NBER WORKING PAPER SERIES

OWNERSHIP FORM AND TRAPPED CAPITAL IN THE HOSPITAL INDUSTRY

Henry Hansmann
Daniel Kessler
Mark McClellan

Working Paper 8989
http://www.nber.org/papers/w8989

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
June 2002

We would like to thank Alex Whalley and Arran Shearer for exceptional research assistance, and David Cutler, Ed Glaeser, and participants in the NBER Not-for-Profits conference for many helpful suggestions. Funding from the US National Institutes on Aging through the NBER and from the Center for Social Innovation at the Stanford Graduate School of Business is greatly appreciated. The views expressed herein are those of the authors and not necessarily those of the National Bureau of Economic Research or the U.S. Government.

© 2002 by Henry Hansmann, Daniel Kessler and Mark McClellan. All rights reserved. Short sections of text, not to exceed two paragraphs, may be quoted without explicit permission provided that full credit, including © notice, is given to the source.

Ownership Form and Trapped Capital in the Hospital Industry
Henry Hansmann, Daniel Kessler and Mark McClellan
NBER Working Paper No. 8989
June 2002
JEL No. G3, I1, L3

ABSTRACT

Over the past 20 years, demand for acute care hospital services has declined more rapidly than has hospital capacity. This paper investigates the extent to which the preponderance of the nonprofit form in this industry might account for this phenomenon. We test whether rates of exit from the hospital industry differ significantly across the different forms of ownership, and especially whether secular nonprofit hospitals reduce capacity more slowly than do other types of hospitals. We estimate the effect of population changes (a proxy for changes in demand) at the zip-code level between 1985 and 1994 on changes in the capacity of for-profit, secular nonprofit, religious nonprofit, and public hospitals over the same period, holding constant metropolitan statistical area (MSA) fixed effects and other 1985 baseline characteristics of residential zip codes. We find that for-profit hospitals are the most responsive to reductions in demand, followed in turn by public and religiously affiliated nonprofit hospitals, while secular nonprofits are distinctly the least responsive of the four ownership types.

Henry Hansmann
Yale Law School
P.O. Box 208215
New Haven, CT 06520

Daniel Kessler
Graduate School of Business and
Hoover Institution
Stanford University
Stanford, CA 94305
and NBER
fkessler@stanford.edu

Mark McClellan
Council of Economic Advisers
Washington, DC 20502
and NBER
markmc@stanford.edu

I. INTRODUCTION

Hospital care is the most prominent of several important service industries – concentrated heavily in health care, education, and the arts – in which nonprofit firms account for a substantial share of total production. Nonprofit firms do not, however, provide all of the nation's hospital care; the industry is also heavily populated with both for-profit and governmental firms. The mix of ownership forms in this industry has fed a long-standing debate among economists, sociologists, and legal scholars about the patient and social welfare implications of ownership, with particular attention to differences between nonprofit and for-profit institutions. In this vein, several studies (reviewed in Kessler and McClellan 2002) have examined the effects of ownership on quality of care, operating efficiency, prices, costs, and the volume of charity care. We explore here a different but related issue: the effects of ownership on the rapidity of exit in the face of declining demand.

In recent years, hospital care in the U.S. has been characterized by rapidly falling demand, likely due in large part to technological advances in medical procedures and to managed care (Cutler 2000). Between 1980 and 1999, inpatient non-federal days in short-stay hospitals in the U.S. fell from 293,830,162 to 160,560,460, or 45.4 percent (Health United States 2001, Tables 1 and 91). Capacity, however, has declined significantly less rapidly. The number of non-federal hospital beds fell from 1,247,188 to 938,746 over this period, or 24.7 percent (Health United States 2001, Table 108).

The preponderance of the nonprofit form in the hospital industry may largely explain this divergence between the rate of decline in demand and the rate of contraction of capacity. The managers of nonprofit hospitals, lacking a class of owners to whom they are accountable, face no

external pressure to maximize profits, or even (like a public utility) to produce at least a market rate of return on the firm's invested capital. Rather, when cash flow is positive, they are free to reinvest all of it, expanding capacity to the point where net revenues (and hence the marginal rate of return on existing investments) is zero. And, even if cash flow is negative, they are free to maintain capacity by drawing down on accumulated net assets (which, among nonprofit hospitals, are often substantial). Indeed, managers of nonprofit hospitals may even feel it is their duty to behave in this fashion, believing in good faith that all of the firm's revenues and net assets must be dedicated to providing the maximum amount of hospital care possible.

A natural and potentially more efficient alternative would be for the hospital to return its (potential) free cash flow, beyond what can be reinvested with an appropriately high social rate of return, to patients in the form of lower prices. But for hospital managers this alternative is rendered even less morally salient than it might otherwise be by the fact that the bulk of hospital revenue today comes, not directly from patients, but rather from third-party insurers. (Another alternative would be to donate net revenues or assets to other charities with greater social need, as is sometimes done with the proceeds from conversion from nonprofit to for-profit form.) Reluctance to reduce capacity is likely to be strongly reinforced, moreover, by pressure from a hospital's affiliated staff physicians, whose income may be threatened by reduction or elimination of the hospitals' facilities (Pauly and Redish 1974).

To be sure, the managers of for-profit firms, and particularly of broadly-held business corporations, also have at times both the incentive and the opportunity to engage in empire-building. But the market for corporate control acts as an ultimate check on such tendencies, as demonstrated by the numerous hostile takeovers of the 1980s, which were in part directed at

reducing overcapacity and excessive reinvestment (Jensen 1988). No similar check exists for nonprofit firms, which cannot be the subject of a hostile takeover.

It follows that a nonprofit firm not only can, but might well be expected to, maintain capacity and even expand in circumstances where its for-profit competitors choose to contract or exit the market entirely. And this can remain true even if for-profit firms are significantly more cost efficient, and even if the nonprofit firm receives no special subsidies (Hansmann, 1996a). In short, nonprofit firms have a tendency to act as capital traps, in which capital remains inefficiently embedded over long periods.

The social welfare implications of such behavior are theoretically indeterminate. On one hand, "slow" adjustment of capacity to demand may be optimal. Altering the level of a factor of production whose costs are as sunk as those of a hospital bed is socially costly. On the other hand, "slow" adjustment may be socially wasteful. Maintaining a hospital bed is costly, in both financial and nonfinancial terms. Substantial research, starting with Roemer (1961), has suggested that high levels of bed capacity per patient lead to longer lengths of stay and higher costs. More recent research indicates that hospitals that treat relatively few cases of any particular type of patient – a potential consequence of high capacity – may deliver lower-quality care. Kessler and McClellan (2000), for example, find that elderly heart attack patients from markets with high levels of capacity per unit cardiac patient experience both generally higher levels of Medicare expenditures and higher mortality rates (although somewhat lower rates of cardiac complications).

Thus, it is important to understand how ownership affects capacity choice. If ownership forms respond differently to changes in demand, then public policies that favor one ownership

form over another may affect welfare not just by altering the mix of ownership forms itself, but also by affecting the aggregate level of industry capacity. Moreover, identifying differences in the response of capacity to demand by ownership type can help distinguish among competing general models of nonprofit firm behavior.

Despite the importance of the subject, however, little empirical work has focused on the impact of ownership form on capacity choice. Two studies have examined the differential supply response of nonprofit and for-profit firms, and of hospitals in particular, to rapid increases in demand. Both studies found that the market share of for-profit as opposed to nonprofit firms was significantly higher in areas that had recently experienced rapid growth in population. (Steinwald and Neuhauser 1970; Hansmann 1987.) These studies concluded that this pattern is explained, in important part, by the difficulties that nonprofit firms face in obtaining rapid access to capital.[1] The long-term pattern of development in the hospital industry, prior to the implementation of Medicare and Medicaid in 1966, was that the ratio of for-profit to nonprofit firms increased during periods of rapidly increasing demand, and then fell -- owing, in part, to conversions from for-profit to nonprofit form -- as demand growth slackened (Steinwald and Neuhauser 1970). The sluggish nonprofit supply response to increasing demand was thus largely a short-term phenomenon.

The principal problem facing the hospital industry today, however, may not be to hasten capacity expansion to meet growing demand, but just the opposite: to hasten the elimination of excess capacity already in place. Moreover, the problem is not peculiar to the hospital industry. The nonprofit form frequently performs a transitional role in the early stages of a service industry's development, serving as an important source of production until adequate demand-

side financing is organized, and the service is sufficiently standardized or regulated, to permit for-profit firms to serve as efficient providers. After that, the nonprofit firms lose their special *raison d'etre*, yet retain a substantial market share owing to trapped capital. Savings banking is a conspicuous example from the past (Hansmann, 1996b); health insurance and health maintenance organizations are contemporary examples; and higher education may be an example in the future (Hansmann 1996a). The problem of trapped capital is generic in the nonprofit sector.

We have spoken so far of the effects of nonprofit versus for-profit ownership on the rate of capacity adjustment, but the underlying model of behavior described above can explain other differences in capacity choice between ownership forms. Hospital care, like some other important services such as education, is also provided in substantial part by governmental institutions. Supply response in general, and trapped capital in particular, may be less of a problem for these public firms than it is for nonprofit firms. A public hospital is not a nonprofit entity, but rather a proprietary entity, with the government as the owner. And the government has other pressing uses for its funds besides providing hospital care. Consequently, when the private sector becomes capable of providing services formerly provided by the government, governments may face political incentives to exit. Consistent with this logic, after Medicare and Medicaid relieved much of the need for public and nonprofit hospitals to provide uncompensated care, there was substantial exit by public institutions, whose share of total beds dropped from roughly 31% to 24% between 1971 and 1992, while for-profit hospitals simultaneously increased their market share from 6% to 12%. In striking comparison, nonprofit hospitals, rather than

[1] See Lakdawalla and Philipson (1998) for related work on other constraints on nonprofits' ability to expand.

exiting in large numbers like the public institutions, actually increased their market share slightly during that period, from 63% to 64%. (Hansmann 1996a.)

For similar reasons, one might expect nonprofit hospitals to differ among themselves in terms of supply response. The most conspicuous divide in this respect is between religiously-affiliated and nonreligious hospitals. Like public hospitals, religiously-affiliated hospitals often have an owner of sorts, if not in the formal legal sense then at least in the functional sense that they are commonly associated with another entity, the church, that both exercises substantial control over them and stands to benefit from economies achieved in the hospitals' operations (and can serve as a source of funds and act as entrepreneur when expansion or entry is called for). By this reasoning, religiously-affiliated hospitals would show greater supply response than non-religious nonprofit hospitals.

In this paper we seek to test whether rates of exit from the hospital industry differ significantly across the different forms of ownership, and especially whether secular nonprofit hospitals, which supply the majority of industry capacity, are much slower to reduce capacity than are other types of hospitals. We examine the relative responsiveness of the different types of hospitals to changes in demand for hospital services, using changes in the size of the elderly population as a proxy for changes in demand. We present estimates of the effect of population changes at the zip-code level between 1985 and 1994 on changes in the capacity of for-profit, secular nonprofit, religious nonprofit, and public hospitals over the same period, holding constant metropolitan statistical area (MSA) fixed effects and other 1985 baseline characteristics of residential zip codes. We decompose the effect on each ownership form's capacity of population into four mutually exclusive and exhaustive sources: changes due to opens and closes

of hospitals, changes due to conversions, changes due to mergers and spinoffs, and changes due to changes in hospitals' bed size. We also investigate whether the responsiveness of different ownership forms' capacity to population differ according to zip codes' baseline 1985 hospital market characteristics.

Sections II through IV present the statistical models, the sources of data, and the empirical results. Section V concludes with some observations about the implications of our results for the hypothesized model of nonprofit firms' behavior described above, and for economic efficiency in sectors dominated by nonprofit firms.

II. MODELS

For every residential zip code $z = 1, \ldots, Z$ in a MSA in 1985 and 1994, we construct a measure of the hospital capacity serving that zip code. We assume that z is served by every nonfederal, general medical /surgical hospital $j = 1, \ldots, J_z$ within 35 miles of the patient's residence with at least five heart attack (AMI) admissions, and every large, nonfederal, general medical/surgical teaching hospital within 100 miles of the patient's residence with at least five AMI admissions.[2] We allocate a hospital's beds B_j to z in inverse proportion to the distance between the hospital and the center of z, such that the capacity of z in 1985 is defined as

$$C_{z,85} = \sum_{j=1}^{J_z} \frac{B_{j,85}}{D_{jz} \sum_{z=1}^{Z_j} \frac{1}{D_{jz}}},$$

[2] We explain the reason for these *a priori* constraints in Kessler and McClellan (2000); because markets for cardiac care are generally much smaller than the constraints, they are not restrictive.

where D_{jz} is the distance from *j* to *z* for every $z = 1, \ldots, Z_j$ that is served by *j*. We define $C_{z,94}$ analogously, and the log growth of capacity in zip code z as $dlnC_z = \ln(C_{z,94}) - \ln(C_{z,85})$. The normalizing factor

$$\frac{1}{\sum_{z=1}^{Z_j} \frac{1}{D_{jz}}}$$

assures that for any hospital, the sum across the zip codes that it serves of the weights allocating its capacity equals 1, i.e.

$$\sum_{z=1}^{Z_j} \frac{1}{D_{jz}} * \frac{1}{\sum_{z=1}^{Z_j} \frac{1}{D_{jz}}} = 1.$$

We decompose capacity in two ways to explore whether market conditions and changes in demand for hospital services have different effects on the capacity provided by hospitals of different ownership types. First, we decompose each residential area's capacity by its form of ownership. We define the secular nonprofit capacity of *z*, C_z^{SNP}, as

$$C_{z,85}^{SNP} = \sum_{j=1}^{J_z} \frac{B_{j,85} * SNP_{j,85}}{D_{jz} \sum_{z=1}^{Z_j} \frac{1}{D_{jz}}},$$

where $SNP_j = 1$ if *j* is a secular nonprofit hospital. We define for-profit capacity $C_{z,85}^{FP}$, religious nonprofit capacity $C_{z,85}^{RNP}$, and public capacity $C_{z,85}^{P}$ (and their associated growth rates) analogously. Estimates of the effect of market conditions and changes in demand on each ownership form's capacity will show how different types of organizations respond to exogenous shocks.

Second, we decompose each area's change in capacity by the source of the change. We categorize changes in total capacity and changes in each ownership form's capacity as due to one or more of four exhaustive and mutually exclusive causes: opens and closes of new hospitals; conversions (i.e., changes in ownership status); mergers and demergers; and changes in bed size for hospitals not experiencing any of the three changes above. We construct an area's (counterfactual) change in capacity due to (for example) opens and closes as follows. Define each hospital's 1985 capacity $B_{j,85}$ as its actual 1985 capacity; define each hospital's 1994 capacity $B_{j,94} = B_{j,85}$, unless the hospital opened or closed, in which case define $B_{j,94} = B_{j,94}$. Then, recalculate each area's capacity and change in capacity using these counterfactual hospital capacities.

We model area changes in capacity as a function of 1985-1994 changes in a zip code's Medicare enrollee population (to proxy for changes in demand for hospital services), the 1985 demographic characteristics of each zip code, the 1985 hospital market characteristics of each zip code, and MSA fixed effects. Thus, our effects are identified from within-MSA changes in population and within-MSA differences in market characteristics. We allow hospital capacity to respond asymmetrically to population increases and decreases. Our basic models specify the log change in residential zip code *z*'s capacity of ownership form k as a linear function of these factors:

$$(1) \qquad dlnC_z^k = \alpha_k + \beta^+ dlnP_z^+ + \beta^- dlnP_z^- + X_z\phi + M_z\gamma + \varepsilon_z,$$

where α_k is an MSA-specific constant term; $dlnP_z^+$ is *z*'s log change in population if *z*'s population expanded, 0 otherwise; $dlnP_z^-$ is *z*'s log change in population if *z*'s population contracted, 0 otherwise; X_z is a vector of six variables denoting the proportion of *z*'s population

in 1985 who were female, black, age 70-74, age 75-79, age 80-89, and age 90-99 (omitted group is the proportion of population that were white males aged 65-69); M_z is a vector of six variables denoting whether *z* in 1985 was in a highly-concentrated hospital market (in the top quartile of the distribution of Hirschman-Herfindahl indices), and whether *z* in 1985 had above the median density of patients admitted to large hospitals, teaching hospitals, hospitals that were members of multi-hospital systems, for-profit versus nonprofit hospitals, and public versus nonprofit hospitals;[3] and ε_z is an independently-distributed error term, with $E(\varepsilon_z \mid dlnP_z, X_z, M_z) = 0$. We weight each observation by the number of beds of ownership type *k* in zip code *z,* C_z^k.

We reestimate model (1) including controls for baseline 1985 beds per capita as a control variable, to investigate the extent to which our results are sensitive to differences in baseline capacity that are correlated with ownership status across areas:

$$(2) \qquad dlnC_z^k = \alpha_k + \beta^+ dlnP_z^+ + \beta^- dlnP_z^- + X_z\phi + M_z\gamma + \theta lnC_{z,85} + \varepsilon_z.$$

We also estimate two expanded models to investigate whether the responsiveness of capacity to population shifts varies by 1985 baseline characteristics of hospital markets. First, we estimate models that interact lnC_z with dlnP, to investigate the extent to which capacity is differentially responsive to demand in high- versus low-capacity areas:

$$(3)\ dlnC_z = \alpha_k + \beta^+ dlnP_z^+ + \beta^- dlnP_z^- + \delta^+ lnC_{z,85} * dlnP_z^+ + \delta^- lnC_{z,85} * dlnP_z^- + \\ + \theta lnC_{z,85} + X_z\phi + M_z\gamma + \varepsilon_z.$$

Second, we estimate models that interact M_z with $dlnP_z$:

$$(4)\ dlnC_z = \alpha_k + \beta^+ dlnP_z^+ + \beta^- dlnP_z^- + \delta^+ M_z * dlnP_z^+ + \delta^- M_z * dlnP_z^- + X_z\phi + M_z\gamma + \varepsilon_z.$$

[3] See Kessler and McClellan (2001) for a detailed description of how these variables were constructed.

Estimates from this model will show, for example, the extent to which capacity of different ownership forms respond differently to demand in more versus less competitive markets.

III. DATA

We use data from four sources. First, we use data on U.S. hospital characteristics collected by the American Hospital Association (AHA). The response rate of hospitals to the AHA survey is greater than 90 percent, with response rates above 95 percent for large hospitals (>300 beds). We exclude rural hospitals and hospitals owned by the federal government (primarily Veterans' Administration hospitals) because the process governing capacity decisions for these hospitals may differ from other hospitals. We analyze the capacity of only those hospitals that ever reported providing general medical or surgical services (for example, we exclude psychiatric and rehabilitation hospitals from analysis). To assess hospital size and bed capacity per patient, we use total general medical/surgical beds, including ICU/CCU and emergency beds. We classify hospitals as teaching hospitals if they report at least 20 full-time residents.

Second, we use a hospital system database constructed from multiple sources (see Madison 2001 for a detailed discussion). The AHA survey contains extensive year-by-year information on hospital system membership status. Our validity checking indicated that the universe of systems and system hospitals, and the timing of hospitals' system membership, as defined by AHA did not conform to discussion of hospital systems in the trade press such as *Modern Healthcare*. We therefore created our own system database based on a combination of the AHA and other sources. We classify hospitals as for-profit, secular nonprofit, religious

nonprofit, or publicly-owned. We classify all public hospitals as non-system hospitals because system membership of public hospitals in our data did not reflect reliably actual transfer of control to an outside entity.

Third, we use Medicare enrollment data to calculate the size and age/gender/race distribution of each non-rural zip code's elderly population. The Health Care Financing Adminstration's HISKEW enrollment files include demographic information on virtually all elderly Americans (including those enrolled in Medicare HMOs) because of the extremely high rate of takeup in the Medicare program.

Fourth, we use comprehensive Medicare claims data on the hospital choices of virtually all elderly Medicare beneficiaries with heart attack in 1985, matched with the three data sources described above, to estimate a model of patients' demand for hospital services as a function of travel distances between patients and hospitals, the characteristics of patients, and the characteristics of hospitals. With these estimates, we construct measures of patient flows to hospitals of different broad types (ownership status, size, teaching status, system membership status) that are based only on the arguably exogenous factors described above. Then, we calculate a vector of six indicator variables describing the hospital market characteristics of each zip code in 1985 as described above (see Kessler and McClellan 2000, 2002 for a detailed discussion).

Table 1 describes how hospital capacity under different ownership forms has changed over the 1985-1994 period, and the sources of those changes. Table 1 decomposes changes in the number of hospital beds (and the facilities experiencing changes in beds) into four exhaustive and mutually exclusive categories: changes due to conversions (changes in ownership status),

changes due to opens and closes, changes due to mergers and spinoffs, and changes due to changes in bed size (absent a conversion, open/close, or merger/spinoff). The most salient feature of the hospital industry during our study period was a massive contraction in capacity.

In percentage terms, religious nonprofit hospitals experienced the greatest contraction in bed capacity (32.5 percent), with public hospitals close behind (29.6 percent). For-profit beds contracted by 21.4 percent, while nonreligious nonprofit beds contracted the least, by 20 percent. These simple percentages do not give a clear picture of relative supply response, however, because the environments in which these four forms of ownership are found tend to differ. In particular, at the beginning of the study period, nonprofit hospitals, in comparison with for-profit hospitals, tended to be concentrated in areas with unusually high levels of capacity, where the need for reduction in capacity was presumably greatest. In results not presented in Table 1, the correlation coefficient between M_z^5 (=1 if the concentration of for-profit/nonprofit admissions in the zip code were above the median, 0 otherwise) and log(capacity per person in 1985) is .062, $p < .01$, and the correlation coefficient between M_z^6 (=1 if the concentration of public/nonprofit admissions in the zip code were above the median, 0 otherwise) and log(capacity per person in 1985) is .025, $p < .01$.

In recent years, much attention has been focused on conversions of nonprofit hospitals to for-profit form – attention that has been due, in part, to concerns about private profiteering that accompanying some of these conversions (see, e.g., Sloan, Taylor, and Conover 2000). Table 1 suggests that the pattern of conversion activity is not well described, however, as an overall shift of capacity from nonprofit to for-profit form. Rather, Table 1 shows that conversions were in fact a net source of *increase* in secular nonprofit hospital beds between 1985 and 1994, and it

further shows that, in aggregate, net conversion activity in that period was out of both public and religious nonprofit hospitals and into both for-profit and secular nonprofit hospitals.

To provide a more refined view of conversion activity, Table 2 tabulates the conversions in our data according to the ownership status of the hospitals involved both before and after the conversion. Those data show that, while there is a substantial number of conversions directly from secular nonprofit to for-profit form, there are also nearly two-thirds as many conversions in the reverse direction – likely as a response to declining profitability. The principal net conversion activity across ownership forms is, instead, from public hospitals to secular nonprofit hospitals, which accounts for nearly all of the overall net increase in secular nonprofit hospitals through conversion during the period in question.[4]

Table 3 shows how residential zip codes' hospital capacity responds to changes in population, according to the size of the zip codes' MSA, and previews the results of our regression models. Table 3 reports the 1985-1994 percentage change in the four hospital ownership types' capacity by MSA size for fast- growing versus slow-growing MSAs. Specifically, Table 3 groups zip codes according to the quartile of the zips' urban 1985 elderly population, with 80 MSAs in each quartile. Then, within each population quartile, each of the 80 MSAs is classified into one of two groups of 40 MSAs, depending on its 1985-1994 growth in elderly population.

Table 3 shows that, in the second and third population quartiles, variation across MSAs in supply response is consistent with the predictions that follow from the organizational incentives discussed in Section I. Capacity for all ownership types decreased in each group of MSAs, as

one would expect in an industry generally characterized by substantial overcapacity. For all ownership types except secular nonprofits, moreover, the percentage reduction in capacity is markedly greater in the slow-growing MSAs than in the fast-growing MSAs. For example, for-profit capacity in areas in the second population quartile shrank by 26.8 percent in fast-growing MSAs, but by 37.8 percent slow-growing MSAs. For secular nonprofit hospitals, however, not only is the relative rate of capacity reduction in fast- versus slow-growing MSAs much smaller than the relative rate of contraction for the other three ownership forms, but also the absolute rate of contraction in fast-growing MSAs is actually higher than the rate of contraction in slow-growing MSAs.

The rates of capacity change in the most-populous and least-populous MSA quartiles present a more complex pattern. In particular, Table 3 shows that, among the most populous MSAs, for-profit hospitals exited the faster-growing MSAs at a slightly faster rate than they exited slower-growing MSAs. At the same time, for-profit hospitals actually *expanded* capacity in the slowest-growing MSAs in the least populous quartile. Both these results are consistent with a wholesale shift by for-profit hospitals from the largest urban areas to smaller MSAs, regardless of expected trends in demand. The figures for the least populous quartile of MSAs, including particularly the large percentage increase in for-profit capacity that appears there, are also affected by the small number of institutions from which the figures are computed: the quartile of least populous MSAs contains dramatically fewer hospital beds than does the quartile containing the most populous MSAs.

---

[4] There is, however, an important caveat to be added here. We do not count as a conversion the potentially important phenomenon of nonprofit hospitals' contracting-out management of its facility to a for-profit firm.

The fact that the response to changing demand of hospitals of different ownership types differs depending on the characteristics of the cities in which they are located motivates our regression models. Those models identify the effects of changing demand on capacity based on within-MSA variation in population rather than on variation across MSAs, to control for such unobserved differences in hospitals' strategies. Specifically, we estimate the effect, on zip-code level measures of changes in capacity, of zip-code changes in demand and zip-code hospital market characteristics, holding constant MSA fixed effects. Descriptive statistics of all of the variables used in the regression analysis appear in Table 4.

IV. RESULTS

Table 5 presents estimates of the effect of population changes and base year hospital market characteristics on changes in differently-owned forms of hospital capacity from model (1). For hospitals overall, and for each individual ownership type, responsiveness to increases in demand, as proxied by population increases, is lower than responsiveness to decreases in demand, controlling for other market characteristics. A one percent increase in population leads to a .017 percent increase in overall capacity, holding other factors constant, while a one percent population decrease leads to a .095 percent decrease in overall capacity. This is what one would expect in an industry generally characterized by overcapacity.

Comparing the second through fifth columns of the first row of Table 5 shows that responsiveness to increases in demand for secular nonprofits is similar to that for religious nonprofit and for-profit hospitals, and rather lower than that of public institutions. This is perhaps because the expansionary incentives facing (the managers of) secular nonprofits, which

– as we have suggested above – are arguably greater than those present in the other three ownership types, are counterbalanced by the greater difficulty that secular nonprofits face in obtaining rapid access to capital.

Of primary interest to us here, however, is the relative responsiveness to *decreases* in demand exhibited by hospitals under different forms of ownership. Here, the results in Table 5 follow precisely the pattern that our theoretical discussion would predict. For-profit capacity is most responsive to decreases in demand. Next most responsive are public capacity and religious nonprofit capacity, for which the estimated coefficients are nearly identical. Secular nonprofit capacity is distinctly the least responsive to decreases in demand, with a coefficient that is less than half the coefficient for public and religious nonprofit capacity, and only one third of the coefficient for the responsiveness of for-profit capacity.

Tables 6 and 7 present estimates of models (2) and (3), respectively. Estimates of model (2) from Table 6 differ from the estimates of model (1) from Table 5 in that the former are calculated controlling baseline (1985) total hospital capacity per elderly Medicare beneficiary. Estimates of model (3) from Table 7 differ from the estimates of model (1) in Table 5 in that the former are calculated controlling for baseline hospital capacity plus baseline capacity interacted with the two population change variables, producing estimates of the effect of demand responsiveness that vary with the level of baseline capacity.

Table 6 shows that, especially for both forms of nonprofit capacity, the estimated responsiveness of capacity to increases in population grows larger once baseline capacity is held constant. The results are similar for the alternative specification in Table 7. In both Tables 6 and 7, this increase in responsiveness is offset by a significant negative effect of high baseline

capacity on the rate of growth in capacity. These are the results one would expect: there is less need to expand capacity to meet growing demand when the capacity in place is already unusually large.

The estimated responsiveness of capacity to population decreases remains essentially unchanged from Table 5 to Table 6 for all forms of ownership, even though baseline capacity is statistically significantly correlated with population decreases, just as it is with population increases (from analysis not in the table, $\rho = .106$ and $\rho = -.047$, respectively). One possible interpretation is that areas with declining population are already marked by sufficient overcapacity that they are contracting as fast as feasible (given organizational constraints), and that the added stimulus of yet further overcapacity has no important effect on the rate of contraction. In Table 7, the responsiveness of capacity to decreases in population drops substantially for all ownership types. High-capacity areas are less responsive to decreases in demand than are low-capacity areas, likely due to the same factors – not captured in these models – that were responsible for the high capacity to begin with.

Table 8 presents estimates of model (4), which allows the effects on capacity of increases and decreases in population to vary by hospital market characteristics. For-profit hospitals adjust to demand contractions much more rapidly when the market is concentrated, as, to a much lesser extent, do religious nonprofits. Secular nonprofit hospitals, in contrast, do not respond differently to demand contractions in concentrated versus unconcentrated markets.[5] One possible interpretation is that individual institutions internalize more of the gains from capacity reduction when they have a larger market share, and thus have a stronger incentive to eliminate

[5] In results not presented in the table, we also reestimated equation (4) with controls for baseline 1985 capacity per capita (as we did for equation (1), with results in Table 5), which had no substantial effect on this finding.

excess capacity in such circumstances – but only if the institutions value profitability above size and survival, which is presumably true of for-profit hospitals but may not be true of secular nonprofits. Differences by ownership status in the response of capacity to population increases in concentrated versus unconcentrated markets follow a different pattern. For-profit and public hospitals adjust to demand increases statistically significantly more rapidly in concentrated markets, whereas religious nonprofits adjust to demand increases statistically significantly less rapidly, reflecting the conflicting incentives for, and constraints on, expansion of hospitals of different ownership statuses discussed above.

Tables 9 through 13 present estimates of model (1) analogous to those in Table 4, but decomposed by the source of the change in capacity. Each table decomposes the changes in a single ownership form's capacity into four exhaustive and mutually exclusive sources: opens and closes, conversions, mergers and spinoffs, and changes in bed size.[6] Table 9 gives results for hospital capacity in aggregate. The exhaustive/exclusive nature of the decomposition is reflected in the fact that the coefficients across columns in Table 9 add to approximately the coefficients in column 1 of Table 2. Tables 10 through 13 give results for each ownership form taken separately.

Table 9 indicates that, as means of responding to both increases and decreases in demand, neither conversions nor mergers/spinoffs are significant vehicles for all forms of ownership in aggregate. This is not surprising, since those transactions do not in themselves lead to any change in aggregate capacity, although they can be the occasion for change. More interesting is

[6] The effects of population (and other covariates) on changes in an ownership form's capacity due to different causes do not necessarily average to the total effects on that ownership form because the a zip code's percentage change in the (counterfactually constructed) capacity due to the four causes does not necessarily average to a zip code's total percentage change in capacity.

the result that opens/closes, but not changes in bed size, is a significant means of responding to increases in demand. One reason for this pattern may be that areas with increasing population are often newly developed sections of MSAs that are far from existing facilities, and hence not easily served by expanding those facilities; rather, new facilities must be built to serve those areas. Another reason may be that, with changes in technology, it is often easier to build an entirely new facility than to expand an existing one.

The most surprising result in Table 8, however, is that only changes in bed size, and not opens/closes, are a significant means of reducing aggregate hospital capacity in response to decreases in demand. This result is due to the fact that (as seen in Tables 9 and 10) both secular and religious nonprofit hospitals use reductions in bed capacity much more than closure of facilities to respond to decreasing demand, consistent with the strong managerialist bias against complete exit that theory suggests we would find at least among secular nonprofits.

At first glance, Tables 10-13 appear to suggest that conversions are not used to transform the ownership structure of beds in response to demand changes: rows 1 and 2, column 2 of Tables 10-13 are small and statistically insignificant. However, this may be an artifact of our limited definition of conversion (i.e., same name and AHA identifier in 1985 and 1994, but with a different ownership status), which may exclude some changes in control that were *de facto* conversions. Tables 10-13 hint that this may be the case. In areas of decreasing population, nonprofit capacity contracts through opens/closes, while for-profit and public hospitals actually *expand* capacity significantly through opens/closes, suggesting that some of the closes and opens involved may actually be conversions. This finding underscores one potential limitation of the analysis of tables 10-13: any classification of changes in capacities into mutually exclusive

categories necessarily involves some arbitrary decisions that may not reflect the complex realities of the changing structure of the hospital industry.

V. CONCLUSION

Numerous empirical studies have sought to identify how differences in the incentives facing managers of nonprofit and for-profit firms lead to differences in economic performance.[7] Many of these studies have taken the hospital industry as their focus. Depending on the dimension of performance examined, these studies have reported both similarities and differences across ownership forms.[8] We have focused here on a largely neglected aspect of performance – rapidity of exit -- where differences in behavior between nonprofit and for-profit hospitals seem likely to be unusually pronounced, and where those differences may have important implications for the overall structure and performance of the industry.

Managers of for-profit hospitals, and to a lesser degree also managers of public hospitals and of religiously affiliated nonprofit hospitals, have an incentive to minimize costs of service, and hence to eliminate unused or underused capacity. Managers of unaffiliated nonprofit institutions, in contrast, may not feel such an incentive so long as net cash flow does not become negative. Consequently, it is a plausible hypothesis that nonprofit hospitals adjust capacity much more slowly than do for-profit firms in response to reductions in demand, effectively serving as capital traps.

---

[7] See Scott Morton and Podolny (2001) for work on related question: how differences in the incentives of hobbyist versus professional managers lead to differences in price and quality in the California wine industry.

[8] Compare, for example, Kessler and McClellan (2002), who find that areas with a presence of for-profit hospitals have lower levels of hospital expenditures but virtually the same patient health outcomes to Duggan (2000), who finds that nonprofit firms responded as strongly as for-profit firms to a California program that greatly increased immediate financial incentives to treat the indigent.

The results presented here provide strong support for that hypothesis. For-profit hospitals are the most responsive to reductions in demand, followed in turn by public and religiously affiliated nonprofit hospitals, while secular nonprofits are distinctly the least responsive of the four ownership types.

It follows that, if excess capacity is a continuing social problem in the hospital sector, then the high density of nonprofit firms, which are the legacy of a very different era of hospital technology and financing, may be in large part responsible. This suggests, in turn, that encouraging exit by nonprofit institutions – and particularly by secular nonprofits – may enhance efficiency. For example, the withdrawal of federal, state, and local tax exemption from nonprofit hospitals, or at least from those that do not provide substantial amounts of uncompensated care (much as federal tax exemption was withdrawn from nonprofit health insurance companies in 1986) could lead to a reallocation of assets to more productive uses. Alternatively, facilitating conversion to more cost-sensitive forms of organization by altering the fiduciary duties of nonprofit directors under corporate law to deny them the right to "just say no" to acquisition offers from other firms, and particularly from for-profit firms (Hansmann, 1996a, 2000), could accomplish the same goal. The latter reform would restrict the defensive tactics available to the managers of nonprofit corporations even more severely than those available to the managers of business corporations. Given, however, that nonprofit institutions by their nature are relatively insensitive to market pressures for exit, more expansive legally imposed fiduciary duties may be socially optimal.

Table 1: Sources of Changes in Hospital Capacity, 1985-1994

	Beds					Facilities				
	Total	For-profit	Nonprofit secular	Nonprofit religious	Public	Total	For-profit	Nonprofit secular	Nonprofit religious	Public
1985 total	546,321	63,276	296,650	116,134	70,261	2,684	449	1,401	445	389
1994 total	414,716	49,711	237,232	78,339	49,434	2,363	383	1,284	388	308
Net change	-131,605	-13,565	-59,418	-37,795	-20,827	-321	-66	-117	-57	-81
% of 1985 total	-24.1%	-21.4%	-20.0%	-32.5%	-29.6%	-12.0%	-14.7%	-8.4%	-12.8%	-20.8%
1985-94 opens and closes										
Gross gains	13,524	4,091	7,231	1,022	1,180	110	39	50	12	9
Gross losses	42,325	9,313	20,495	5,843	6,674	343	99	158	36	50
Net change	-28,801	-5,222	-13,264	-4,821	-5,494	-233	-60	-108	-24	-41
% of 85 total	-5.3%	-8.3%	-4.5%	-4.2%	-7.8%	-8.7%	-13.4%	-7.7%	-5.4%	-10.5%
1985-94 conversions										
Gross gains	38,257	5,757	22,359	7,011	3,130	242	51	125	46	20
Gross losses	50,177	4,718	17,746	17,494	10,219	242	32	89	65	56
Net change	-11,920	1,039	4,613	-10,483	-7,089	0	19	36	-19	-36
% of 85 total	-2.2%	1.6%	1.6%	-9.0%	-10.1%	0.0%	4.2%	2.6%	-4.3%	-9.3%
1985-94 mergers and spinoffs										
Gross gains	36,367	3,795	21,678	8,078	2,816	137	22	81	26	8
Gross losses	48,644	6,370	28,572	10,602	3,100	225	47	126	40	12
Net change	-12,277	-2,575	-6,894	-2,524	-284	-88	-25	-45	-14	-4
% of 85 total	-2.2%	-4.1%	-2.3%	-2.2%	-0.4%	-3.3%	-5.6%	-3.2%	-3.1%	-1.0%
1985-94 changes in bed size										
Gross gains	7,597	1,581	3,481	1,546	989	306	54	155	40	57
Gross losses	86,504	8,388	47,654	21,513	8,949	1,474	196	816	258	204
Net change	-78,907	-6,807	-44,173	-19,967	-7,960	-1,168	-142	-661	-218	-147
% of 85 total	-14.4%	-10.8%	-14.9%	-17.2%	-11.3%	-43.5%	-31.6%	-47.2%	-49.0%	-37.8%
Facilities without changes							21	62	6	10

Notes: Includes only nonrural, nonfederal hospitals that ever reported providing general medical or surgical services. 1994 total facilities = 1985 total facilities + net change due to opens and closes + net change due to conversions + net change due to mergers and spinoffs. 1985 total facilities = gross losses due to opens and closes + gross losses due to conversions + gross losses due to mergers and spinoffs + facilities experiencing gross gains due to changes in bed size + facilities experiencing gross losses due to changes in bed size + facilities without changes.

Table 2: Sources and Products of Hospital Conversions, 1985-1994

	Ownership Status in 1994				
Ownership Status in 1985	Nonprofit Secular	Nonprofit Religious	For-Profit	Public	Total
Nonprofit Secular		38	37	14	89
Nonprofit Religious	56		8	1	65
For-Profit	22	5		5	32
Public	47	3	6		56
Total	125	46	51	20	

Table 3: Percentage Changes in Hospital Capacity in Fast- and Slow-Growing MSAs, by MSA Size and Ownership Status 1985-1994

	All MSAs		Least populous MSAs		MSAs in second population quartile		MSAs in third population quartile		Most populous MSAs	
	fast-growing MSAs	slow-growing MSAs	fast-growing MSAs	slow-growing MSAs	fast-growing MSAs	slow-growing MSAs	fast-growing MSAs	slow-growing MSAs	fast-growing MSAs	slow-growing MSAs
All ownership forms	-23.7%	-25.7%	-18.9%	-33.0%	-23.1%	-27.9%	-20.1%	-25.7%	-25.4%	-25.0%
For-profit	-24.2%	-25.9%	-6.1%	155.0%	-26.8%	-37.8%	-7.4%	-35.8%	-30.4%	-26.3%
Nonprofit secular	-20.9%	-20.8%	7.1%	-34.8%	-24.3%	-18.0%	-23.2%	-16.2%	-21.2%	-20.9%
Nonprofit religious	-25.0%	-35.3%	-41.0%	-43.4%	-13.6%	-39.9%	-25.7%	-33.6%	-26.0%	-34.5%
Public	-29.2%	-34.4%	-33.2%	-43.0%	-29.3%	-46.2%	-15.0%	-37.5%	-32.6%	-31.6%
Number of MSAs	160	160	40	40	40	40	40	40	40	40

Notes: Population quartile cutpoints are based on elderly Medicare beneficiary enrollments of 15,005, 27,387, and 63,867. Fast-growing/slow-growing cutpoints are 17.0 percent for the least populous MSAs, 14.7 percent for second quartile, 15.3 percent for third quartile, 12.3 percent for the most populous MSAs.

Table 4: Characteristics of Zip Codes Used in Regression Analysis

Variable	N	Mean	Std Dev	Minimum	Maximum
Capacity, 1985	12753	24.754	19.274	0.420	275.842
secular nonprofit capacity	12753	13.877	12.846	0.000	127.115
religious nonprofit capacity	12753	5.018	7.114	0.000	148.047
for-profit capacity	12753	2.787	5.970	0.000	63.160
public capacity	12753	3.071	5.286	0.000	77.473
Log change in capacity, 1985-94	12753	-0.298	0.277	-4.465	4.041
secular nonprofit capacity	12253	-0.242	0.518	-5.795	4.502
religious nonprofit capacity	11010	-0.375	0.636	-6.010	6.194
for-profit capacity	6178	-0.277	0.655	-3.747	4.795
public capacity	10020	-0.411	0.769	-5.600	4.711
Log change in population, 1985-1994	12753	0.176	0.517	-4.736	6.581
ln(beds per capita in 1985)	12753	-1.921	1.420	-6.137	4.500
Very concentrated hospital market	12753	0.371	0.483	0.000	1.000
Above median density of for-profit/nonprofit	12753	0.441	0.497	0.000	1.000
Above median density of public/nonprofit	12753	0.479	0.500	0.000	1.000
Above median density of large hospitals	12753	0.400	0.490	0.000	1.000
Above median density of teaching hospitals	12753	0.410	0.492	0.000	1.000
Above median density of system hospitals	12753	0.484	0.500	0.000	1.000

Table 5: Effect of Increases and Decreases in Population and 1985 Hospital Market Characteristics on Changes in Hospital Bed Capacity, 1985-1994

	Dependent variable is zip code level ln(1994 capacity) – ln(1985 capacity) of				
	All ownership types	Nonprofit			
		secular	religious	For-profit	Public
dln(pop), increases	0.017**	0.023**	0.017	0.033**	0.053**
	(0.005)	(0.008)	(0.011)	(0.012)	(0.016)
dln(pop), decreases	0.095**	0.043**	0.109**	0.146**	0.110**
	(0.006)	(0.009)	(0.012)	(0.014)	(0.014)
Characteristics of hospital market in 1985					
Very concentrated hospital market	-0.014**	0.000	-0.023	-0.124**	-0.117**
	(0.007)	(0.009)	(0.014)	(0.024)	(0.020)
Above median density of for-profit/nonprofit	-0.010	0.056**	0.013	-0.332**	-0.233**
	(0.008)	(0.011)	(0.017)	(0.039)	(0.026)
Above median density of public/nonprofit	-0.021**	0.054**	-0.044**	-0.062**	-0.261**
	(0.006)	(0.009)	(0.013)	(0.019)	(0.024)
Above median density of large hospitals	0.029**	0.047**	0.032**	0.015	-0.059**
	(0.005)	(0.008)	(0.012)	(0.014)	(0.019)
Above median density teaching hospitals	0.010*	0.029**	0.001	0.019	0.125**
	(0.006)	(0.009)	(0.013)	(0.017)	(0.020)
Above median density of system hospitals	-0.003	0.021**	-0.008	-0.133**	0.004
	(0.006)	(0.009)	(0.011)	(0.018)	(0.018)

Notes: Number of zips with nonmissing change in capacity for all ownership types is 12,753, for secular nonprofit is 12,252, for religious nonprofit is 11,010, for for-profit is 6,178, and for public is 10,020. ** denotes statistical significance at a 5 percent level; * denotes statistical significance at a 10 percent level.

Table 6: Effect of Increases and Decreases in Population and 1985 Hospital Market Characteristics on Changes in Hospital Bed Capacity, 1985-1994, including controls for baseline 1985 capacity per person

	Dependent variable is zip code level ln(1994 capacity) – ln(1985 capacity) of				
	All ownership types	Nonprofit secular	Nonprofit religious	For-profit	Public
dln(pop), increases	0.026**	0.036**	0.044**	0.049**	0.056**
	(0.006)	(0.009)	(0.012)	(0.013)	(0.017)
dln(pop), decreases	0.091**	0.037**	0.096**	0.142**	0.109**
	(0.006)	(0.010)	(0.012)	(0.015)	(0.014)
Characteristics of hospital market in 1985					
ln(beds per capita in 1985)	-0.006**	-0.008**	-0.017**	-0.010**	-0.002
	(0.001)	(0.002)	(0.003)	(0.004)	(0.004)
Very concentrated hospital market	-0.014**	0.000	-0.022	-0.126**	-0.117**
	(0.007)	(0.009)	(0.014)	(0.024)	(0.020)
Above median density of for-profit/nonprofit	-0.011	0.055**	0.010	-0.336**	-0.234**
	(0.008)	(0.011)	(0.017)	(0.039)	(0.026)
Above median density of public/nonprofit	-0.021**	0.054**	-0.043**	-0.061**	-0.261**
	(0.006)	(0.009)	(0.013)	(0.019)	(0.024)
Above median density of large hospitals	0.029**	0.046**	0.031**	0.018	-0.059**
	(0.005)	(0.008)	(0.012)	(0.014)	(0.019)
Above median density of teaching hospitals	0.010	0.029**	0.001	0.018	0.124**
	(0.006)	(0.009)	(0.013)	(0.017)	(0.020)
Above median density of system hospitals	-0.003	0.021**	-0.008	-0.133**	0.004
	(0.006)	(0.009)	(0.011)	(0.018)	(0.018)

Notes: See notes to table 2.

Table 7: Effect of Increases and Decreases in Population and 1985 Hospital Market Characteristics on Changes in Hospital Bed Capacity, 1985-1994, including controls for baseline 1985 capacity per person and capacity*population interactions

	Dependent variable is zip code level ln(1994 capacity) – ln(1985 capacity) of				
	all ownership types	Nonprofit secular	Nonprofit religious	for-profit	public
dln(pop), increases	0.039**	0.046**	0.051**	0.068**	0.062**
	(0.006)	(0.009)	(0.012)	(0.013)	(0.017)
dln(pop), decreases	0.034**	0.004	0.087**	0.034	0.059**
	(0.007)	(0.012)	(0.015)	(0.021)	(0.019)
Interactions between ln(population) and ln(beds per capita) in 1985					
dln(pop), increases* Ln(beds/cap in 1985)	-0.017**	-0.016**	-0.025**	-0.022**	-0.026**
	(0.002)	(0.004)	(0.005)	(0.005)	(0.008)
dln(pop), decreases* Ln(beds/cap in 1985)	-0.035**	-0.024**	-0.004	-0.049**	-0.026**
	(0.003)	(0.005)	(0.007)	(0.007)	(0.007)
Characteristics of hospital market in 1985					
ln(beds per capita in 1985)	-0.007**	-0.007**	-0.011**	-0.012**	0.000
	(0.002)	(0.002)	(0.003)	(0.004)	(0.005)
Very concentrated Hospital market	-0.010	0.003	-0.018	-0.121**	-0.111**
	(0.007)	(0.009)	(0.014)	(0.023)	(0.020)
Above median density of for-profit/nonprofit	-0.010	0.056**	0.010	-0.334**	-0.231**
	(0.008)	(0.011)	(0.016)	(0.038)	(0.026)
Above median density of public/nonprofit	-0.022**	0.053**	-0.044**	-0.057**	-0.261**
	(0.006)	(0.009)	(0.013)	(0.018)	(0.024)
Above median density of large hospitals	0.031**	0.048**	0.033**	0.016	-0.055**
	(0.005)	(0.008)	(0.012)	(0.014)	(0.019)
Above median density of teaching hospitals	0.012*	0.030**	0.005	0.023	0.128**
	(0.006)	(0.009)	(0.013)	(0.017)	(0.020)
Above median density of system hospitals	-0.005	0.019**	-0.010	-0.136**	0.000
	(0.006)	(0.009)	(0.011)	(0.018)	(0.018)

Table 8: Differential Effects of Increases and Decreases in Population on Changes in Hospital Bed Capacity, 1985-1994, by Characteristics of Hospital Market in 1985

	Dependent variable is zip code level ln(1994 capacity) – ln(1985 capacity) of				
	All ownership types	Nonprofit secular	Nonprofit religious	For-profit	Public
dln(pop), increases	0.022	0.002	0.107**	-0.216**	-0.006
	(0.014)	(0.021)	(0.028)	(0.070)	(0.055)
dln(pop), decreases	0.126**	0.169**	0.034	0.116	0.054
	(0.020)	(0.030)	(0.043)	(0.105)	(0.082)
Interactions between ln(population) and characteristics of hospital market in 1985					
Very concentrated mkt* ln(population increase)	0.044**	-0.010	-0.123**	0.131**	0.086**
	(0.013)	(0.021)	(0.026)	(0.032)	(0.034)
Very concentrated mkt* ln(population decrease)	0.124**	-0.037	0.078**	0.682**	0.023
	(0.016)	(0.028)	(0.039)	(0.048)	(0.038)
High for-profit/nonprofit* ln(population increase)	-0.032**	-0.013	-0.056**	0.097	0.001
	(0.012)	(0.019)	(0.023)	(0.066)	(0.036)
High for-profit/nonprofit* ln(population decrease)	0.083**	0.085**	-0.022	-0.254**	0.132**
	(0.015)	(0.024)	(0.030)	(0.105)	(0.042)
High public/nonprofit* ln(population increase)	-0.001	0.012	0.035	0.096**	-0.005
	(0.010)	(0.016)	(0.021)	(0.025)	(0.047)
High public/nonprofit* ln(population decrease)	-0.075**	-0.088**	0.106**	0.035	-0.041
	(0.015)	(0.023)	(0.029)	(0.046)	(0.074)
High density of large* ln(population increase)	-0.026**	0.024	-0.023	-0.116**	-0.052*
	(0.011)	(0.018)	(0.022)	(0.024)	(0.031)
High density of large* ln(population decrease)	-0.036**	-0.054**	0.111**	-0.084**	0.091**
	(0.014)	(0.022)	(0.033)	(0.033)	(0.035)
High density of teaching* ln(population increase)	-0.009	-0.004	-0.084**	0.058*	0.027
	(0.012)	(0.020)	(0.024)	(0.032)	(0.036)
High density of teaching* ln(population decrease)	-0.067**	-0.123**	-0.053	0.171**	-0.084**
	(0.016)	(0.026)	(0.037)	(0.037)	(0.042)
High density of system* ln(population increase)	0.027**	0.025	-0.003	0.133**	0.085**
	(0.011)	(0.017)	(0.023)	(0.030)	(0.032)
High density of system* ln(population decrease)	-0.019	-0.013	-0.042*	0.195**	-0.089**
	(0.012)	(0.019)	(0.025)	(0.035)	(0.033)

Table 9: Effect of Increases and Decreases in Population and 1985 Hospital Market Characteristics on Changes in Total Hospital Bed Capacity, 1985-1994

	Dependent variable is zip-code level change in ln(capacity) due to…			
	Opens/closes	conversions	merger/spinoff	changes in bed size
dln(pop), increases	0.007**	0.001	0.002	0.004
	(0.002)	(0.002)	(0.002)	(0.004)
dln(pop), decreases	0.000	0.001	-0.002	0.089**
	(0.002)	(0.002)	(0.002)	(0.005)
Characteristics of hospital market in 1985				
Very concentrated hospital market	0.004**	0.000	0.005**	-0.027**
	(0.002)	(0.002)	(0.002)	(0.005)
Above median density of for-profit/nonprofit	-0.007**	-0.012**	0.011**	0.000
	(0.003)	(0.002)	(0.003)	(0.006)
Above median density of public/nonprofit	-0.004**	-0.008**	0.007**	-0.013**
	(0.002)	(0.002)	(0.002)	(0.005)
Above median density of large hospitals	0.010**	-0.001	-0.002	0.017**
	(0.002)	(0.002)	(0.002)	(0.004)
Above median density of teaching hospitals	-0.011**	0.002	0.015**	0.003
	(0.002)	(0.002)	(0.002)	(0.005)
Above median density of system hospitals	-0.005**	0.000	-0.014**	0.015**
	(0.002)	(0.002)	(0.002)	(0.005)

Table 10: Effect of Increases and Decreases in Population and 1985 Hospital Market Characteristics on Changes in Nonprofit Secular Hospital Bed Capacity, 1985-1994

	Dependent variable is zip-code level change in ln(capacity) due to…			
	opens/closes	conversions	merger/spinoff	changes in bed size
dln(pop), increases	0.006**	0.003	0.003	0.009*
	(0.002)	(0.004)	(0.003)	(0.005)
dln(pop), decreases	0.005**	0.001	-0.011	0.079**
	(0.002)	(0.005)	(0.003)	(0.006)
Characteristics of hospital market in 1985				
Very concentrated hospital market	0.006**	0.012**	0.001	-0.021**
	(0.002)	(0.005)	(0.003)	(0.006)
Above median density of for-profit/nonprofit	-0.003	0.020**	0.015**	-0.018**
	(0.002)	(0.006)	(0.004)	(0.007)
Above median density of public/nonprofit	0.004**	0.028**	0.001	-0.016**
	(0.002)	(0.005)	(0.003)	(0.006)
Above median density of large hospitals	0.005**	0.026**	-0.013**	0.020**
	(0.002)	(0.004)	(0.003)	(0.005)
Above median density of teaching hospitals	-0.009**	-0.010**	0.020**	0.017**
	(0.002)	(0.005)	(0.003)	(0.006)
Above median density of system hospitals	0.001	-0.015**	-0.010**	0.025**
	(0.002)	(0.005)	(0.003)	(0.006)

Table 11: Effect of Increases and Decreases in Population and 1985 Hospital Market Characteristics on Changes in Nonprofit religious Hospital Bed Capacity, 1985-1994

	Dependent variable is zip-code level change in ln(capacity) due to…			
	opens/closes	conversions	merger/spinoff	Changes in bed size
dln(pop), increases	0.004**	-0.003	0.011**	0.004
	(0.002)	(0.007)	(0.004)	(0.006)
dln(pop), decreases	0.002	0.007	0.018**	0.087**
	(0.002)	(0.007)	(0.004)	(0.007)
Characteristics of hospital market in 1985				
Very concentrated hospital market	0.004**	-0.013	0.034**	-0.049**
	(0.002)	(0.009)	(0.005)	(0.008)
Above median density of for-profit/nonprofit	0.010**	-0.067**	0.008	0.049**
	(0.002)	(0.010)	(0.006)	(0.009)
Above median density of public/nonprofit	-0.011**	-0.043**	0.048**	-0.010
	(0.002)	(0.008)	(0.005)	(0.007)
Above median density of large hospitals	0.006**	-0.011	0.012**	-0.007
	(0.002)	(0.007)	(0.004)	(0.007)
Above median density of teaching hospitals	-0.020**	0.000	0.023**	-0.003
	(0.002)	(0.008)	(0.005)	(0.007)
Above median density of system hospitals	0.016**	-0.007	-0.022**	0.010
	(0.002)	(0.007)	(0.004)	(0.006)

Table 12: Effect of Increases and Decreases in Population and 1985 Hospital Market Characteristics on Changes in For-Profit Hospital Bed Capacity, 1985-1994

	Dependent variable is zip-code level change in ln(capacity) due to…			
	opens/closes	conversions	merger/spinoff	changes in bed size
dln(pop), increases	0.015**	-0.010	0.004	0.020**
	(0.003)	(0.007)	(0.005)	(0.007)
dln(pop), decreases	-0.017**	-0.006	0.003	0.145**
	(0.004)	(0.008)	(0.006)	(0.008)
Characteristics of hospital market in 1985				
Very concentrated hospital market	-0.009	-0.049**	-0.048**	0.000
	(0.007)	(0.013)	(0.010)	(0.013)
Above median density of for-profit/nonprofit	0.000	-0.161**	-0.005	-0.003
	(0.010)	(0.020)	(0.015)	(0.020)
Above median density of public/nonprofit	-0.003	-0.010	-0.007	-0.035**
	(0.005)	(0.010)	(0.008)	(0.011)
Above median density of large hospitals	-0.005	-0.028**	0.031**	0.030**
	(0.004)	(0.008)	(0.006)	(0.008)
Above median density of teaching hospitals	-0.021**	0.016*	0.032**	-0.006
	(0.005)	(0.010)	(0.007)	(0.010)
Above median density of system hospitals	-0.031**	0.012	-0.088**	-0.025**
	(0.005)	(0.010)	(0.008)	(0.010)

Table 13: Effect of Increases and Decreases in Population and 1985 Hospital Market Characteristics on Changes in Public Hospital Bed Capacity, 1985-1994

	Dependent variable is zip-code level change in ln(capacity) due to…			
	opens/closes	conversions	merger/spinoff	changes in bed size
dln(pop), increases	0.008*	0.041**	-0.004	-0.003
	(0.004)	(0.011)	(0.003)	(0.008)
dln(pop), decreases	-0.008*	-0.019*	0.000	0.106**
	(0.004)	(0.011)	(0.003)	(0.008)
Characteristics of hospital market in 1985				
Very concentrated hospital market	0.044**	-0.101**	0.011**	-0.018
	(0.006)	(0.015)	(0.005)	(0.011)
Above median density of for-profit/nonprofit	-0.019**	-0.105**	0.007	-0.063**
	(0.008)	(0.020)	(0.006)	(0.015)
Above median density of public/nonprofit	-0.029**	-0.155**	-0.018**	0.006
	(0.007)	(0.018)	(0.005)	(0.013)
Above median density of large hospitals	0.044**	-0.070**	-0.040**	0.047**
	(0.006)	(0.014)	(0.004)	(0.010)
Above median density of teaching hospitals	0.029**	0.088**	0.013**	-0.083**
	(0.006)	(0.015)	(0.005)	(0.011)
Above median density of system hospitals	0.018**	0.001	0.003	-0.015
	(0.005)	(0.013)	(0.004)	(0.010)

References

Cutler, David, 2000, "Introduction," in David Cutler, ed., The Changing Hospital Industry: Comparing Not-for-Profit and For-Profit Institutions. Chicago: University of Chicago Press.

Duggan, Mark, 2000, "Hospital Ownership and Public Medical Spending," Quarterly Journal of Economics 140: 1343-73.

Hansmann, Henry, 1980, "The Role of Nonprofit Enterprise," Yale Law Journal 89: 835-901.

Hansmann, Henry, 1987, "The Effect of Tax Exemption and Other Factors on the Market Share of Nonprofit versus For-Profit Firms," National Tax Journal 40: 71-82.

Hansmann, Henry, 1996a, "The Changing Roles of Public, Private, and Nonprofit Enterprise in Education, Health Care, and Other Human Services," in Victor Fuchs, ed., Individual and Social Responsibility: Child Care, Education, Medical Care, and Long-Term Care in America. Chicago: University of Chicago Press.

Hansmann, Henry, 1996b, The Ownership of Enterprise. Cambridge: Harvard University Press.

Hansmann, Henry, 2001, "A Reform Agenda for the Law of Nonprofit Organizations," in Klaus Hopt and Dieter Reuter, eds., Stiftungsrecht in Europa 241-72. Hamburg: Carl Heymanns Verlag.

Jensen, Michael, 1988, "Takeovers: Their Causes and Consequences," Journal of Economic Perspectives 2: 21-48.

Kessler, Daniel P. and Mark B. McClellan, 2002, "The Effects of Hospital Ownership on Medical Productivity," forthcoming in RAND Journal of Economics.

Kessler, Daniel P. and Mark B. McClellan, 2000, "Is Hospital Competition Socially Wasteful?" Quarterly Journal of Economics 115: 577-615.

Lakdawalla, Darius and Tomas Philipson, 1998, "Nonprofit Production and Competition," NBER Working Paper 6377.

Madison, Kristin, 2001, "The Relationship Between Multihospital System Membership and Treatments, Costs, and Outcomes of Medicare Patients with Acute Myocardial Infarction," PhD. Thesis, Stanford University.

National Center for Health Statistics, 2001, "Health United States 2001, with Urban and Rural Chartbook," Hyattsville, MD: National Center for Health Statistics.

Pauly, Mark, and Michael Redisch, 1973, "The Not-For-Profit Hospital as a Physician's Cooperative,"American Economic Review 63: 87-99.

Roemer, M., 1961, "Bed Supply and Hospital Utilization: A Natural Experiment," Hospitals 35: 36-42.

Scott Morton, Fiona and Joel Podolny, 2001, "Love or Money? The Effect of Motivation in the California Wine Industry," draft.

Sloan, Frank A., Donald H. Taylor, Jr., and Christopher J. Conover, 2000, "Hospital Conversions: Is the Purchase Price Too Low?" in David Cutler, ed., The Changing Hospital Industry: Comparing Not-for-Profit and For-Profit Institutions. Chicago: University of Chicago Press.

Steinwald, Bruce, and Duncan Neuhauser, 1970, "The Role of the Proprietary Hospital," Law and Contemporary Problems 35: 817-38.