142	0.272	0.296	0.142	0.269
Length of Stay	5.380	2.093	4.916	5.345	1.924	4.940	5.522	2.681	4.796
Casemix Index	1.096	0.214	1.070	1.118	0.207	1.090	1.002	0.218	0.990
Occupancy	0.669	0.209	0.667	0.667	0.189	0.668	0.674	0.279	0.644
Total Assets	18.179	1.201	18.288	18.431	1.102	18.535	17.135	1.015	17.202
Competition Index	23.446	25.820	10.429	19.558	24.171	6.415	39.551	26.231	64.080
Teaching_Ind	0.207	0.405	0.000	0.219	0.414	0.000	0.158	0.365	0.000
Rural_Ind	0.132	0.338	0.000	0.159	0.366	0.000	0.019	0.138	0.000
Number_System	13.139	17.069	4.000	12.787	16.334	4.000	14.600	19.788	5.000
Leverage	0.348	0.257	0.301	0.337	0.204	0.305	0.397	0.406	0.277
Net Margin	0.028	0.120	0.034	0.037	0.086	0.037	−0.007	0.204	0.012

Notes:

The table presents univariate descriptive statistics on the hospitals in our sample. *Charity Care* is unreimbursed charges related to charity care/gross patient charges. *P4P* is the sensitivity of hospital manager compensation to net income, measurement described in section 3. *Proportion Medicare* is Medicare patient days/total patient days. *Proportion Medi-Cal* is Medi-Cal patient days/total patient days. *Proportion Outpatients* is outpatient charges/gross charges. *Length of Stay* is total inpatient days/number of inpatient discharges. *Casemix Index* is the Case Mix Index value from Medicare. *Occupancy* is actual patient days/available patient days. *Total Assets* is the natural log of the hospital's total assets. *Competition Index* is 1/Herfindahl–Hirschman Index. *Teaching_Ind* is 1 if the hospital is a teaching hospital, 0 otherwise. *Rural_Ind* is 1 if the hospital is a rural hospital, 0 otherwise. *Number_System* is the number of total hospitals within the same system. *Leverage* is total hospital debt/total hospital assets. *Net Margin* is the sum of operating and nonoperating income/the sum of operating and nonoperating revenue.

4. Empirical tests and results

Descriptive statistics

The first set of columns in Table 2 shows descriptive statistics for the pooled sample that includes both nonprofit and for-profit hospitals. The second and third sets of columns in Table 2 provide descriptive statistics for the nonprofit and for-profit samples, respectively. All variables are winsorized at the top and bottom one percent based on the distribution of all hospitals.

For the pooled sample, the average hospital provides about 1.1 percent of its gross revenue as charity care. The average (median) value of *P4P* is 0.042 (0.029). The average (median) R^2 for the models used to estimate *P4P* is 17.4 percent (8.0 percent).

Regarding control variables, Medicare patient days comprise about 44.1 percent of total patient days while Medi-Cal patient days are about 22.2 percent. Teaching hospitals represent 20.7 percent of the sample and 13.2 percent of hospitals are located in rural areas. The average hospital-year is profitable (both mean and median of *Net Margin* are positive). However, while the mean and median values of *Net Margin* are positive, the lower quartile is negative (untabled), indicating that loss-years are also relatively frequent.

A comparison of the mean values across ownership types indicates several differences. However, the univariate differences do not reflect the effects of other confounding factors such as differences in size. The average for-profit hospital (Mean ln(*Total Assets*) = 17.135) is smaller than the average nonprofit hospital (Mean ln(*Total Assets*) = 18.431).

Table 2 also compares the distribution of *P4P* across for-profit and nonprofit hospitals. Untabulated analysis indicates that the mean value of *P4P* is not significantly different across these ownership groups.[15] Note that while the distributions of *P4P* are not identical, there is considerable overlap in the values reported in the two groups, suggesting that the *P4P* values are comparable.[16] To reduce concerns that the nonprofit sample has systematically lower values of *P4P*, we also perform a matched sample analysis where nonprofit and for-profit hospitals are matched based on their *P4P* coefficients; this analysis is discussed in detail in section 4.

Table 3 presents the correlations among our research variables for the pooled sample. For the average firm, *Charity Care* is negatively associated with *P4P* (Pearson = −0.05, Spearman = −0.04). Both of these correlations are significant at the 10 percent level. *Net Margin* and *Total Assets* are positively correlated (Pearson = 0.29, Spearman = 0.27), indicating the presence of economies of scale in the healthcare industry. *Charity Care* and *Proportion Medi-Cal* are correlated (Pearson = 0.40, Spearman = 0.30), suggesting that *Proportion Medi-Cal* captures hospital-specific factors, such as socioeconomic aspects of location that are associated with the provision of charity care.

We also observe a positive association between *Net Margin* and *Charity Care* (Pearson = 0.07, Spearman = 0.13). This contemporaneous association is difficult to interpret because there is a mechanically negative association where greater levels of charity care lead to smaller levels net income, implying a negative association. However, hospitals may be more willing to provide charity care when hospital viability is less a concern (*Net Margin* is high), resulting in a positive association. Of course, this univariate association could also arise because both *Charity Care* and *Net Margin* are correlated with another hospital characteristic (size). We further investigate the association between profitability and charity care in section 4.

15. We perform two tests to compare *P4P* in the nonprofit and for-profit samples. In a univariate model, we estimate a regression with *P4P* as the dependent variable and a dummy for nonprofit status (*NP*) as the independent variable. The *t*-statistic for the coefficient on *NP* is calculated based on clustered standard errors adjusted for repeated hospital observations and it is also robust to heteroscedasticity allowing for different variances in the *NP* = 1 and *NP* = 0 samples. We also estimate a multivariate version and include additional hospital control variables related to size, teaching status, rural status, and system membership. The univariate and multivariate models result in *t*-statistics of −1.06 and −0.32, respectively.

16. While the mean value of *P4P* is lower in the nonprofit sample relative to the for-profit sample, there is greater variance in the nonprofit sample (SD = 0.315 vs. 0.167). Thus, while there are more small *P4P* observations in the nonprofit sample, this sample also includes several large observations. Alternatively, we observe that each of the deciles of *P4P* (calculated across all hospitals) contains at least one for-profit and one nonprofit hospital. Taken together this suggests that our nonprofit dummy is not simply an indicator for small *P4P*.

TABLE 3
Univariate correlations based on all for-profit and nonprofit hospital-years where the upper (lower) triangle presents the Spearman (Pearson) correlations

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(1) *Charity Care*	1.00	**−0.04**	**−0.20**	**−0.14**	**0.30**	**−0.24**	**0.14**	**−0.11**	0.03	**0.17**	**0.08**	**0.11**	**−0.08**	**0.07**	**−0.12**	**0.13**
(2) *P4P*	**−0.05**	1.00	**0.14**	0.00	0.03	**−0.09**	**−0.06**	**−0.11**	**−0.05**	**−0.10**	**0.10**	0.01	−0.02	**0.08**	0.03	0.04
(3) R^2	**−0.12**	**0.07**	1.00	−0.01	0.00	**0.14**	**−0.08**	−0.02	−0.02	**−0.12**	**−0.09**	**−0.05**	**0.06**	**0.12**	**0.12**	**−0.09**
(4) *Proportion Medicare*	**−0.20**	0.00	**−0.05**	1.00	**−0.48**	**0.20**	**−0.15**	**0.25**	**−0.12**	**−0.05**	**−0.19**	**−0.13**	**0.22**	0.02	0.02	−0.01
(5) *Proportion Medi-Cal*	**0.40**	−0.03	**0.09**	**−0.57**	1.00	**−0.19**	**0.40**	**−0.30**	**0.11**	**−0.17**	**0.17**	**0.13**	0.01	−0.03	**−0.08**	**−0.09**
(6) *Proportion Outpatients*	**−0.21**	−0.02	**0.10**	**0.19**	**−0.11**	1.00	**−0.42**	**−0.29**	**−0.34**	**−0.50**	**−0.50**	**−0.24**	**0.50**	**−0.12**	**0.04**	**−0.08**
(7) *Length of Stay*	**0.07**	−0.02	**0.10**	**−0.27**	**0.53**	**−0.25**	1.00	**0.23**	**0.27**	**0.15**	**0.24**	**0.18**	**−0.23**	**0.07**	0.02	**−0.09**
(8) *Casemix Index*	**−0.16**	**−0.07**	**−0.05**	**0.18**	**−0.31**	**−0.35**	**0.08**	1.00	**0.14**	**0.47**	−0.02	**0.23**	**−0.18**	**0.15**	−0.01	**0.11**
(9) *Occupancy*	**0.05**	−0.04	−0.02	**−0.13**	**0.12**	**−0.43**	**0.23**	**0.14**	1.00	**0.32**	**0.18**	**0.13**	**−0.20**	**−0.07**	0.02	**0.06**
(10) *Total Assets*	**0.06**	**−0.07**	**−0.17**	**−0.06**	**−0.21**	**−0.59**	**−0.05**	**0.48**	**0.34**	1.00	**0.18**	**0.32**	**−0.36**	**0.11**	−0.01	**0.27**
(11) *Competition Index*	**0.19**	0.01	−0.03	**−0.06**	**0.22**	**−0.31**	**0.16**	**−0.04**	**0.09**	**0.08**	1.00	**0.20**	**−0.45**	−0.03	−0.09	**−0.09**
(12) *Teaching_Ind*	**0.09**	−0.04	**−0.09**	**−0.12**	**0.07**	**−0.26**	**0.10**	**0.28**	**0.14**	**0.31**	**0.17**	1.00	**−0.19**	−0.03	**−0.09**	0.01
(13) *Rural_Ind*	**−0.09**	0.00	0.03	**0.22**	**−0.01**	**0.55**	**−0.10**	**−0.18**	**−0.23**	**−0.36**	**−0.30**	**0.19**	1.00	0.00	**−0.02**	0.01
(14) *Number_System*	0.03	**0.05**	**0.16**	0.01	0.01	−0.01	**0.05**	**0.08**	**−0.08**	−0.02	**0.05**	**−0.05**	0.02	1.00	0.00	**0.05**
(15) *Leverage*	**−0.16**	**0.07**	**0.15**	0.01	−0.04	**0.07**	**−0.04**	**−0.09**	0.01	**−0.08**	**−0.07**	**−0.10**	−0.03	0.00	1.00	**−0.18**
(16) *Net Margin*	**0.07**	0.04	**−0.05**	−0.01	−0.09	**−0.13**	**−0.10**	**0.10**	**0.12**	**0.29**	**−0.08**	0.03	0.01	0.03	**−0.15**	1.00

Notes:

The table presents univariate correlations between the dependent and independent variables used in the study based on all hospital-years (both for-profit and nonprofit observations). Correlations in bold are significant at the 0.10 level (two tailed). See Table 2 for variable definitions.

TABLE 4
Profit-based incentives and charity care—full sample

$$Charity\ Care_{it} = \beta_0 + \beta_1 P4P_i + \beta_2 P4P * NP + \beta_3 NP + Controls_{it} + \varepsilon_{it}. \quad (2)$$

		Model A		Model B		Model C		Model D	
Independent variable	Predicted Sign	Coefficient	*t*-statistic	Coefficient	*t*-statistic	Coefficient	*t*-statistic	Coefficient	*t*-statistic
P4P	− (H1)	−1.543	−2.64***	−20.092	−2.09**	−33.512	−2.83***	−32.674	−2.07**
*P4P * NP*	+ (H2)	1.498	2.22**	19.380	1.91**	33.721	2.74***	31.392	1.89**
NP		−0.776	−0.19	7.064	3.00***	4.889	1.91*	7.083	1.61
Proportion Medicare		6.255	0.98	5.970	0.95	4.919	0.79	9.473	1.141
Proportion Medi-Cal		45.729	5.98***	45.012	5.96***	44.648	6.00***	51.388	4.65***
Proportion Outpatients		−20.086	−2.68***	−19.821	−2.72***	−18.598	−2.71***	−12.988	−1.13
Length of Stay		−1.786	−3.63***	−1.790	−3.61***	−1.825	−3.68***	−2.006	−3.17***
Casemix Index		−6.934	−1.80*	−7.166	−1.88*	−7.085	−1.86*	−12.972	−2.41**
Occupancy		−2.809	−0.78	−2.807	−0.78	−2.660	−0.75	−1.805	−0.38
Total Assets		−1.018	−0.93	−0.990	−0.91	−0.950	−0.89	−0.733	−0.45
Competition Index		0.065	1.86*	0.064	1.80*	0.064	1.8	0.034	0.71
Teaching_Ind		0.762	0.38	0.815	0.41	0.970	0.5	−0.851	−0.35
Rural_Ind		−3.338	−1.53	−3.331	−1.52	−3.336	−1.54	−6.306	−1.77*
Number_System		0.034	0.78	0.034	0.78	0.030	0.68	0.072	1.29
Leverage		−6.270	−2.97***	−6.275	−2.82***	−6.730	−3.03***	−8.977	−2.92***
Net Margin		32.981	1.70*	33.154	1.70*	30.409	1.54	25.272	1.39
Year fixed effects		Yes		Yes		Yes		Yes	
R^2		32.4%		32.1%		32.5%		37.7%	
Number of observations		1,594		1,594		1,594		934	

Notes:

The table presents multivariate regression analysis of the determinants of charity care (Equation 2). In Model A, *P4P* is ranked across all hospitals. In Model B, *P4P* is the continuous estimated coefficient. In Model C, negative values of *P4P* are set equal to zero. In Model D, negative values of *P4P* are deleted. All *t*-statistics are calculated based on heteroscedasticity robust standard errors that are clustered by hospital. See Table 2 for variable definitions. *, **, *** denote statistical significance (one-sided) at the 10 percent, 5 percent, and 1 percent levels, respectively. All coefficients are multiplied by 1,000.

Charity care and profit-based incentives

Estimates of (2) presented in Table 4 provide evidence on whether the association between *Charity Care* and *P4P* varies with ownership type for the pooled full sample. All *t*-statistics are calculated based on heteroscedasticity-robust standard errors that are clustered by hospital. Our analysis is also robust to calculating standard errors with two-way clustering based on hospital and time.

Four specifications of (2) are presented that vary based on the measurement of *P4P*. In Model A, *P4P* is transformed into a ranked variable where the decile ranking of incentives is calculated across all hospitals (nonprofit and for-profit). In Model B, *P4P* is the continuous coefficient from Equation (1). In Model C, the negative values of the continuous measure of *P4P* are set equal to zero. In Model D, the negative values of the continuous measure of *P4P* are truncated.[17]

We view the results using ranks (Model A) as the preferred specification, though we present results from the four models to illustrate their robustness. There are two main advantages of the rank specification. First, it identifies cases where a hospital has high or low profit-based incentives relative to the entire universe of hospitals (both nonprofit and for-profit). That is, the rank specification relaxes the strict-linearity assumption inherent in the continuous specification. Second, the ranking reduces the influence of outliers that could arise due to measurement error in the estimation process. Consistent with these advantages, Model A has the highest R^2 relative to Model B, which uses unranked values of *P4P*.

The results for the rank specification (Model A) provide support for both hypotheses. Consistent with Hypothesis 1, we observe that *P4P* is negatively associated with *Charity Care* in for-profit hospitals. The coefficient is −1.543 (all coefficients multiplied by 1,000 to improve informativeness) with a *t*-statistic of −2.64. This result suggests that for-profit hospital managers respond to profit-based incentives by reducing levels of charity care. In addition, consistent with Hypothesis 2, there is a positive and significant interaction term (1.498, $t = 2.22$), indicating that the effect of profit-based incentives on charity is smaller for the nonprofit sample. Furthermore, an *F*-test (untabulated) indicates that the total effect of *P4P* on *Charity Care* in the nonprofit sample ($\beta_1 + \beta_2$) is not statistically significantly different from zero.

These results highlight the contrast in how nonprofit and for-profit managers internalize similar incentives. Our evidence indicates that nonprofit managers, unlike their for-profit counterparts, do not decrease charity care in response to profit-based incentives.

With regard to the control variables, *Charity Care* is positively related to the *Proportion Medi-Cal* patients. Patients who qualify for Medi-Cal must meet low-income criteria and likely live in areas with other low-income and uninsured populations. *Proportion of Outpatients*, *Length of Stay*, and *Casemix Index* are negatively related to *Charity Care*, indicating that charity patients have shorter stays and are not as severely ill as other patients. This likely reflects an age-related effect, whereby Medicare patients (who are insured and not eligible for charity care) drive up hospitals' length of stay and Case Mix Index. *Leverage* is negatively related to *Charity Care* suggesting that hospitals under financial distress are more likely to reduce charity care (Kim et al. 2009).

Model B estimates a parallel specification for (2) the absent rank transformation and also provides evidence consistent with both of our hypotheses. The parameters also suggest

17. Our results are robust to estimating (2) after dropping observations with studentized residuals with an absolute value greater than 2. Alternatively, our results are also robust to removing influential observations with DFITTS values greater than 2.

that the association between profit-based incentives and charity care is economically significant. A one SD increase in *P4P* within for-profit hospitals is associated with a decrease in charity care of 0.0034 (−0.0034 = −(20.092 / 1000) * (0.167), which is approximately 37 percent of the mean level of charity care in for-profits (37 percent = 0.0034 / 0.009). This economic significance in the for-profit setting highlights the importance of investigating whether similar incentives lead to detrimental outcomes in the nonprofit setting.

Similar to Eldenburg and Krishnan (2008), there are observations with negative estimated values of *P4P*, which are somewhat more difficult to interpret. However, there are plausible explanations for them. For example, hospital managers could receive increases in pay when financial performance is falling but clinical performance is increasing. Because there is greater ambiguity about these negative observations, we estimate two additional models for robustness. In Model C the negative values of *P4P* are set to zero, while in Model D the negative *P4P* observations are deleted. In both models the coefficient on *P4P* is negative and significant, suggesting that for-profit managers reduced charity care in response to profit-based incentives. The interaction between *P4P* and *NP* is also positive and significant in both models, indicating that factors unique to nonprofit ownership mitigate the incentive to reduce charity care created by profit-based incentives.[18]

Matched sample analysis

As noted in the discussion of Table 2, the distributions of *P4P* in the nonprofit and for-profit samples have considerable overlap, but they are not identical. While there is not a significant difference in mean *P4P* across the groups, there could be concern that some systematic difference in the distributions is related to our results. To address this issue, we perform a matched sample analysis using the following procedure. For each for-profit hospital-year observation, we consider all nonprofit hospital-year observations in the same year and identify as a match the nonprofit hospital with the closest value of *P4P*. This matching ensures that the level of incentives and the distributions is effectively the same in both groups. The resulting sample is 620 observations for 82 hospitals, which is considerably smaller than our full sample (1,594 hospital-year observations) and could reduce the power of these tests.

Table 5 presents results that parallel the analysis in Table 4 but use the matched sample. The coefficients for the variables of interest remain significant, though there is a drop in the degree of significance, possibly due to the smaller sample. The notes to Table 5 provide descriptive statistics on the distributions of *P4P* for the two ownership groups in this analysis. Overall, the matched sample results are consistent with our hypotheses and provide further support for our main finding that nonprofit and for-profit hospitals respond to profit-based incentives differently.

Endogeneity concerns

Similar to other studies of compensation and performance, the interpretation of the association between incentives and performance is limited by concerns related to endogeneity. To empirically address this concern, we perform a two-stage least squares analysis. We expect that greater monitoring could reduce the need for incentives and yet monitoring is not directly related to the provision of charity care. Therefore, we estimate a first stage model predicting the level of *P4P* based on two proxies for the monitoring environment including (i) the hospital's governance expenditures (e.g., salaries and benefits for board members, costs for equipment and seminars) and (ii) a dummy indicating corporate

18. We run the same regressions on government hospitals during the same time period and find no significant association between pay and performance or between charity care and the *P4P* coefficients.

TABLE 5
Profit-based incentives and charity care—Matched sample only

$$Charity\ Care_{it} = \beta_0 + \beta_1 P4P_i + \beta_2 P4P * NP + \beta_3 NP + Controls_{it} + \varepsilon_{it} \quad (2)$$

		Model A		Model B		Model C		Model D	
Independent variable	Predicted sign	Coefficient	*t*-statistic	Coefficient	*t*-statistic	Coefficient	*t*-statistic	Coefficient	*t*-statistic
P4P	− (H1)	−1.022	−1.80**	−12.281	−1.31*	−27.631	−2.85***	−31.691	−2.8***
*P4P *NP*	+ (H2)	1.070	1.55*	17.099	1.61*	27.821	2.16**	31.488	2.06**
NP		−0.381	−0.08	4.634	1.93*	3.299	1.21	4.325	1.03
Proportion Medicare		2.841	0.37	2.990	0.38	0.351	0.05	−8.146	−1.05
Proportion Medi-Cal		26.817	3.47***	26.603	3.34***	25.202	3.36***	22.582	2.81***
Proportion Outpatients		−30.716	−2.45**	−30.413	−2.43**	−28.785	−2.41**	−44.604	−2.96***
Length of Stay		−1.199	−2.11**	−1.203	−2.03**	−1.309	−2.29**	−1.858	−3.11***
Casemix Index		−17.147	−3.40***	−17.365	−3.50***	−17.528	−3.58***	−17.855	−3.23***
Occupancy		−4.413	−1.06	−4.467	−1.06	−3.858	−0.95	−6.734	−1.37
Total Assets		−1.326	−0.72	−1.117	−0.60	−1.277	−0.73	−2.795	−1.32
Competition Index		−0.029	−0.74	−0.035	−0.86	−0.022	−0.56	−0.065	−1.4
Teaching_Ind		−0.403	−0.18	−0.396	−0.18	0.081	0.04	2.721	0.94
Rural_Ind		−2.309	−0.66	−2.302	−0.65	−1.788	−0.50	−2.571	−0.62
Number_System		0.012	0.25	0.007	0.15	0.008	0.18	0.052	0.97
Leverage		−6.582	−3.01***	−6.550	−2.88***	−7.154	−3.25***	−10.028	−3.37***
Net Margin		34.899	1.92*	34.243	1.83*	30.242	1.63	7.588	0.56
Year fixed effects		Yes		Yes		Yes		Yes	
R^2		38.9%		38.5%		39.9%		44.1%	
Number of observations		620		620		620		430	

Notes:

The table presents our matched sample analysis, where each for-profit observation is matched to a nonprofit observation with the closest *P4P* in the same year. After the matching procedure, the mean (median, SD) *P4P* in for-profits remains 0.075 (0.071, 0.167), while the mean (median, SD) *P4P* in nonprofits is 0.074 (0.071, 0.166). In Model A, *P4P* is ranked across all hospitals. In Model B, *P4P* is the continuous estimated coefficient. In Model C, negative values of *P4P* are set equal to zero. In Model D, negative values of *P4P* are deleted. All *t*-statistics are calculated based on heteroscedasticity robust standard errors that are clustered by hospital. See Table 2 for variable definitions. *, **, *** denote statistical significance (one-sided) at the 10 percent, 5 percent, and 1 percent levels, respectively. All coefficients are multiplied by 1,000.

TABLE 6
Two-stage least square analysis using coefficients from an instrumental variable in place of changes in compensation

Independent variable	Predicted sign	Coefficient	*t*-statistic
E[*P4P*]	− (H1)	−69.186	−3.26***
E[*P4P*] * *NP*	+ (H2)	58.218	3.42***
NP		−10.862	−2.47**
Proportion Medicare		20.060	2.33**
Proportion Medi-Cal		60.479	5.19***
Proportion Outpatients		−24.596	−3.38***
Length of Stay		−2.036	−3.87***
Casemix Index		−8.144	−2.22**
Occupancy		0.086	0.02
Total Assets		−0.869	−0.85
Competition Index		0.072	2.05**
Teaching_Ind		2.700	1.00
Rural_Ind		−3.819	−1.55
Number_System		0.072	1.68*
Leverage		−4.840	−2.29**
Net Margin		48.504	2.33**
Year fixed effects		Yes	
R^2		33.4%	
Number of observations		1,594	

Notes:

The table presents multivariate regression analysis of the association between *P4P* and charity care (Equation 2). However, in this analysis, *P4P* is replaced by expected *P4P* (*E*[*P4P*]) based on a first stage model that includes hospital governance expenses and a dummy indicating corporate ownership. All *t*-statistics are calculated based on heteroscedasticity robust standard errors that are clustered by hospital. See Table 2 for variable definitions. *, **, *** denote statistical significance (one-sided) at the 10 percent, 5 percent, and 1 percent levels, respectively. All coefficients are multiplied by 1,000.

ownership. We substitute the predicted value of *P4P* from the first stage regression into a second stage analysis (Equation 2). Table 6 presents these results, which help reduce concerns about endogeneity.[19]

A more specific concern about endogeneity could be that hospital boards choose the level of *P4P* to obtain a desired level of charity care. This would imply that nonprofits offer lower *P4P* to secure charity care, while for-profits offer higher *P4P* to minimize charity care. However, the results from our main analysis suggest that nonprofit hospitals with high levels *P4P* do not appear to reduce charity care. In addition, the matched-sample results discussed in section 4 address this concern most directly, holding the level of *P4P* constant across for-profit and nonprofit hospitals.

19. The first stage model is:

$$P4P_{it} = \delta_0 + \delta_1 CORP_{it} + \delta_2 GOVEXP_{it} + Controls_{it} + \varepsilon_{it},$$

where *CORP* is a dummy for corporate ownership (nonprofit or for-profit corporation as opposed to a health coop or partnership). *GOVEXP* reflects governing expenses scaled by gross revenues. These two variables provide insight into the level of monitoring and need for pay-for-performance incentives. This model includes the same controls and year fixed effects as in the main analysis.

In summary, while endogeneity is always a concern in empirical archival work absent a true "natural experiment," our two-stage least squares and matched sample analysis provide reasonable assurance that our evidence appears to be consistent with our hypotheses.

Analysis of P4P using pooled models

In this section, we examine our maintained assumptions. One assumption is that charity care is not included as a performance target in compensation contracts. We further assume that the relative strength of profit-based incentives at the average for-profit hospital and the average nonprofit hospital is similar. We test these assumptions by estimating pay-for-performance sensitivities for both accounting income and charity care at the pooled rather than hospital-specific level.

To examine the extent to which hospitals use performance measures based on profitability and charity care, we modify Equation (1). The added degrees of freedom in our pooled model allow us to add $\Delta ln(Charity\ Care_{it})$ and other control variables. Consistent with prior pooled analyses (Core 2002), all of the variables in the model are changes to remove firm fixed effects. In addition, we also include $\Delta ln(Total\ Assets_{it})$ to control for size and year fixed effects to control for macro determinants of pay in the hospital industry that vary by year. Lastly, we include interaction terms based on ownership type to allow all of the coefficients to vary with ownership types so that we can test for whether one group adjusts for *Charity Care*. This results in the following equation:

$$\begin{aligned}\Delta ln(Pay_{it}) = {} & \alpha_0 + \alpha_1 \Delta ln(Net\ Income_{it}) + \alpha_2 \Delta ln(Charity\ Care_{it}) + \alpha_3 \Delta ln(Total\ Assets_{it}) \\ & + \alpha_4 NP + \alpha_5 NP * \Delta ln(Net\ Income_{it}) + \alpha_6 NP * \Delta ln(Charity\ Care_{it}) \\ & + \alpha_7 NP * \Delta ln(Total\ Assets_{it}) + Year\ fixed\ effects + \varepsilon_{it}. \qquad (3)\end{aligned}$$

Our maintained assumption predicts that the coefficient on $\Delta ln(Charity\ Care_{it})$ will be insignificant for both for-profit and nonprofit hospitals, indicating that charity care receives no weight in executive compensation (α_2 and $\alpha_6 < 0$). In addition, (3) allows us to test the extent to which the strengths in profit-based incentives differ between for-profit and nonprofit hospitals (i.e., whether α_5 is significantly different from zero).

Table 7 presents pooled estimates of (3). As expected, the coefficient on $\Delta ln(Net\ Income_{it})$ is positive and significant (0.039, $t = 2.71$) indicating that the average for-profit hospital employs profit-based incentives during our time period. In addition, the coefficient on the interaction term, $NP*\Delta ln(Net\ Income_{it})$, is insignificant (0.001, $t = 0.02$). These results suggest that the strengths of profit-based incentives in for-profit and nonprofit hospitals are at least somewhat similar.

The coefficient on $\Delta ln(Charity\ Care_{it})$ is insignificant (0.011, $t = 0.55$) indicating that charity care is *not* used as a performance measure in executive compensation contracts for the average for-profit firms. In addition, the coefficient on $NP * \Delta ln(Charity\ Care_{it})$ is also insignificant (0.011, $t = 0.33$) indicating that neither group appears to remove the effect of charity care from compensation incentives. Given the number of insignificant terms in (3), we ran an *F*-test that rejected the null that all coefficients in the model are insignificant ($F = 2.500$, $p < 0.0021$). Taken together, these tests support our assumption that nonprofit and for-profit hospitals both use profit-based incentives during our sample period but do not link compensation to charity care.

The pooled specification of (3) also allows us to test another maintained assumption. Equation (1) assumes that *P4P* is stationary during the estimation window. This assumption could be a concern particularly if *P4P* coefficients are less stationary in one group, which could result in more noise in one sample. We test these assumptions by adding two additional terms to (3). First, we test stationarity for the average hospital by allowing the coefficient on $\Delta ln(Net\ Income_{it})$ to vary over time by interacting it with year fixed effects.

TABLE 7
Pooled analysis of the association between pay and net income

$$\Delta ln(Pay_{it}) = \alpha_0 + \alpha_1 \Delta ln(Net\ Income_{it}) + \alpha_2 \Delta ln(Charity\ Care_{it}) + \alpha_3 \Delta ln(Total\ Assets_{it}) + \alpha_4 NP + \alpha_5 NP * \Delta ln(Net\ Income_{it}) + \alpha_6 NP * \Delta ln(Charity\ Care_{it}) + \alpha_7 NP * \Delta ln(Total\ Assets_{it}) + Year\ fixed\ effects + \varepsilon_{it}. \quad (3)$$

Independent variable	Coefficient	*t*-statistic
$\Delta ln(Net\ Income_t)$	0.039	2.71*
$\Delta ln(Charity\ Care_t)$	0.011	0.55
$\Delta ln(Total\ Assets_t)$	0.140	1.15
NP	−0.028	−0.97
$NP * \Delta ln(Net\ Income_t)$	0.001	0.02
$NP * \Delta ln(Charity\ Care_t)$	0.011	0.33
$NP * \Delta ln(Total\ Assets_t)$	−0.083	−0.50
Year fixed effects	Yes	
R^2	2.0%	
Number of observations	1,360	

Notes:

The table presents multivariate regression analysis of the determinants of hospital manager pay (Equation 3), which is estimated using all hospital-years with available data and includes interactions allowing the effects of net income, charity care, and asset growth to vary across ownership types. All *t*-statistics are calculated based on heteroscedasticity robust standard errors that are clustered by hospital. * denotes statistical significance (one-sided) at the 1 percent level. See Table 2 for variable definitions.

Second, we allow the coefficient on $\Delta ln(Net\ Income_{it})$ to vary over time differentially by interacting $NP * \Delta ln(Net\ Income_{it})$ with year fixed effects. We calculate an *F*-test for each term (which contain multiple interactions, one for each year) to determine whether the new term adds explanatory power to the model. These *F*-tests (untabulated) reveal that none of these new interaction terms are significant at conventional levels, suggesting that our assumption of a stationary association between pay and net income appears reasonable for our sample period for both ownership groups.

Sensitivity analysis

We employ a variety of sensitivity tests to assess the robustness and appropriateness of our empirical results. First, because some of our *P4P* estimates are either insignificant or negative values, similar to those found in prior research (e.g., Eldenburg and Krishnan 2008), we examine their influence by setting any *P4P* estimates that are not positive and statistically significant to zero reestimating (2). The results are presented in Table 8. We continue to observe support for both of our hypotheses, suggesting that variation across the insignificant *P4P* values is not driving our results.

Second, we consider the possibility that differences in precision of our first stage estimate are driving our results in the second stage. As the average *P4P* R^2 in Table 2 shows, the precision of our *P4P* estimate is relatively higher in the for-profit group. In untabulated tests, we also include the hospital-specific R^2 and an interaction between R^2 and *P4P* in our main analysis, and find that our results are very similar while the coefficients on R^2 and R^2 * *P4P* are not significant. Thus, the difference in the association between *Charity*

TABLE 8
The role of *P4P* that are insignificant based on Equation (1) standard errors

$$Charity\ Care_{it} = \beta_0 + \beta_1 P4P_i + \beta_2 P4P * NP + \beta_3 NP + Controls_{it} + \varepsilon_{it}. \quad (2)$$

Independent variable	Predicted sign	Coefficient	*t*-statistic
P4P	− (H1)	−25.832	**−1.92***
*P4P * NP*	+ (H2)	25.499	**1.88***
NP		6.553	2.61
Proportion Medicare		6.511	1.03
Proportion Medi-Cal		44.210	5.92
Proportion Outpatients		−21.741	−3.04
Length of Stay		−1.754	−3.58
Casemix Index		−7.126	−1.84
Occupancy		−1.874	−0.52
Total Assets		−1.115	−1.04
Competition Index		0.057	1.59
Teaching_Ind		1.093	0.56
Rural_Ind		−2.982	−1.37
Number_System		0.037	0.84
Leverage		−5.867	−2.57
Net Margin		40.595	1.98
Year fixed effects		Yes	
R^2		31.9%	
Number of observations		1,594	

Notes:

The table presents multivariate regression analysis of the determinants of charity care (Equation 2). In this model, values of *P4P* that are not positive and significant at the 10 percent level one-tailed (based on their standard errors from the estimate of Equation 1) are set equal to zero. All *t*-statistics are calculated based on heteroscedasticity robust standard errors that are clustered by hospital. See Table 2 for variable definitions. * denotes statistical significance (one-sided) at the 5 percent level. All coefficients are multiplied by 1,000.

Care and *P4P* across nonprofit and for-profit hospitals does not seem to be driven by differences in precision across samples.

Third, to show that *P4P* likely captures profit-based incentives rather than incentives related to charity care, we calculate hospital-specific sensitivities of pay to charity care and replace *P4P* in the second stage with these sensitivities (which we call *P4C*). The coefficients on *P4C* and *P4C * NP* are both insignificant (untabulated), confirming that *P4P* is not driven by charity care. To address the possibility of reverse causality, we examine the association between *P4P* and *Charity Care* when *P4P* is determined first. Accordingly, we estimate the association between the lagged *P4P* and future *Charity Care* (calculated using a hold-out sample). We continue to observe a negative coefficient on *P4P* and a positive coefficient on *P4P * NP*, consistent with Hypotheses 1 and 2.

Fourth, we consider alternative scalars for charity care (net patient revenue, and total expenses) and find similar results. We also examine alternative standard-error specifications. As mentioned earlier, we used one-way clustering (by hospital) to control for autocorrelation. If we calculate standard errors using two-way clustering our inferences are unchanged. As another alternative, we estimate (2) using hospital-specific means to transform the panel

data structure into a cross-sectional sample, thus avoiding time-dependence problems. Results from this cross-sectional approach are comparable to the original results.

Fifth, if profit-based pay leads to higher levels of compensation, it is possible that our results are driven by the level of pay instead of the influence of profit-based incentives. To examine this issue, we include controls for total executive compensation and changes in total executive compensation, using several different scalars (i.e., total revenues, gross charges, net patient revenues, and total expenses). These controls are mostly insignificant while our main inferences remain the same (untabulated).

Sixth, (2) allows the coefficient on *P4P* to vary across the for-profit and nonprofit samples. However, the coefficients on the control variables are assumed to be the same across the samples. If we allow these coefficients to vary across samples, we continue to find support for our hypotheses with coefficients that are significant at the 10 percent level.

Seventh, we also verify that hospital managers make trade-offs between profitability and charity care. As mentioned previously, current period charity care mechanically decreases profits. However, it is possible that charity care helps hospitals attract subsidies, grants, and donations which could offset the cost of charity care. In untabulated tests, we include donations (scaled by gross charges) as an additional control in our second stage estimation and find that it has little impact on our coefficients on interest. We also regress $Net\ Margin_{t+1}$ on $Charity\ Care_t$ and find that charity care leads to lower future profitability, suggesting that charity care is indeed a costly activity. We tested whether this association is different between nonprofits and for-profits and found that the *t*-test was insignificant, suggesting it holds for both samples.

5. Conclusion

Recently, controversy has risen over the tax-exempt status of nonprofit hospitals. Critics have scrutinized both their compensation practices and charity care expenditures (Taylor 2004). To provide evidence about the effects of compensation practices on charity care, we analyze data from for-profit and nonprofit hospitals. Consistent with prior research (e.g., Brickley and Van Horn 2002; Eldenburg and Krishnan 2008), we find evidence that both for-profit and nonprofit hospitals place weight on financial performance in their executive compensation contracts. When we examine the association between profit-based compensation and charity care levels, we find a negative association within for-profits and no association within nonprofits.

The difference in managers' behavior can be explained by institutional theory, which suggests that nonprofit hospital managers are subject to different institutional pressures and constraints than for-profit managers. For example, nonprofit hospital managers experience normative pressure from stakeholders, such as donors and community members who value charity care, and regulative pressures from external monitors (i.e., the IRS and state and federal regulators) who also value charity care. These pressures encourage managers to provide charity care. In addition, nonprofit organizations are subject to nondistribution constraints that may help attract altruistic managers who value the nonprofit mission and derive personal utility from providing charity care (Hannsman 1980; Rose-Ackerman 1996). Finally, the nondistribution constraint increases the likelihood that additional profits will be used to fund charity care (Erus and Weisbrod 2003).

Our study is not without limitations. Because of data availability, we use hospital-specific estimates of pay-for-performance sensitivities to estimate profit-based incentives, which is a noisy measure. In addition, our estimates of profit-based incentives are calculated over a 10-year period, and are thus assumed to be fixed. In reality, hospitals are unlikely to use the same weights across the entire period. Notwithstanding these limitations, we believe our study contributes to this research area.

Our results have policy implications. The U.S. Internal Revenue Service (IRS) has scrutinized compensation practices for nonprofit managers more closely to prohibit *de facto* distributions of hospital profits. In 2005 and 2009, the IRS changed its Form 990, the *Return of Organization Exempt from Income Tax*, to collect data on executive compensation practices and amounts of community benefits provided (including charity care). Further, the IRS now requires all nonprofits (regardless of size) to submit the revised Form 990 annually. These changes reflect Congressional and public concern over the executive compensation and charity care practices of nonprofit hospitals. Our results help alleviate this concern, suggesting that incentive compensation is not associated with decreases in the level of charitable activities.

From a regulatory point of view, our results speak to the recent debate about the value of tax-exempt status in nonprofit hospitals. Regulators, industry observers, and the media have increasingly questioned the tax-exempt status of nonprofit hospitals, asserting that they behave no differently than for-profit hospitals. These criticisms of nonprofit hospitals are almost always based on comparisons of executive compensation and charity care between for-profit and nonprofit hospitals. A recent report by Clark Consulting, a large compensation consulting firm, notes: "[the public] can understand paying competitive salaries and benefits, but it has a hard time appreciating why a mission-based, tax-exempt organization should pay bonuses or supplemental benefits or perquisites" (Ackerman 2007).[20] Growing public scrutiny of nonprofit hospitals is also evidenced by recent, state-level proposals to strip tax-exempt status from hospitals with highly paid executives and low commitment to charity care.[21] Our results speak of this debate and suggest a key way in which for-profit and nonprofit hospital managers behave differently—their response to incentive compensation. This evidence partially alleviates concerns over nonprofit compensation arrangements that mirror those used in for-profit hospitals, thus providing some reassurance to regulators.

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20. Source: "Total Compensation Philosophy" an internal document discussing the compensation practices of nonprofit hospitals provided to us by Clark Consulting.
21. Source: "States review nonprofit hospitals' tax exemptions" *American Medical News*, September 10, 2007. http://www.ama-assn.org/amednews/2007/09/10/bisc0910.htm

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