Profit Incentives and the Hospital Industry: Are We Expecting Too Much?

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In the recent past, a great deal of faith has been placed in the idea that the performance of the hospital industry could be improved significantly by relying more heavily on profit incentives. This article considers the effect of profit incentives on hospital behavior and finds that the existence of profit incentives has not led the for-profit hospitals in the sample to behave in significantly different economic fashions than the nonprofits.

Few industries have been subjected to closer scrutiny in the recent past than has the hospital industry. Most of the analyses conducted have been concerned with either identifying the determinants of the industry's rapidly rising costs or developing remedial proposals to restrain such cost increases. One such proposed remedy suggests that the industry's economic performance could be improved by more heavy reliance on profit incentives. This proposal is based on the economic theory of property rights, which predicts that for-profit firms, or at least those which operate under for-profit incentives, are likely to be more efficient than nonprofit firms [1-5]. The underlying idea is that within nonprofit firms, no individual, owner, or manager can significantly augment his or her income by enforcing economic efficiency within the hospital. Given this situation, the nonprofit firm may diverge from strict profit maximization. The situation differs significantly in the for-

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profit firm. Specifically, the owner of the for-profit firm holds an exclusive residual claim to the net revenues generated by the firm. Given this, it is predicted that the owner will desire the firm to be operated in an economically efficient, profit-maximizing fashion. Further, to ensure managerial compliance with this objective, the for-profit owner may extend a partial residual claim to the appointed manager. Finally, the for-profit manager must always be on guard against corporate takeover and displacement should his or her behavior diverge from strict economic efficiency.

The argument from the theory of property rights is simply, then, that the behavior of the nonprofit firm is likely to diverge from the economically efficient profit-maximizing behavior due to the lack of profit incentives within the firm. Applied to the hospital industry, the argument contends that the industry has experienced rapid cost increases due to inefficiencies brought about by the predominance of nonprofit firms operating in that industry. The industry's performance thus can be improved by promoting profit incentives through either promoting for-profit hospitals or urging a shift to for-profit management of the existing nonprofit hospitals.

This proposal serves as the basis of the study reported in this article. Specifically, the study was designed to determine whether the existence of profit incentives should be expected to lead to greater economic efficiency in providing hospital care. Before such a determination can be made, several steps must be taken. First, in the second section of this work, the previous empirical and theoretical analyses of the impact of profit incentives on hospital performance are presented. The discussion of the empirical tests is not intended to serve as an all-encompassing treatment of the subject but, rather, as an empirical backdrop for the tests and results of the presented work. In the discussion of the theoretical models, special emphasis has been placed on identifying theoretically predicted nonprofit divergences from profit maximization. These predicted differences in for-profit and nonprofit hospital behavior then serve as the hypotheses tested in the third section. Finally, in the last section, conclusions and implications are drawn based on the empirical tests.

PROFIT INCENTIVES IN PRACTICE AND THEORY

PREVIOUS EMPIRICAL WORK

Numerous authors have considered whether significant differences exist between for-profit and nonprofit hospitals. An early test of the proposition was conducted by Ogur [6]. The author correctly asserted that economic theory predicts that nonprofit hospitals should tend to be less efficient than for-profits. To test the assertion, Ogur estimated a derivative of the for-profit hospital's production function, specifically, the logarithm of the average product of labor. The estimated parameters were used to predict the value of the average product of labor that would result if the for-profits had been nonprofit. Empirically, it was determined that the logarithm of the average product of labor was significantly greater in the for-profit hospital. Given this result, the author concluded that the theoretical prediction of greater for-profit efficiency was confirmed.

Kushman and Nuckton considered another aspect of the relative performance of the two hospital types: their responsiveness to changes in demand variables and ability to pay [7]. The authors argued that, theoretically, for-profit hospitals have the most to lose by not responding quickly to demand and ability-to-pay changes. Using regression analysis, Kushman and Nuckton showed that the for-profits have been more responsive to these changes than the nonprofits.

Clarkson approached the problem from the property rights standpoint, arguing that nonprofit hospital managers have relatively more latitude to deviate from profit-maximizing behavior [8]. Empirically, Clarkson reported that nonprofit hospital managers tend to select simpler managerial tasks, to use market information less frequently, and generally to perform managerial functions less efficiently than do their for-profit counterparts.

In another study along the property line, Baird argued that a significant proportion of the recent rises in hospital costs is attributable to inefficiency brought about by the predominantly nonprofit nature of the hospital industry [9]. The author supported the finding with evidence which suggests that the existing variations in costs among hospitals are too great to be explained by factors such as differences in wages or the quality of care.

Lewin, Derzon, and Margulies considered a slightly different question, that is, whether significant differences exist between for-profit chain and nonprofit, nonchain hospitals [10]. Using data on hospitals in California, Florida, and Texas, the authors found that the for-profit hospitals are more expensive, have slightly higher costs, have shorter average lengths of stay, and enjoy broader profit margins than their nonprofit counterparts.

In a study of hospital cost increases, Ashby advanced research in the area by categorizing costs by cost centers [11]. With reference to the for-profit–nonprofit debate, Ashby reported that the private nonprofit hospitals had consistently the lowest overall increases in costs per unit of output, while the for-profits exhibited the greatest degree of growth in per unit costs over the latter half of the sample period. The author further reported that this overall per unit cost picture among the hospitals was fairly representative for the individual cost centers. (The primary centers of cost growth in the for-profits were the general services and ancillary services sectors.)

Coyne also analyzed differences between system hospitals and independent hospitals [12]. Of interest to the for-profit–non-profit issue, Coyne reported that the for-profit hospitals in the sample had the shortest average length of stay, lowest rate of occupancy, lowest expenses, and lowest nonmedical staffing ratios.

Finally, in a study emphasizing differing managerial strategies, Pattison and Katz argued that much of the recent success of the for-profit hospital chains is due to reimbursement scheme-related management strategies [13]. These strategies include aggressive marketing and pricing practices and have led to high rates of growth and profitability. The finding of greatest importance for the current analysis is that the for-profits tended to have both higher costs and charges, during the sample period, than corresponding nonprofit hospitals.

The empirical literature on the subject of profit incentives, then, is substantial and, at times, seemingly contradictory. Many of the works indicate greater for-profit efficiency while others point out higher for-profit costs and charges. With the question far from answered, the current work hopes to shed further light on the impact of profit incentives on hospital behavior. A review of the theoretical literature on the subject precedes this, however.

NONPROFIT HOSPITAL MODELS

Numerous models of the nonprofit hospital have been developed in the literature [14]. Consider first the quality maximization model of Lee [15]. In this model, the hospital's manager is thought to operate the firm to maximize his or her own utility subject only to one constraint:

that the hospital generate net revenues of a level deemed satisfactory by the owners. Further, the manager's utility is assumed to be a function of the prestige of the hospital which, in turn, is thought to be determined by the range and sophistication of services offered by the hospital. In an attempt to maximize his or her own usefulness, then, the manager of the nonprofit hospital will often purchase quality-enhancing inputs without regard to the degree of use of those inputs.

Consequently, the quality maximization model predicts that, in an attempt to maximize his or her own utility, the nonprofit hospital manager will cause the nonprofit hospital to treat a mix of cases that is heavily tilted toward more severe cases. The severe cases are attractive to the nonprofit hospital manager in that these are the cases that typically require the use of the most sophisticated inputs. One testable hypothesis concerning the relative behavior of for-profit and nonprofit hospitals, then, is that the two hospital types treat the same mix of cases.

A second model of nonprofit hospital behavior is the physician control model [16, 17]. In this model, it is assumed that the nonprofit hospital is in the control of the staff of physicians. Given their control, the physicians are thought to operate the hospital to maximize their own utility. The key to this model is the assumption that the physicians do not have an incentive to restrain increasing hospital costs and may actually have a pro-cost bias. Specifically, in order to maximize their pecuniary and nonpecuniary income from the hospital, the physicians may desire costly increases both in sophisticated equipment and, more importantly, in highly trained supporting personnel. The desire for the most modern, sophisticated equipment is not dissimilar from the prediction of the quality maximization model and bears no further mention. What is unique to this model is the prediction of the physicians desiring a more skilled mix of supporting personnel to work with. By demanding this type of staff, the physicians are attempting to enhance their own productivity and, thereby, to raise their income.

Given the physician-control model, one would expect to find significant differences in the mix of labor inputs employed by for-profit and nonprofit hospitals. It is predicted that the nonprofits will hire relatively more highly skilled supporting staff members, enabling the physicians of the nonprofit hospital to maximize their own utility. A second testable hypothesis, then, is that the two hospital types employ equally skilled mixes of labor inputs.

The final model of nonprofit hospital behavior to be considered is the quantity maximization model [18, 19]. This model assumes that the nonprofit hospital manager will purchase and combine resources to maximize the output of the hospital, subject only to the constraint of net revenues being as great as the minimum level acceptable to the owners. Given that this minimally acceptable level of net revenues is less than the level of profit maximization, the nonprofit hospital is predicted to purchase more inputs and produce greater output than the for-profit hospital.

Consequently, one should expect to find significant differences in the productive arrangements of the two hospital types. A testable hypothesis here is simply that the two hospital types produce under the same productive conditions. Should such differences in production techniques be found, an appropriate question to ask is: which of the hospital types is operating economically more efficiently? A fourth, and final, hypothesis to consider is that the two hospital types are equally efficient.

Based on the theories of nonprofit hospital behavior discussed above, four behavioral differences are expected between the for-profit and nonprofit hospitals. First, a reflection of the quality maximization model should be found in the relatively more severe mix of cases handled by the nonprofit hospitals. Further, from the physician-control model it is predicted that the nonprofit hospitals should be found to employ a relatively more skilled mix of labor inputs. Third, from the quantity maximization model, and the other models for that matter, it is predicted that the two hospital types should operate under differing productive relationships. Finally, this third prediction is extended to indicate that the for-profit hospitals should be found to be more efficient than nonprofits.

Should these differences be found, a case could be made for relying more heavily on profit incentives to improve the industry's performance. On the contrary, should these differences not exist, the result would indicate that the existence of profit incentives within the hospital is unlikely to alter the hospital's behavior significantly, and therefore, that little confidence should be placed in the proposed remedy.

THE DATA, METHODOLOGY, AND EMPIRICAL RESULTS

THE DATA

The data used in the research for this article are taken from the Oklahoma Health Planning Commission's annual hospital survey. The data include responses for the 120 short-term, acute care hospitals in Oklahoma for the years 1978–1981, yielding a total sample size of 480. Included in the hospitals are 14 which are classified, for this study, as for-profit. The for-profit group includes both those hospitals which are owned for profit and those which are not owned but are managed for profit. Taken together, these hospitals form the population of hospitals which operate in an atmosphere of profit incentives. The remainder of the hospitals are classified as nonprofit, composed of those hospitals both owned and operated on a nonprofit basis. By comparing the economic behavior of the for-profit and nonprofit groups, a determination may be made with regard to the economic significance of profit incentives in this industry. Before such a determination is attempted, some general characteristics of the industry are presented to provide the reader with an intuitive feel for the hospitals under consideration.

As indicated in Table 1, the for-profit hospitals tend to be smaller, as measured by the number of beds and the average number of inpatient days. The for-profits also offer a slightly less comprehensive array of services as indicated by the scope-of-service index. Further, average cost per inpatient day is somewhat lower in the for-profit hospitals. All of these descriptive characteristics appear to be consistent with theoretical prediction. The only troubling aspect is the longer length of stay in the for-profit hospital. This may be consistent with profit-maximizing behavior, however, in that the lengthening of the average stay allows for the spreading of fixed costs over additional units of output.

There appear, then, to be predictable differences in behavior between the two hospital types. The purpose of the remainder of this work will be to determine if these and other behavioral differences are statistically significant.

THE CASE-MIX HYPOTHESIS

The first null hypothesis is that the for-profit and nonprofit hospitals treat the same mix of cases. To consider this hypothesis, a case-mix variable is defined as the proportion of inpatient days in each of five possible service categories: general medical, CM-GM; intensive care, CM-ICU; intensive cardiac care, CM-ICCU; pediatrics, CM-PED; and obstetrics and gynecology, CM-OBGYN. This particular approach to capturing the multiproduct nature of the hospital was first employed by Feldstein [20]. In recent years, numerous researchers have chosen other approaches to the problem in the formulation of cost functions [21]. In the case of cost estimation, the problem is to control for the cost effects of differential output mixes. In the present analysis,

Table 1: General Hospital Characteristics (Oklahoma, 1978–1981)

Characteristic	Hospital Type: Nonprofit	For-Profit
Bed-size (number)	112	88
Scope-of-service index*	8.4	7.1
Length of stay† (days)	5.9	6.3
Occupancy rate (percent)	58	60
Average inpatient days	64.9	52.8
Percent urban	25	40
Personnel‡	241	211
Average cost§	210.55	204.91
Average wage cost‖	9,830	10,106

Source: Annual Hospital Survey, Oklahoma Health Planning Commission.

* Scope-of-service index is an index indicating the number of services offered. The scale is ordered from 1 to 20 with 1 representing no services.

† Length of stay is equal to the number of inpatient days divided by the number of hospital admissions.

‡ Personnel is the number of full-time-equivalent employees.

§ Average cost is total expenses divided by inpatient days.

‖ Average wage cost is total wage cost divided by personnel.

a much simpler question is entertained: do case mixes differ between hospital types? Given the nature of the hypothesis, it is felt that the nature of the simple service-mix procedure employed is adequate. For the samples of for-profit and nonprofit hospitals, then, there will be a case-mix vector representing, on average, the proportion of total inpatient days, in each hospital type, from each of the five service categories. The null hypothesis to be tested is that the two case-mix vectors are the same. Formally stated, the first null hypothesis is:

$$H_0: \mu_1 = \mu_2$$
$$H_1: \mu_1 \neq \mu_2 \quad (1)$$

where μ_1 and μ_2 are the means of the nonprofit and for-profit *case-mix* vectors, respectively.

The methodology employed to test this hypothesis is the Multivariate Analysis of Variance (MANOVA). The sample size for the test is 345. The appropriate test statistic for the procedure is Wilks' Lambda

(Λ) [22], which, with the proper adjustment, is distributed as an F-statistic. The null hypothesis of equal case-mix vector means is rejected when the observed F-value is greater than the critical value of the F distribution at a specified level.

In this case, with 5 and 339 degrees of freedom, the observed F-value is: $F(5,339) = 1.18$, while the critical value of the F distribution at the 5 percent level, by interpolation, is: $f_{c,.05} = 2.24$.

Therefore, the hypothesis of equal case-mix means cannot be rejected. Failure to reject the null implies that, contrary to the theoretical prediction, the for-profit and nonprofit hospitals did not treat a significantly dissimilar mix of cases during the sample period. It should be recalled that the nonprofits were expected to treat a case mix heavily skewed to more serious cases, relative to the for-profit hospitals. This expectation was based on the belief that the more serious cases required a greater quantity and quality of care and a more sophisticated mix of inputs. Consequently, by treating a relatively more severe mix of cases, the nonprofit manager could enhance the prestige of the hospital and, thereby, increase his or her own utility.

Given the limitations of this test, the first null hypothesis cannot be rejected. This result indicates that the for-profit and nonprofit hospitals did not treat significantly different mixes of cases during the sample period.

THE SKILL-MIX HYPOTHESIS

The second null hypothesis to be considered is that the two hospital types employ equally skilled mixes of labor inputs. As a measure of the mix of skills employed by the hospitals, the hospital's personnel are distributed by one of six skill-mix categories: staff physicians, SM-DOC; interns, SM-INT; registered nurses, SM-RN; licensed practical nurses, SM-LPN; aids, orderlies, and attendants, SM-AOA; and other employees, SM-O. The proportion of employees in each category forms the skill-mix vector to be considered in the test of the hypothesis. Such a specification should provide a simple test for the theoretical proposition that for-profit hospitals will tend to employ a relatively less skilled mix of workers. Specifically, given a sample size of 225, the hypothesis to be tested is that the means of the skill-mix vectors are equal. Formally stated, the hypothesis is:

$$H_0\colon \mu_1 = \mu_2$$
$$H_1\colon \mu_1 \neq \mu_2 \qquad (1a)$$

where μ_1 and μ_2 represent the means of the for-profit and nonprofit *skill-mix* vectors, respectively.

The appropriate test statistic and rejection criteria are the same as given above in the test of the first hypothesis and are not repeated here. Again, the MANOVA procedure is utilized. In this case, the observed F-value is: $F(6,218) = 0.32$, while the critical value of the F distribution at the 5 percent level, through interpolation is: $f_{c,.05} = 2.05$.

Therefore, the null hypothesis of equal skill mixes cannot be rejected. For the sample period, then, the two hospital types did not employ a significantly different mix of labor inputs. Again, the result is contrary to the theoretical prediction which indicated that the nonprofits should be found to employ a relatively more skilled mix of labor inputs. It was thought that, by employing the more skilled mix of labor, the physicians could increase their own productivity, resulting in higher income.

Given the limitations of the procedures involved, it is concluded that, contrary to the theoretical prediction, the for-profit and nonprofit hospitals did not employ significantly different mixes of labor inputs during the sample period.

THE PRODUCTIVE RELATIONS HYPOTHESIS

Theoretically, it is expected that the for-profit and nonprofit hospitals operate under differing productive relations. The third hypothesis to consider, therefore, is that the two hospital types operate under identical productive conditions. Should this null be rejected, as is expected, then a fourth hypothesis is considered, which indicates that the two hospitals are equally efficient. Failure to reject the third hypothesis, however, would render redundant the fourth hypothesis. Put simply, if the two hospitals do not operate in significantly different fashions, one cannot be more efficient than the other. The third hypothesis, then, is critical to the analysis at hand. Testing the hypothesis that the two hospital types operate under the same productive conditions requires the specification of a hospital production function. Much has been written about the problems of estimating such a function, but it appears that the Translog function is most preferred [23, 24]. Testing the hypothesis begins with the following form of the Translog production function [25]:

$$\begin{aligned} \ln Q_{it} = {} & a_0 + a_1 \ln L_{it} + a_2 \ln K_{it} + a_{11} \ln^2 L_{it} + a_{22} \ln^2 K_{it} + \\ & a_{12} (\ln L_{it})(\ln K_{it}) + db_0 + db_1 \ln L_{it} + db_2 \ln K_{it} + \\ & db_{11} \ln^2 L_{it} + db_{22} \ln^2 K_{it} + db_{12} (\ln L_{it})(\ln K_{it}) \end{aligned} \tag{2}$$

where:
ln = natural log of the variable in question
Q = hospital output, measured in inpatient days
K = capital input, measured in staffed beds
L = labor input, measured in total personnel
d = dummy variable representing hospital type ($d = 0$ for nonprofit and $d = 1$ for the for-profit hospitals)
n_1 = 442, and n_2 = 50: the sample sizes for the nonprofit and for-profit hospitals, respectively
i = hospital
t = year.

The hypothesis to be tested is formalized as:

$$H_0\text{: } b_j = 0; j = 0, 1, 2, 11, 22, 12.$$
$$H_1\text{: not } H_0. \tag{3}$$

The appropriate test statistic is [26]:

$$\frac{(ESS_R - ESS_{UR})/q}{MSE_{UR}} \sim F(q, N-K) \tag{4}$$

where:
ESS_R = error sum-of-squares of the restricted model ($d = 0$)
ESS_{UR} = error sum-of-squares of the unrestricted model ($d = 1$)
q = 6, number of restrictions implied by the null
MSE_{UR} = mean square error of the unrestricted model.

The null hypothesis of equal productive relations is rejected when the observed F-value exceeds the critical value of the F distribution at a specified level.

The results of this regression, where ordinary least-squares was the estimation procedure, are given in Table 2 for the restricted model ($d = 0$) and Table 3 for the unrestricted ($d = 1$). Each of the coefficients reported in Table 2 has the expected sign and is highly significant. For example, consider the two inputs: labor and capital. In both cases, the coefficient of the relevant natural log is positive and significant beyond the 5 percent level. The other coefficients are equally well behaved. Further, the model offers a high degree of explanatory power as evidenced by the strong coefficient of determination and significant F-value. Specifically, the R^2 of 0.9307 indicates that the regression explains about 93 percent of the variation in the dependent variable. Finally, the critical value of the F distribution, at the 5 percent level, is:

Table 2: Restricted Production Function Dependent Variable—Natural Log of Inpatient Days

Independent Variable	*Beta Coefficient*	T-*Ratio*
Constant	3.115	10.53†
ln L	0.503	3.16*
ln K	1.236	5.91†
$ln^2 L$	0.135	3.34†
$ln^2 K$	0.140	2.36*
*lnl * lnK*	-0.337	-3.70†
F = 1309.59	R^2 = 0.9307	*ESS* = 42.5681

*Significant at the 5 percent level.
†Significant at the 1 percent level.

$f_{c,.05}$ = 2.23. Therefore, with a calculated F-value of 1309.59, the null hypothesis of an insignificant R^2 can be rejected.

Of more importance to the third hypothesis is the comparison between this model and the unrestricted model, however.

As Table 3 indicates, the unrestricted model is also well behaved, offering a very high degree of explanatory power. In this case, the R^2 of 0.932 indicates that the regression explains approximately 93 percent of the variation in the dependent variable. Further, the null hypothesis of an insignificant R^2 can be rejected since the critical value of the F distribution, at the 5 percent level, is: $f_{c,.05}$ = 1.81. Of particular importance for the hypothesis in question are the coefficients on the terms which represent the for-profit hospitals (those with the dummy variables). In general, these terms lack the significance of the other terms suggesting that identifying the for-profits adds little to the explanatory power of the model. The precise test of the hypothesis requires formulating the F-statistic described above. In this case, the observed F is:

$$F(6,480) = \frac{(42.5681 - 41.6796)/6}{0.0866}$$

which gives: $F(6,480) = 1.709$. The critical value of the F distribution, at the 5 percent level is, by interpolation: $f_{c,.05}$ = 2.12. Therefore, the hypothesis that the for-profit and nonprofit hospitals produce under the same productive relations cannot be rejected for the sample period. The fact that the two hospital types did not produce in a

Table 3: Unrestricted Production Function Dependent Variable—Natural Log of Inpatient Days

Independent Variable	*Beta Coefficient*	T-*Ratio*
Constant	3.095	10.02†
ln L	0.422	2.60*
ln K	1.334	6.28†
$ln^2 L$	0.142	3.49†
$ln^2 K$	0.130	2.16*
ln L * *ln K*	-0.337	-3.56†
d * Constant	1.395	0.95
d * *ln L*	2.110	2.72*
d * *ln K*	-3.029	-2.58*
d * $ln^2 L$	-0.099	-0.39
d * $ln^2 K$	0.469	1.24
d * *ln L* * *ln K*	-0.235	-0.41
F = 601	R^2 = 0.932 *MSE* = 0.0866	*ESS* = 41.679

*Significant at the 5 percent level.
†Significant at the 1 percent level.

significantly different fashion during the sample period indicates that the fourth hypothesis is redundant. Such a result is contrary to that predicted by the theoretical discussion of the second section. In that discussion it was noted that, due to the existence of profit incentives, the for-profit hospitals should be expected to produce in an economically efficient fashion. The reverse was predicted for the nonprofits. Because of the lack of profit incentives, the nonprofit hospital's behavior was predicted to diverge from strict economic efficiency.

A closer viewing of Table 3 indicates that, while the *F*-test conducted above suggests no significant difference between for-profit and nonprofit, the fact that the for-profit coefficients on the natural log of labor and capital are significant suggests that some difference, however slight, may exist. To consider this possibility the insignificant for-profit coefficients were eliminated from the unrestricted regression. Thus, the regression was the original restricted model plus the two significant for-profit terms, the natural log of labor and capital. Again, however, the hypothesis could not be rejected. When this model was run, the two previously significant for-profit coefficients became insignificant.

As a further test of this result, two additional possibilities were considered. First, to determine if grouping those hospitals which were nonprofit owned but for-profit managed together with those that were both for-profit owned and managed introduced a bias, the test of the hypothesis of equal productive conditions was replicated for the latter group alone. In this case, while the coefficients and levels of significance were altered for the restricted and unrestricted models, the result was unchanged. Specifically, no difference was found in the productive relations of the for-profit and nonprofit hospitals when the former included only those which were both for-profit owned and managed. The results of the test are not presented here in that the primary question of this study is whether profit incentives make a difference in the behavior of hospitals. Therefore, grouping the two hospital types which operate under profit incentives is the appropriate procedure. Separating the two merely serves as a test of the result obtained when the for-profit-owned and -managed group was taken together with the nonprofit-owned but for-profit-managed group. The result obtained suggests that no bias is introduced by this grouping.

Finally, it was necessary to determine if the assumption of homoscedasticity was reasonable in this case. To consider the possibility of heteroscedasticity, a test of the Goldfeld-Quandt type was conducted [27]. The results of the test were such that the null hypothesis of homoscedasticity could not be rejected.

Realizing the limitations of the procedures involved, it is found that, for the sample period, the for-profit and nonprofit hospitals did not operate under significantly different production conditions. Given this result, the fourth hypothesis cannot be rejected. Specifically, by finding that the two do not produce differently, it is impossible to reject the hypothesis that they are equally efficient.

Conclusions and Implications

The question considered in this article is whether the existence of profit incentives should be expected to alter significantly the economic behavior of hospitals. The sample chosen included the 120 short-term, acute care hospitals in the state of Oklahoma for the years 1978 through 1981. The results, in general, indicate that the for-profit and nonprofit hospitals in the sample did not behave in significantly different economic fashions during the period. Specifically, it was not possible to reject any of the four hypotheses presented. It appears that the two hospital types treated the same mix of cases, employed the same mix of employees, and produced under the same productive conditions. This last result indicates further that the two hospital types were equally efficient. Based on the theoretical discussion of the second section of this work, none of these results was expected.

Given these results, the question posed at the outset can be answered. Specifically, realizing the limitations of the present study, it is unlikely that a policy designed to promote profit incentives would significantly alter the behavior of the hospital industry.

An interesting and natural extension of this work is in reference to the changing institutional arrangements facing hospitals in the form of greater reliance on prospective reimbursement schemes. The sample period considered here is such that the hospitals operated under cost-reimbursement arrangements. The extension would consider whether the theoretical predictions concerning the relative behavior of the two hospital types would be altered if prospective reimbursement were assumed. Under prospective reimbursement, payments to hospitals are based on a fixed-fee schedule for diagnostic diseases. If the hospital is able to provide the care for less, the hospital earns a profit. If costs exceed the scheduled fees, a loss is incurred. The hospital, then, is faced with a cost-minimizing incentive. A cursory glance at the new system of reimbursement would lead to the prediction that the distinction between for-profit and nonprofit hospitals would become blurred. Such a prediction does not, however, necessarily follow. Rather than meeting the new cost-minimizing incentive with cost-limiting behaviors, it is possible that the hospital may merely accept the loss on prospective reimbursement cases and finance the loss through cross-subsidization from cases not covered by prospective reimbursement. Further, a hospital may avoid the loss by classifying patients in higher-cost diagnostic categories. Regardless, however, of the actual divergence from cost minimization, should such behaviors arise and should the two hospital types engage in the activities differentially, the theoretical prediction of behavioral differences would still hold given prospective reimbursement.

The impact of prospective reimbursement becomes an empirical question, then. While there is some reason to believe this scheme would further blur the distinction between the two hospital types, such need not be the case. In any event, it seems reasonable to conclude that if the study reported here were conducted during a period of prospective reimbursement, the conclusion—no significant differences between the two hospital types—would become even more probable.

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