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HOSPITAL OWNERSHIP MIX EFFICIENCY IN THE US: AN EXPLORATORY STUDY

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ABSTRACT

This paper offers an empirical test of ownership mix efficiency in the U.S. hospital services industry. The test compares the benefits of quality assurance with the costs from the attenuation of property rights that result from an increased presence of nonprofit organizations. The empirical results suggest that too many not-for-profit and public hospitals may exist in the typical market area of the U.S. The policy implication is that more quality of care per dollar might be obtained by attracting a greater percentage of for-profit hospitals into some market areas. This conclusion, however, is tempered with several caveats. We discuss these and also make recommendations for further research.

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I. Introduction

Health care spending as a percentage of the gross domestic product has been on the rise again in the United States, with an increase from 13.3 percent in 2000 to 14.9 percent in 2002 (Levit et al., 2004). A considerable share of this growth can be attributed to the hospital services sector of the health economy because expenditures on hospital services account for 36 percent of all personal health care spending. The observed high level of spending in this sector has sometimes been linked to the inefficient use of resources by nonprofit organizations, which may result from the attenuation of property rights incentives.

Hansmann (1980) notes that nonprofit organizations face a non-distribution constraint because they cannot legally distribute any of their residual earnings. By law, nonprofit organizations must dispense all residual earnings for the express educational, charitable, or religious purposes for which they were formed. As a result, economists are quick to point out that nonprofit organizations are likely to face a more severe principal-agent problem than for-profits. In particular, the absence of a residual claimant with a financial interest in the organization means that no one individual, or group of individuals, has strong incentives to monitor the behavior of the organization. Therefore, in a nonprofit health care organization, the divergence between the interests of the principal(s) and the agent(s) often leads to the inefficient production and provision of medical care services. This occurs because unconstrained managers of nonprofit organizations are more inclined to pursue personal goals and objectives, which are likely to conflict with minimum cost production, *ceteris*

paribus. Consequently, property-rights theory predicts that a nonprofit healthcare organization, in isolation, will produce medical services at higher costs than an otherwise comparable for-profit organization.

However, if nonprofits do produce with higher costs, as property-rights theory predicts, it becomes unclear why nonprofit organizations are so dominant in many health care markets. Arrow (1963) has cleared up some of this ambiguity by pointing out that medical care is a highly complex personal service, one for which there exists considerable uncertainty surrounding quality. Accordingly, one hypothesis for the prevalence of nonprofits in healthcare markets is that nonprofit ownership status serves as a signal for quality in the presence of asymmetric information.

In this case, the non-distribution constraint implies nonprofit organizations face little financial incentive to compromise the quality of care they provide when consumers face asymmetric information. This is in contrast to for-profit organizations, which clearly confront financial incentives to engage in opportunistic behavior, such as skimping on the quality of care they provide, when consumers are imperfectly informed. Thus, economic theory suggests that an isolated nonprofit healthcare organization may offer higher levels of quality than an otherwise comparable for-profit organization.

While theory tends to be unambiguous in predicting that an "isolated" nonprofit organization will produce medical care with higher quality and production costs than an otherwise similar for-profit organization, both Hirth (1999) and Grabowski and Hirth (2002) have pointed out that nonprofit and for-profit organizations rarely operate in isolation; in fact, they often compete against one another in the same

market area. They hypothesize that competitive spillovers from nonprofits may lead to a higher quality of care in for-profit organizations. In support of this theory, the researchers find empirical evidence that an increase in nonprofit market share improves for-profit, and overall, nursing home quality.

Grabowski and Hirth (2002), and much earlier, Tuckman and Chang (1988), also note that competitive spillovers from for-profits may influence the behavior of nonprofit organizations because competition from for-profit organizations may limit the inefficiency of nonprofits. Inefficiency is limited because nonprofits have to be more concerned with the costs of producing medical care when facing competition from the more cost conscious for-profit organizations.[1] Grabowski and Hirth conclude (p. 19) that 'If non-profits have a competitive advantage in "trustworthiness" while for-profits have greater incentives for efficiency, intersectoral competition can yield better outcomes than a market consisting exclusively of one type of firm.'

Based upon the notion that a mix of for-profit and nonprofit organizations may promote societal well being, this paper develops and conducts a unique empirical test to assess the efficiency of the ownership mix in the typical hospital services market. As previously discussed, the existence of both nonprofit and for-profit organizations in a single market area can be expected to generate both social benefits and costs. By empirically estimating the relationship between the nonprofit (or for-profit) market share and the utilization of hospital services at the market level, we can infer the net social benefit of additional nonprofit facilities. We discuss this in the next section of this paper and also explain how we plan to conduct the empirical test. Section III

describes the data and sample used in the empirical analyses. Section IV presents the empirical findings and the last section offers conclusions, caveats, and suggestions for future research.

II. Conceptual Model

The method we employ to test for the efficient mix of for-profit and nonprofit hospitals in a geographical market is derived from Svorney (1987). Svorney examined the role of professional interests in establishing physician licensure. She argued that physician licensure potentially raises costs through higher wages because it acts as an entry barrier, but, she emphasized, licensure may also provide greater benefits in the form of quality assurance. The ultimate test of the efficiency of professional licensure, she argued, depends on whether or not the favorable demand response outweighs the undesirable supply response. For example, if the benefit of quality assurance causes demand to increase more than higher wages cause supply to decrease, then the utilization of physician services increases, and this reflects the net social benefit that physician licensure offers.[2] Hence, one may observe the impact of a regulation (or type of institution) on the utilization of a particular good or service, and from that draw an inference about its effect on economic efficiency.

In a similar vein, the efficiency of a *mix* of health care organizations with different ownership forms may be analyzed in this manner. For example, and in the context of this research, suppose we are comparing two similar hospital services markets that differ in the following respect: market area "A" is completely dominated by for-profit facilities whereas market area "B" is characterized by an equal

distribution of market shares across for-profit and nonprofit facilities. A graphical exposition of this comparison is presented in figure 1 for a competitive marketplace.

[INSERT FIGURE 1 ABOUT HERE]

The curves D_A and S_A represent the demand and supply for hospital services in market A (where for-profit facilities completely dominate). Notice that Q_A measures the market clearing quantity of hospital services in market A.

Given the different mix of ownership structures, the markets are likely to differ in two principle respects, *ceteris paribus*. First, a greater demand for hospital services will exist in market area B because of the increased quality assurance resulting directly (or indirectly) from the greater prevalence of nonprofit organizations. This higher level of quality assurance is captured by demand curve D_B in figure 1. Second, the supply of hospital services may be lower in market area B because of the higher production costs resulting from the diminished property-rights incentives from the greater proportion of nonprofit hospitals operating in the market. Higher production costs are reflected in supply curve S_B in figure 1. Because the demand (quality assurance) effect is assumed to be stronger than the cost effect in our example, the equilibrium quantity of hospital services, Q_B, is greater in market B than in market A.

Whether or not the demand effect more than offsets the supply effect in the typical market for hospital services is an empirical question that can be tested using standard regression techniques. The test can be conducted by observing the impact that the nonprofit (or for-profit) market share has on hospital care utilization, while carefully controlling for a host of other supply and demand factors. Equation 1 represents the general reduced-form model used in the forthcoming statistical

estimations. In equation 1, Q_i represents the equilibrium quantity of hospital care in market *i*; NPS_i represents the market share held by not-for-profit hospitals in market *i*;[3] PS_i stands for the market share held by public or government hospitals in market *i*; D_{ji} is a vector of *j* additional variables that are expected to influence the demand for hospital care in market *i*; and S_{ki} is a vector of *k* additional variables hypothesized to affect the supply of hospital care in market *i*. The error term, μ_i, is assumed to be independent and normally distributed with constant variance and a mean of zero (fixed effects in equation 1 have been suppressed for algebraic convenience).

$$Q_i = \beta_0 NPS_i + \beta_1 PS_i + \sum_{n=1}^{j} \gamma_n D_{in} + \sum_{n=1}^{k} \gamma_{j+n} S_{in} + \mu_i \qquad (1)$$

The coefficients on the not-for-profit and public hospital shares reflect whether the two ownership forms generate positive or negative net benefits at the margin. For example, if $\beta_0 < 0$ the benefit of quality assurance (i.e., demand increases) is less than the costs resulting form the diminished property rights incentives (i.e., supply decrease). In this case, the results would indicate that too many not-for-profits exist in the typical market area. If $\beta_0 > 0$, however, the opposite scenario holds. Finally, if $\beta_0 = 0$ this suggests that an efficient mix of not-for-profit and for-profit organizations exist in the typical market area.[4] The same logic holds for the public market share variable and the coefficient β_1.

III. Data and Empirical Test

In our test, the metropolitan statistical area (MSA) was assumed to be a reasonable approximation for the relevant geographical market (RGM) for hospital services. While this definition of the RGM is not without its weaknesses (Dranove and White, 1994), urban hospital markets are commonly defined in this manner for empirical research (e.g., Joskow, 1980; Manheim, Bazzoli, and Sohn, 1994; Spang, Bazzoli, and Arnould, 2001; Douglas and Ryman, 2003). Only community hospitals were included in the analysis because they provide a similar cluster of inpatient services and therefore operate in the same relevant product market. Access to necessary data such as the uninsured rate, the penetration rate of health maintenance organizations, and the Medicare managed care penetration rate prevented us from extending the empirical analysis to all 320 MSAs in the U.S. But the 90 MSA observations, for which we could obtain all of the required data, account for 75 percent of the population in the U.S. The data used in our empirical analyses are for the year 1999 and come from Health Forum (2002) and the Agency for Health Care Research and Quality.[5] Table 1 reports the mean value, standard deviation, and data source for each of the variables used in our empirical analyses.

[INSERT TABLE 1 ABOUT HERE]

The conceptual model indicates that a measure of hospital care utilization, or quantity, Q_i, is necessary to conduct the test. We employed several measures of utilization: number of admissions, inpatient beds, inpatient days, surgeries, outpatient visits, and emergency room visits. All of these indicators were measured on a per capita basis. Because good instruments are unavailable, we were unable to test and correct for the possibility that the market shares based on ownership are endogenous from a market

perspective. While an endogenous market share is indeed a possibility, there are nevertheless strong theoretical and institutional reasons to treat the hospital services market shares based on ownership as being exogenous. Evidence suggests that these market shares tend to change very little from one year to the next. In fact, Grabowski and Hirth (2002) note that the relative share of nonprofit hospitals in different parts of the country may be deeply rooted in historical factors such as the age of the city and different patterns of voluntarism and charitable provision that have little to do with the advanced technology and prevalence of third party payment that characterize the current health care environment. However, as Bound, Jaeger, and Baker (1995) have shown, when faced with the choice of using weak instruments and no instruments at all, the latter is often the best empirical strategy because weak instruments may lead to large inconsistencies in the IV-generated estimates. Moreover, if endogeneity is present, IV estimates in finite samples will still be biased in the same direction as OLS-generated estimates.

As previously mentioned, in an effort to isolate the impact of ownership mix on efficiency, we must also control for other factors that could result in utilization differences across market areas. Otherwise, the omission of variables that are correlated with both ownership mix and the measures of output could lead us to draw incorrect inferences from our empirical results. Following the conceptual model, these other influences can be broken down into the aforementioned demand-side variables, D_j and supply-side variables S_k.

Demand-side variables affecting hospital care utilization include indicators of population size, population density, the age composition of the population, the level of income and its distribution in the area, the presence and prevalence of disabilities among

the population, the percentage of uninsured individuals and the type of insurance coverage (e.g., HMO penetration rate and Medicare managed care penetration rate), competitiveness of the HMO insurance market, the availability of community health centers as an alternative to hospitals, and environmental conditions (e.g., unemployment, crime, and housing). These demand-side variables are intended to control for differences in the willingness and ability to pay for hospital services across market areas. Supply-side variables are fewer in number and include population density (as a proxy for the price of land), the presence of non-teaching hospitals (as a surrogate for quality of care), and the number of hospitals per capita. By construction, each measure of output, such as the number of admissions per capita, captures the average amount observed for the typical hospital in each MSA. Thus, the dramatic case-mix and quality of care differences normally observed among hospitals within a given metropolitan area are likely to be neutralized through the averaging process such that the average outputs are more similar, in terms of quality and case-mix, across MSAs (Keeler and Ying, 1996). We also controlled for individual state effects using a fixed-effects model specification to capture any omitted variables that may vary systematically across states.

IV. Empirical Results

The multiple regression equations for the six different measures of output are estimated by the ordinary least square procedure. White's (1980) test did not detect the presence of heteroscasticity. Each independent variable's coefficient estimate and its corresponding t-statistic (in absolute terms) are reported in table 2. The six regression equations explain between 48 and 80 percent of the variation in the various measures of output.

[INSERT TABLE 2 ABOUT HERE]

Looking across the various columns, it can be noted that the coefficient estimates on the not-for-profit and public hospital market shares are remarkably similar across the six regression equations in terms of their signs and magnitudes. This finding suggests that both types of nonprofit hospital organizations exert a similar marginal impact on efficiency. More specifically, the coefficient estimates are negative on both the not-for-profit and public hospital market shares in five of the six equations. Recall that a negative coefficient estimate indicates an overrepresentation of a particular type of hospital ownership from an efficiency perspective. For two of the five equations, inpatient beds and admissions, the coefficient estimates are statistically different from zero on the not-for-profit hospital market share and for three equation, inpatient beds, admissions, and days, the coefficient estimates are statistically significant on the public hospital market share. From an *inpatient care* efficiency perspective, these results suggest that not-for-profit and public hospitals may be overly dominant in the typical market area. That is, more quality of inpatient care per dollar might be realized by somehow growing the market share of for-profit hospitals.

However, notice in the outpatient visits equation that both the not-for-profit and public hospital market shares possess positive and statistically significant parameter estimates. Taken alone, this result suggests that not-for-profit and public hospitals should participate more extensively in the *outpatient care* sector of the hospital industry because they are underrepresented from an efficiency perspective. Our only reticence in drawing this particular conclusion is that the measure of market share is based on hospital admissions and not outpatient visits. Data limitations preclude us from constructing a

measure of market share based on other measures of output and, unfortunately, we do not know the strength of the correlation between market shares based on inpatient admissions and outpatient visits. However, considering that the outpatient facilities of hospitals often compete with physician clinics that are organized on a for-profit basis, it may not be too surprising that nonprofit organizations are underrepresented in the outpatient sector from an efficiency perspective.

Assuming that our results for the outpatient visits equation are plausible, can we draw any conclusion about the overall efficiency of the hospital ownership mix in the typical MSA? We can if we know something about the relative value that society assigns to the two types of hospital care. For instance, suppose we just focus on the regression results for hospital admissions since they mirror the results for inpatient beds (as well as inpatient days and surgeries but not as precisely). Using the coefficient estimates on the not-for-profit (-0.68) and public (-0.70) shares in the inpatient admissions equation, it can be determined that a one-percentage point increase in the shares of each type of hospital will reduce the number of inpatient visits per 1,000 population by .68 and .70, respectively. Evaluated at the sample mean for inpatient admissions (118 per 1,000 population), it follows that a one-percentage point increase in the two shares reduces inpatient admissions by .57 and .59 percent.

Following the same procedure for outpatient visits, it can be determined that the number of visits increases by .77 and .69 percent with respect to a one-percentage point increase in the market share of not-for-profit and public hospitals. Thus, if society values inpatient care and outpatient care equally, one might draw the conclusion that a greater presence of not-for-profit and public hospitals would benefit society from an overall

efficiency perspective because the percentage gain in outpatient visits outweighs the percentage loss in inpatient care. However, society most likely does not value equally both types of hospital care. For one reason, many visits to the outpatient care facility of a hospital are not the result of a life-threatening situation. In fact, notice in table 2 that the market shares of not-for-profit and public hospitals are not statistically related to the number of emergency room visits, a situation where the medical attention may be life saving in nature.

Another reason why the two types of care cannot be treated equally is that expenditures on inpatient care have tended to dwarf spending on outpatient care on a per unit basis. In 2000, for example, outpatient revenues amounted to $6,177 per discharge whereas inpatient revenues equaled $229 per visit.[6] Using these values to weigh the loss of inpatient admissions and gain of outpatient care resulting from a one-percentage point increase in the market shares, it can be determined that the losses amount to $4,200 for the not-for-profit share ($6,177 x 0.68) and $4,323 for the public hospital market share ($6,177 x 0.70). The corresponding benefits equal $3,073 ($229 x 13.42) and $2,792 ($229 x 12.19). Thus, according to these calculations, a marginal expansion of the not-for-profit and public market shares would result in net social losses.

V. Conclusions

This paper offers a test of the efficiency of the ownership mix in various hospital services markets across the U.S. When consumers lack sufficient information about hospital quality, the general notion is that nonprofit organizations generate societal benefits by offering (and signaling) quality assurance, but they may simultaneously result in higher production costs because of less attention devoted to efficiency. The opposite scenario

holds for for-profit organizations. Thus, a mix of ownership types in the marketplace may keep quality and costs under control as a result of competitive spillovers.

In this study we proposed that the efficiency of the ownership mix might be inferred by viewing how the ownership mix affects utilization through the use of multiple regression analyses. Our empirical results suggest that too many not-for-profit and public hospitals may characterize the typical hospital services market of the U.S., at least in 1999. As a result, greater quality of care per dollar could possibly be achieved by encouraging more for-profit hospitals to enter into some market areas of the U.S. Local and state policy makers could attract more for-profit hospitals by offering inducements such as zoning waivers and construction bond subsidies.

However, before policies of this kind are actually enacted it may be beneficial to replicate this study by obtaining richer data and by using a much larger panel data set of individual hospitals. Data of this kind are not available to us. A larger panel set would allow the investigator to control for a large number of hospital-specific features by employing fixed effects and may also permit some changes in the market shares of the different types of hospitals over time. Lastly, a richer data set might allow market share to be constructed with various measures of output or revenues involving inpatient and outpatient care. At the very least, our study here provides an initializing template to help organize and execute a more ambitious study on such an important and timely topic.

Figure 1:

Impact of Nonprofit Organizations in a Market Area

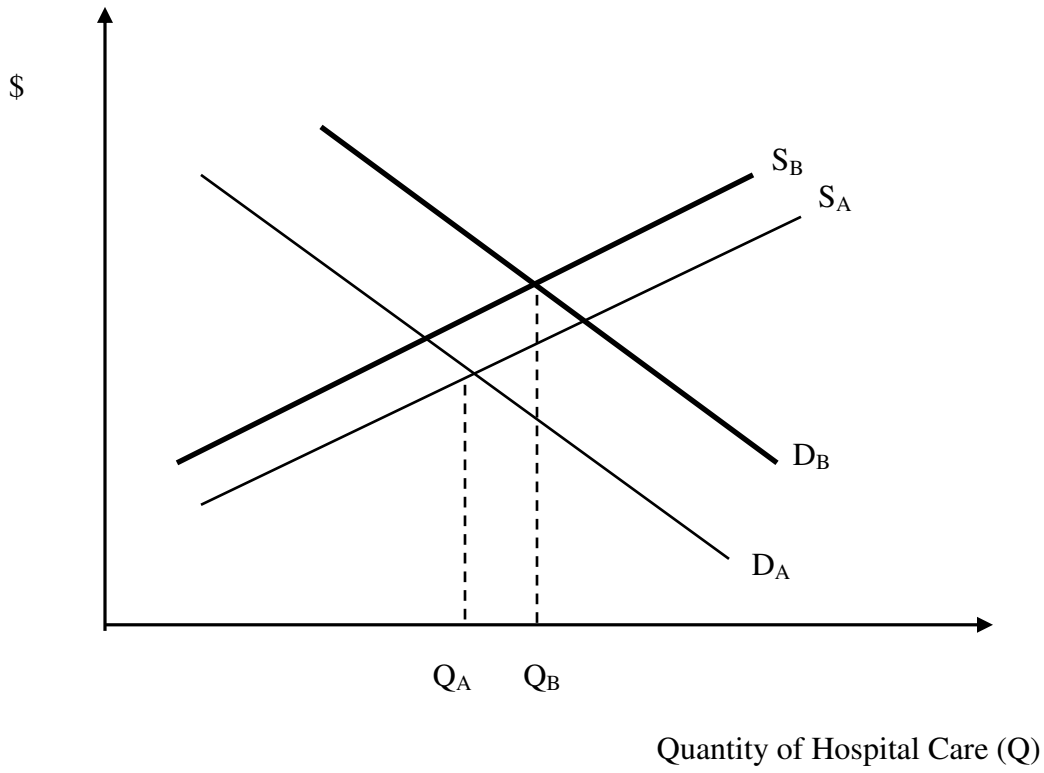

Table 1: Summary Statistics of Model Variables

	Mean	*Maximum*	*Minimum*	*SD*
Output Measures (Q)				
Inpatient beds per 1,000 population	2.70	4.80	1.52	0.74
Admissions per 1,000 population	118.43	194.00	70.00	24.10
Inpatient days per 1,000 population	688.37	1,560.79	347.16	206.10
Surgeries per 1,000 population	93.79	179.06	12.47	28.51
Outpatient visits per 1,000 population	1742.87	3,332.17	717.45	622.34
Emergency room visits per 1,000 population	349.03	610.00	178.00	75.57
Ownership Form				
% Admissions in not-for-profit hospitals	74.31	100.00	11.40	24.41
% Admissions in government hospitals	13.97	62.70	0.00	14.90
Control Variables				
% < 65 years of age that are uninsured	16.78	34.00	7.70	6.04
Population (in logs)	13.94	16.07	12.40	0.81
% < 18 in poverty	14.43	31.3	6.30	4.70
% >=18 in poverty	10.00	19.90	5.10	2.71
% > 65 years of age in poverty	8.66	18.90	4.80	2.51
Median household income (in logs)	10.71	11.22	10.36	0.16
% College graduates	54.57	69.9	38.5	7.19
HHI of HMO plans	0.72	0.92	0.38	0.12
HMO penetration rate	36.20	74.80	10.30	15.52
Managed care penetration rate	22.08	54.50	0.10	15.76
% >= 65 years of age	12.76	28.50	7.60	3.62
% < 18 years of age (children)	25.27	31.70	18.10	2.57
% Elderly that are disabled	41.08	49.00	33.30	3.61
% Children that are disabled	8.15	10.60	6.40	0.88
% Adults disabled	18.83	25.60	11.50	2.89
Community Health Ctr. in area (1=yes; 0=no)	0.94	1.00	0.00	0.23
% White	75.36	96.80	21.30	13.07
% Black	11.89	46.70	1.00	9.32
% Asian	4.29	46.00	0.40	6.22
% Hispanic	11.40	57.30	0.70	11.94
% Unemployed	5.65	12.00	3.00	1.75
Crimes per 10,000 population	448.33	861.00	169.00	130.71
Medicaid spending per recipient	1,229.78	2,263.00	979.00	266.49
Owner occupancy rate	65.68	80.00	30.70	7.61
Population density	887.69	12,687.00	39.00	1,619.46
% Non-teaching hospitals	45.80	100.00	0.80	22.71
Hospitals per capita	1.19E-05	2.50E-05	3.87E-06	3.87E-06

Table 2: Regression Results*
(t-statistics in parentheses; intercept and state fixed-effects not shown)

	Model 1	*Model 2*	*Model 3*	*Model 4*	*Model 5*	*Model 6*
Ownership Form						
% Admissions in not-for-profit hospitals	-0.017408	-0.677734	-2.039460	-0.438540	13.42445	-0.017056
	(-3.398822)	(-3.417784)	(-1.203825)	(-1.378442)	(2.170118)	(-0.021405)
% Admissions in government hospitals	-0.018447	-0.698634	-3.958114	-0.551990	12.19386	-0.060743
	(-3.057534)	(-2.990886)	(-1.983360)	(-1.472906)	(1.673373)	(-0.064711)
Control Variables						
% < 65 years of age that are uninsured	0.028589	-0.000267	2.492547	-0.223533	40.14873	3.915243
	(1.423427)	(-0.000344)	(0.375185)	(-0.179174)	(1.655055)	(1.252947)
Population (in logs)	-0.164641	-4.096928	-76.52110	-11.25629	-103.4276	-20.94462
	(-1.618767)	(-1.040411)	(-2.274526)	(-1.781706)	(-0.841947)	(-1.323592)
% < 18 years of age in poverty	0.089258	4.607877	26.80656	5.253087	124.9665	-5.104614
	(1.700779)	(2.267798)	(1.544214)	(1.611432)	(1.971508)	(-0.625174)
% >=18 years of age in poverty	-0.118910	-4.036185	-42.78689	-1.480802	7.340618	-0.298147
	(-1.237870)	(-1.085244)	(-1.346573)	(-0.248169)	(0.063269)	(-0.019949)
% > 65 years of age in poverty	0.152677	7.150566	-15.64101	3.806968	23.40192	8.599157
	(1.533051)	(1.854486)	(-0.474800)	(0.615398)	(0.194552)	(0.554976)
Median household income (in logs)	-2.136290	-95.20661	-282.5018	-87.45279	4278.866	33.54569
	(-1.310353)	(-1.508327)	(-0.523857)	(-0.863567)	(2.172993)	(0.132251)
% College graduates	0.051406	2.232797	11.27971	-0.362887	17.73480	2.766705
	(1.698818)	(1.905808)	(1.126915)	(-0.193061)	(0.485241)	(0.587662)
HHI of HMO plans	0.605763	11.99904	374.2914	10.08248	397.3641	9.640157
	(0.809866)	(0.414341)	(1.512807)	(0.217006)	(0.439846)	(0.082838)
HMO penetration rate	0.009378	0.368439	4.298054	0.131778	10.95894	0.314880
	(1.301004)	(1.320144)	(1.802563)	(0.294302)	(1.258709)	(0.280760)
% >= 65 years of age	-0.078406	-4.164036	-24.59626	-12.02800	175.7769	5.913105
	(-0.964271)	(-1.322704)	(-0.914493)	(-2.381418)	(1.789828)	(0.467411)
% < 18 years of age (children)	-0.177826	-8.149371	-77.05175	-15.50395	108.3408	-9.278874
	(-2.006915)	(-2.375520)	(-2.628936)	(-2.816896)	(1.012344)	(-0.673077)
% Elderly that are disabled	-0.022366	-3.721201	10.94538	-7.523833	201.3331	16.90855
	(-0.260616)	(-1.119936)	(0.385571)	(-1.411377)	(1.942345)	(1.266343)
% Children that are disabled	-0.360461	-16.53404	-107.8127	-12.48811	267.8056	-10.19527
	(-2.312464)	(-2.739657)	(-2.090981)	(-1.289757)	(1.422454)	(-0.420388)
% Adults disabled	0.105665	4.931317	35.28225	0.642812	-287.4038	0.837431
	(0.951882)	(1.147402)	(0.960886)	(0.093225)	(-2.143613)	(0.048488)
Managed care penetration rate	-0.017112	-0.618769	-4.942305	-0.279421	3.790572	-0.463653
	(-1.995457)	(-1.863650)	(-1.742321)	(-0.524552)	(0.365967)	(-0.347507)
Population density	-7.56E-05	-0.004747	-0.031942	-0.000708	-0.110717	-0.007092
	(-0.959854)	(-1.557426)	(-1.226536)	(-0.144721)	(-1.164321)	(-0.578950)
% Non-teaching hospitals	-0.004939	-0.152286	-1.580252	-0.118094	0.839587	0.086801
	(-1.523956)	(-1.213771)	(-1.474229)	(-0.586675)	(0.214508)	(0.172160)
Hospitals per capita	65185.50	-100100.4	11655593	460227.9	65308751	5349427
	(2.554247)	(-0.101309)	(1.380733)	(0.290321)	(2.118775)	(1.347269)
Community Health Ctr. in area (1=yes; 0=no)	-0.468933	-20.21179	26.96506	-7.062893	489.5722	27.66288
	(-1.719506)	(-1.914246)	(0.298922)	(-0.416936)	(1.486316)	(0.651966)
% White	-0.065743	-3.070321	-4.065585	-2.592480	-26.84783	-9.600755
	(-1.490105)	(-1.797436)	(-0.278584)	(-0.945974)	(-0.503826)	(-1.398653)
% Black	-0.054274	-3.344279	5.877669	-2.345748	-64.18617	-8.374896
	(-1.081284)	(-1.720866)	(0.354008)	(-0.752350)	(-1.058735)	(-1.072405)
% Asian	-0.079420	-3.380427	-12.37272	-3.825286	-13.83316	-12.53368
	(-1.464994)	(-1.610567)	(-0.689979)	(-1.135965)	(-0.211266)	(-1.486006)
% Hispanic	-0.025224	-1.216233	4.359374	-1.488003	-15.98263	-3.197323
	(-1.192190)	(-1.484756)	(0.622910)	(-1.132233)	(-0.625443)	(-0.971314)
% Unemployed	-0.094512	-2.499692	32.36122	-0.526327	-39.91996	-2.519594
	(-1.077113)	(-0.735799)	(1.114963)	(-0.096566)	(-0.376673)	(-0.184560)
Crimes per 10,000 population	0.000715	0.073644	-0.281846	0.059604	-0.004392	0.078918
	(0.733129)	(1.950914)	(-0.873927)	(0.984170)	(-0.003729)	(0.520247)

Medicaid spending per recipient	-0.009956 (-1.793032)	-0.548764 (-2.552613)	-0.727224 (-0.395941)	0.011945 (0.034631)	-7.116356 (-1.061104)	-0.424294 (-0.491134)
Owner occupancy rate	0.037983 (1.472935)	1.676560 (1.679226)	5.271153 (0.617958)	2.155294 (1.345521)	-2.873452 (-0.092256)	2.364285 (0.589284)
Model Fit (Adjusted R-squared)	**0.797**	**0.717**	**0.717**	**0.479**	**0.587**	**0.535**

* Models differ only by dependent variable. Where the dependent variable for each model is the following:
Model 1: Inpatient beds per 1,000 population;
Model 2: Admissions per 1,000 population;
Model 3: Inpatient days per 1,000 population;
Model 4: Surgeries per 1,000 population;
Model 5: Outpatient visits per 1,000 population;
Model 6: Emergency room visits per 1,000 population.

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Endnotes

[1] In recent work by Kessler and McClellan (2002) examining the hospital market, areas with a stronger presence of for-profits have 2.4% lower overall expenditures, but virtually the same patient outcomes.

[2] Svorney finds empirically that physician licensure leads to a reduced consumption of physician services. That is, physician licensure increased entry costs (supply) by more than it increased consumer benefits from quality assurance (demand). Thus her results provide support for the special interest theory of physician licensure.

[3] We categorize the difference types of hospitals based on ownership as private for-profit, private not-for-profit and public or government. Thus, the term "nonprofit" refers to both private not-for-profit and public organizations in this paper.

[4] In fact, an inverted U relationship might hold between each ownership market share and an output measure. However, sufficient variation in ownership does not exist to map out an entire inverted U relationship. We can only identify the direction of the slope.

[5] See http://www.ahrq.gov/data/safetynet/documentation/msatab1.xls (accessed December 1, 2004)

[6] See http://www.cms.hhs.gov/statistics/health-indicators/t1.asp (accessed December 1, 2004)

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