Rate Regulation as a Strategy for Hospital Cost Control: Evidence from the Last Decade

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BOTH FEDERAL AND STATE GOVERNMENTS HAVE responded to the dramatic increase in outlays for hospital care that occurred during the late 1960s and the 1970s by implementing a variety of regulatory approaches. These programs fall into three general categories. Rate regulation establishes the terms under which public and/or private insurers pay hospitals. Facilities and services regulation is designed to control entry of hospitals, investment in beds and major equipment, and expansion of special services. Utilization review focuses on the quantity and quality of care hospitals provide. Since there has been an acceleration in the rise in real expenditures for hospital care during the early 1980s, and governments at all levels face new budgetary pressures, there is a renewed demand for information from a number of camps about the efficacy of alternative approaches to hospital cost control. This study focuses on the effectiveness of rate regulation which is rapidly gaining popularity at both federal and state levels. I first provide a capsule description of past research on this topic. This is followed by new statistical evidence on the efficacy of rate regulation. Finally, there is a discussion of implications of the results, especially for the design of hospital cost-containment programs in the 1980s.

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Literature Review

A considerable amount of evidence has begun to accumulate on the effectiveness of each type of program in controlling the rise in hospital costs. (See recent literature reviews by Schwartz [1981], Sloan [1982], and Steinwald and Sloan [1981].) Although there continues to be some debate about particular findings, some consensus about the effectiveness of regulation in this field has begun to emerge.

Analysis of rate regulation has concentrated on state mandatory rate-setting programs that require hospitals to abide by pricing decisions approved by a public agency. Eight states have had some experience with this form of regulation. Several descriptive studies have compared rates of change in hospital expense per patient day, per admission, and per capita population. All such studies have concluded that growth in expense per day and per admission was substantially less during the late 1970s in states with mandatory rate setting than in the remaining states (Biles, Schramm, and Atkinson 1980; U.S. Health Care Financing Administration 1980; Mitchell 1982). Differences in these measures only began to appear after 1975 for reasons not fully understood. A widely held explanation is that state programs and officials improve administrative procedures as well as political skills over time (Biles, Schramm, and Atkinson 1980; Cohen 1975). An alternative view is that program effects were not discernible until after 1975 because of the confounding influence of the Nixon Administration's Economic Stabilization Program (ESP). Growth of hospital expense per capita population has also been lower in mandatory rate-setting states since the mid-1970s, but the differences are not quite as pronounced (Mitchell 1982).

The descriptive studies as a group have one serious flaw. In concentrating almost exclusively on the effect of rate setting on hospital expense, the authors have not allowed for the possibility that other regulatory programs and nonregulatory factors—such as increased physician supply and a greater percentage of specialists, rising income of the population and prices of hospital inputs—might also influence hospital expense and utilization. If the other regulatory programs and/or the other factors do in fact affect expense and utilization and they are correlated with the presence or absence of a rate-setting program (which is surely the case), simple comparisons between expense, use,

and the presence or absence of rate setting misrepresent the effects of such programs.

Regression analysis was developed to permit researchers to isolate the contribution of several independent variables on a dependent variable. Two-way comparisons are almost equivalent to regression analysis with one independent variable. Adding additional independent variables allows one to consider influences of other factors as well. All studies using regression analysis and data, including post-1975 observations, have found that mandatory rate-setting programs have reduced the growth of hospital cost inflation by about 3 to 4 percentage points a year relative to other states, but these programs were not effective until they had been in effect for about 3 years or more (U.S. Congressional Budget Office 1979; Coelen and Sullivan 1981; Joskow 1980, 1981; Sloan 1981).

The American Hospital Association (*Hospitals* 1980) has described rate-regulation programs in terms of the following typology: mandatory-regulatory; mandatory-advisory; voluntary-regulatory; and voluntary-advisory. The mandatory-voluntary dimension distinguishes between programs based on state law from the private sector rate-setting initiatives. A "regulatory" program may impose penalties for noncompliance with the agency's decisions; in contrast, "advisory" programs "serve in an informative or educational capacity only" (*Hospitals* 1980, 99).

Table 1 classifies states by type of program as of 1980. Compared to other states, the mandatory-regulatory states have higher personal per capita income, population, physician-to-population and hospital bed-to-population ratios, and Blue Cross and Medicaid have comparatively high market shares there. In contrast, differences in proportions of persons over age 65 and wage rates are minimal.

Southwest Ohio and Indiana, with start dates of 1948 and 1959, have the oldest programs in any category. No program began in the 1960s. New York's, started in 1970, is the oldest of the mandatory-regulatory programs. The remaining programs are almost equally divided between pre-1975 and post-1975 start dates.

The scheme for classifying programs in table 1 provides an indication of the degree to which programs are compulsory. There are other pertinent dimensions of rate regulation, such as the administrative body responsible for the program, payers covered, unit of payment

TABLE 1
Rate Regulation Programs by State, 1980

Mandatory-Regulatory	Mandatory-Advisory	Voluntary-Regulatory	Voluntary-Advisory
Connecticut	Arizona	Arkansas	Pennsylvania*
Illinois	Minnesota	Delaware	Wyoming
Maryland	Oregon	Florida	
Massachusetts	Virginia	Indiana	
New Jersey		Kansas	
New York		Kentucky	
Washington		Michigan	
Wisconsin		Missouri*	
		Montana	
		New Hampshire	
		Ohio*	
		Rhode Island	
		Vermont	

Source: Hospitals 1980, 100–101. The article classified Missouri as "mandatory-regulatory" which is clearly incorrect; I have reclassified Missouri in this table and in my empirical analysis. Colorado had a mandatory-regulatory program during part of the 1970s and is considered to have had such a program in my regression analysis. Although it is listed under "mandatory-regulatory" in this table source, Illinois never implemented its program, and my analysis attributes no program to that state. The classification in some cases is debatable, in particular for Indiana and Rhode Island. However, with the exceptions noted above, I have adhered to American Hospital Association classification.

* Only part of state covered by rate regulation: Missouri—Blue Cross of Kansas City Plan Area; Ohio—Blue Cross of Southwest Ohio Plan Area; Pennsylvania—Blue Cross of Western Pennsylvania Plan Area.

(per diem, per case, total budget, etc.), frequency of rate review, method for establishing rates (formula, review of hospital budgets, etc.), and the nature of the adjustment-appeals mechanism (see Esposito et al. 1982; *Hospitals* 1980). Only two of the mandatory-regulatory programs applied to all payers.

Principally because of correlations among specific characteristics and the paucity of states in which specific types of programs have been implemented, it is only reasonable to expect a limited amount of information from statistical studies. They are far more reliable for giving policy makers broad indications of program effectiveness than in telling them which specific elements of rate regulation are likely to yield the biggest bang. To date, virtually all research on rate

regulation has dealt with the mandatory-regulatory programs, which currently exist in seven states. The minimal amount of analysis that has been conducted on private-sector and government-run mandatory advisory programs suggests that these programs have a weak influence at best on the level and growth of hospital expense (U.S. Congressional Budget Office 1979; Coelen and Sullivan 1981).

Most research on hospital rate regulation has focused on hospital expense per day, admission, and/or per capita population, rather than on utilization of hospital services. Indirect inferences about utilization can be derived from the first set of measures. Since expense per admission is the product of expense per day and length of stay, any difference between the measured effect of rate regulation on expense per admission and on expense per day is attributable to length of stay. Moreover, since expense per capita population equals the product of expense per admission and hospital admissions per capita population, any difference between the rate-setting impacts on these two expense variables reflects rate-setting's influence on hospital admissions per capita. However, such comparisons do not allow formal tests of statistical significance.

Worthington and Piro (1982) conducted the most comprehensive analysis of the effect of a rate-setting program on hospital utilization to date. They found that rate setting raised length of stay in states using the patient day as the payment unit, but these programs have had, at most, a negligible influence on admissions.

Between August 1971 and April 1974, the federal government controlled hospital wages and prices under the Economic Stabilization Program (ESP). Annual growth of hospital revenues attributable to price increases was limited to a maximum of 6 percent, based on "allowable" increases in costs. Thus, certain cost increases were "non-allowable" and could not be used to justify an increase in prices. In practice, the effective limit on price increases was nearer to 4 percent because of the very low level of allowable nonlabor cost increases (Ginsburg 1976). The emphasis of ESP on price rather than on total spending increases was not what many health care experts would have preferred. Early verdicts of the program's effect suggested it was ineffective (Ginsburg 1978; Sloan and Steinwald 1980), but a more recent evaluation concluded that ESP reduced hospital cost-growth by several percentage points, holding other factors constant (Sloan 1981).

Goals of This Study's Empirical Analysis

A considerable amount of empirical research has already been conducted on regulatory approaches to hospital cost-containment. This study addresses two important but unresolved issues. First, proponents of regulatory approaches frequently argue that regulation only becomes fully effective years after implementation, and, therefore, early evaluations of program outcome have been premature. On the other hand, some opponents argue that evidence from more recent years may reverse past conclusions. (See, for example, Mitchell 1982.) Empirical research to date has only followed major regulatory efforts in the hospital field through 1978. Second, almost all past research on rate regulation has focused on the mandatory programs operated by states. Especially given widespread interest in voluntarism, there is some interest in the effect of private rate regulation initiatives in hospital cost-containment.

This study uses regression analysis to determine the influence of individual regulatory programs on hospital expense per unit of output, utilization levels, and profitability. To insure that the methodology, findings, and implications are available to a broad audience, the discussion in the text is nontechnical, and regression coefficients on key explanatory variables are presented in an appendix.

Methods

Alternative Concepts of the Goals of Cost-containment Regulation

Cost-containment initiatives may try to reduce the level of expenditures for hospital care below a level that would exist in the absence of regulation. An analogy would be a car speeding at 80 miles an hour when 55 miles per hour is the desired (or required) speed. Deceleration is noticeable between speeds of 80 and 55, but after the car reaches 55, it proceeds at a constant speed. A regulator might seek to squeeze inefficiency out of the hospital system; but once his goal has been achieved, payments to the regulated hospital increase at the same pace as an unregulated one. This concept of regulation is termed Model I here. A somewhat different but probably less plausible view is Model

II. Regulation seeks to reduce the rate of change in outlays for hospital care. If so, at least in theory, deceleration would continue without end. In Model I, regulators focus on levels of the target variables, expense, output, profitability; in Model II, the targets are rates of change. Even though Model I is more realistic, Model II has been implicit, if not explicit, in much past thinking, empirical research, and discussions of this subject in the policy arena.

Data

The primary data sources for this study are state aggregates of hospital data from annual hospital surveys conducted by and published in recent years in *Hospital Statistics* (earlier in annual *Guide Issues of Hospitals*). I have combined data by state for the years 1963 through 1980, which yields a total sample size of 882 (49 states—excluding Alaska and Hawaii but with the District of Columbia as a state). This time span includes years before Medicare and Medicaid and years in which no major regulatory program was in effect. Thus, the study employs two kinds of nonregulatory controls—a "pre" period, and states without specific regulatory programs. The analysis is confined to private, nonprofit hospitals. Such hospitals were 57 percent of community hospitals, but accounted for 70 percent of beds and 73 percent of total spending on care in community hospitals in 1980 (American Hospital Association 1981).

Outcome Variables

By definition, payments to hospitals are the product of output, expense per unit of output, and the ratio of revenue to expense (accounting profits or loss). Revenue, as defined here, consists of receipts from patient care and from nonpatient sources. Contractual allowances, bad debt, and charity care are excluded from revenue. Rate regulation primarily controls expense per unit of output and profits, but it may have the side effect of boosting output, especially length of stay.

Outcome measures in this study based on the Model I concept of regulation are total hospital expense per admission, per "adjusted" (for hospital outpatient activity) admission, per patient day, and per adjusted patient day, and length of stay. Because of limitations on availability of data on outpatient visits, analysis of expense per adjusted

admission and per adjusted patient day is limited to 1969–80. Profits are measured as the ratio of total revenue to total expense.

Outcome measures based on Model II are annual percentage changes in hospital expense per adjusted admission and per adjusted patient day, number of adjusted admissions and adjusted patient days, outpatient visits, length of stay, and profits. The latter analysis is limited to 1969–80. All variables in the regressions expressed in monetary terms have been deflated by a state price index (with 1967 = 1.0).

Rate Regulation Variables

The regulation variables are common to both Models I and II. If a program did not exist in a state and year, the independent variable representing that program equals zero. Six variables represent the influence of state and private sector rate-setting programs. There are six variables for rate setting: young and mature mandatory-regulatory; young and mature mandatory-advisory; and young and mature voluntary-regulatory. The dividing line between young and mature programs is taken to be the beginning of the third year. The rate-setting variables are specified as the proportion of hospital revenue covered by the program under the presumption that a program's strength varies directly with this proportion. A variable for the Economic Stabilization Program (ESP) stands for the years this program was in effect.

Other Regulation Variables

To control for the influence of other forms of hospital regulation, explanatory variables are included to represent certificate of need, Section 1122, Professional Standards Review Organizations, and the American Hospital Association Voluntary Effort (VE) Program. Because of a widespread belief that certificate-of-need programs become more effective over time, program age is also emphasized in specifying these variables. Three variables identify state certificate-of-need programs: 1) during the year immediately prior to and including the year of implementation, 2) the first and second years after implementation, and 3) the third and subsequent years. A variable for Section 1122 is the fraction of hospital revenue covered by Medicare and Medicaid

in years and states when Section 1122 was in effect; otherwise, the variable takes a zero value. The fraction of hospitals in the state with a fully implemented professional standards review organization (PSRO) multiplied by the fraction of hospital revenue from Medicare and Medicaid represents the influence of PSROs. Finally, in response to the threat by the Carter Administration of national regulation, hospital and medical associations began the Voluntary Effort (VE) in December 1977. A variable identifying the years the program was in effect represents VE.

Other Control Variables

Several variables, all state- and year-specific, control for the influence of nonregulatory influences on the above outcome measures. In Model I, the control variables are the fraction of population over age 65, real per capita income, fraction of patient care physicians who are general practitioners, patient care physician-population ratio, population density, fraction of spending on hospital care accounted for by each of the major third party payers, the real wage of manufacturing employees, a time trend variable to capture the influence of unmeasurable temporal influences such as technological change, and separate variables identifying each of the 49 states. The 49 state variables account for unique characteristics of individual states not captured by the other explanatory variables.

With this methodology, all of the variation to be explained by the regressions is within state. The method is almost equivalent to estimating separate regressions for New York, New Jersey, South Carolina, etc., and then computing an average of the estimated regression coefficients. The technique allows one to determine with considerable confidence that rate regulation "worked" or "did not work" in states with such controls, but generalizing to other states with different political climates is a more problematic matter, as discussed more fully below.

Finally, regression analysis based on Model I uses a dynamic specification that recognizes it may take years before a regulatory initiative realizes its complete effect on levels of hospital costs, length of stay, and profits. The rate of change regressions include a much more limited set of controls, more specifically, variables to represent each year.

Findings

This section summarizes the main statistical findings on regulatory effects, expense per unit of output, output, and profits from the regression analysis. Readers interested in specific regression coefficients may consult the appendix. This discussion combines findings based on Models I and II.

Expense per Unit of Output

The four measures of expense per unit of output are expense per admission, per adjusted admission, per patient day, and per adjusted patient day. Since the adjustment allows one to consider outpatient as well as inpatient activity, the adjusted measures are the more comprehensive ones and, for this reason, they merit more attention. The adjustment per se has no meaningful influence on the findings. However, in a couple of instances, lengthening the time period from 1969–80 to 1963–80 makes a difference.

The regressions imply that, with the exception of ESP and VE (for 1978–80), only mature mandatory-regulatory rate-setting programs have definitely reduced expense per unit of output. When the time period is extended back to 1963, mature voluntary-regulatory rate-setting programs also show statistically significant reductions in both expense per admission and per patient day. The fact that these programs do not seem to have been effective when the years 1963–68 are excluded suggests that the voluntary-regulatory programs had their day in the 1960s rather than the 1970s. As noted above, only southwest Ohio and Indiana had such programs in the 1960s and our results for these years are a compliment to them. When other states joined the pack of voluntary-regulatory programs during the 1970s, effectiveness of this group in cost-containment was lost. The mandatory-advisory programs show no effect on hospital costliness in any regression.

Table 2 presents estimates of cumulative effects of mandatory rate-regulation programs by year after implementation on expense per adjusted admission and per adjusted patient day. By "cumulative," I mean that the annual reduction in one year builds on reductions realized in the previous year. Thus, for example, a constant 2 percent annual reduction would be 2 percent in year 1, about 4 percent in year 2, etc. The percent reductions are *relative* to states without rate

TABLE 2
Cumulative Effects of State Mandatory Rate Setting on Hospital Expense: Percent Reductions in Expense Relative to States without Rate Setting

Year After Implementation	Expense per Adjusted Admission		Expense per Adjusted Patient Day	
	Model I (1)	Model II (2)	Model I (3)	Model II (4)
1	−0.8*	−1.6*	−1.1*	−2.1*
2	−1.3*	−3.2*	−2.0*	−4.2*
3	−5.5	−6.5	−6.9	−7.8
4	−8.2	−9.8	−10.7	−11.4
5	−9.0	−13.1	−13.7	−15.0
6	−10.2	−16.4	−16.0	−18.6
.				
.				
Final	−13.3	infinite	−24.3	infinite

Note: * based on a regression coefficient *not* statistically significant at conventional levels. Since estimates for subsequent years build on these insignificant estimates *and* the estimates assume all payers are covered by the rate-setting program, the estimates in the table tend, if anything, to overstate the impact of mandatory rate setting.

setting, not absolute reductions in hospital expense. In no state has hospital expense with any output denominator decreased in real terms (relative to the Consumer Price Index).

The estimates for Model II are derived from regression coefficients for young and mature mandatory-regulatory programs (shown in the appendix). The Model I estimates also rely on such coefficients, but, in addition, the estimated time path from initial impact to the final long-run impact is based on regression coefficients on lagged dependent variables (which are expense per adjusted admission and, alternatively, expense per adjusted patient day in the previous year). All the table 2 estimates are projections of impact when all hospital revenue sources in the state are covered by such programs.

Results from Model I imply that mandatory rate setting would eventually lower expense per adjusted admission and per adjusted patient day by 13.3 and 24.3 percent, respectively. Although these are by no means trivial reductions, two points are worth emphasizing. First, the "final" values are projections. No program has been in effect long enough to realize its final, or equivalently, its full long-run

potential. Second, reductions in the first few years are far from the programs' full, estimated potential. In fact, after the first two years, expense per adjusted admission and per day are estimated to be only -1.3 and -2.0 percent lower on average under mandatory-regulatory rate setting than they would be without any rate regulation program. A conservative interpretation is that such programs have no impact during the first two years since the coefficients on which the table 2 estimates for the first two years are based are statistically insignificant. Most of these programs' full, long-run potential *is* realized 6 years after implementation.

The Model II estimates imply a somewhat greater impact, but this model is less plausible since it assumes regulation continues to reduce hospital expense and/or use without limit. In other words, whereas the cumulative effects for Model I have upper bounds at 13.3 and 24.3 percent, the long-run effects for Model II are infinite.

Previous studies have often failed to distinguish between single year and multi-year consequences of rate regulation. In part, this may reflect the authors' understandable reluctance to extrapolate beyond the time period in which rate-regulation programs have been operative. Sufficient years have now elapsed to allow researchers to appraise six-year effects with some confidence. The estimates become less reliable as one projects far beyond this. Discrepancies in cumulative effects between the two models are not large at the point of 6 years post-implementation, but are substantial thereafter.

Trends in expense per adjusted admission and per adjusted patient day in 1980 dollars in 6 states with mandatory rate setting and 41 others are compared in figures 1 and 2. Colorado and Wisconsin have been excluded from the figures, but their programs are represented in the regressions. Colorado has not had a continuous mandatory rate-setting program, and Wisconsin's program has only covered Medicaid. States with other types of rate setting have been combined with nonrate-setting states in the figures. In view of the empirical evidence presented above, this approach is justified.

Although expense per unit of output has been uniformly higher in the rate-setting states, the differential has narrowed since 1977 when most of the 6 states had mature programs. Between 1977 and 1980, expense per adjusted admission in the 6 states declined by 7.1 percent relative to the other 41; the corresponding relative reduction in expense per adjusted patient day was 8.6 percent. By coincidence, with the

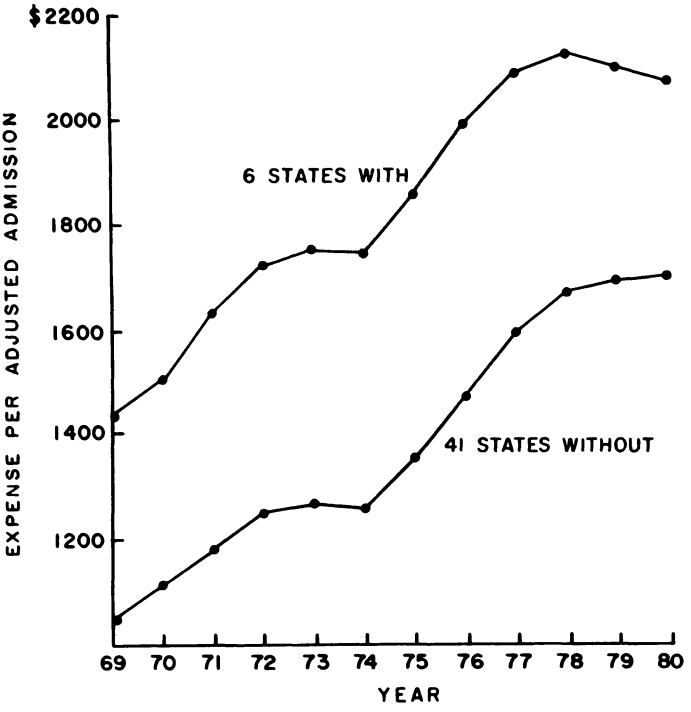

FIG. 1 Hospital expense per adjusted admission: States with and without mandatory-regulatory rate-setting programs (1980$).

exception of Model I expense per adjusted admission which implies a smaller effect, these reductions are quite close to those presented in table 2, considering both when the programs were implemented and the proportion of revenues covered. Estimated effects of ESP and the Voluntary Effort (VE) are about the same as for the mature mandatory state rate-regulation programs. It is generally agreed that VE remained effective as long as the threat of federal hospital cost-containment legislation persisted. Since the Reagan Administration has been in office, hospitals seem not to have viewed such legislation as a likely prospect and, since 1980, the Voluntary Effort has been in a state of disarray.

Output

Length of stay declined between 1969 and 1980 in states without mandatory-regulatory rate-setting programs (fig. 3), but there has been no perceptible trend in the 6 states with such programs since

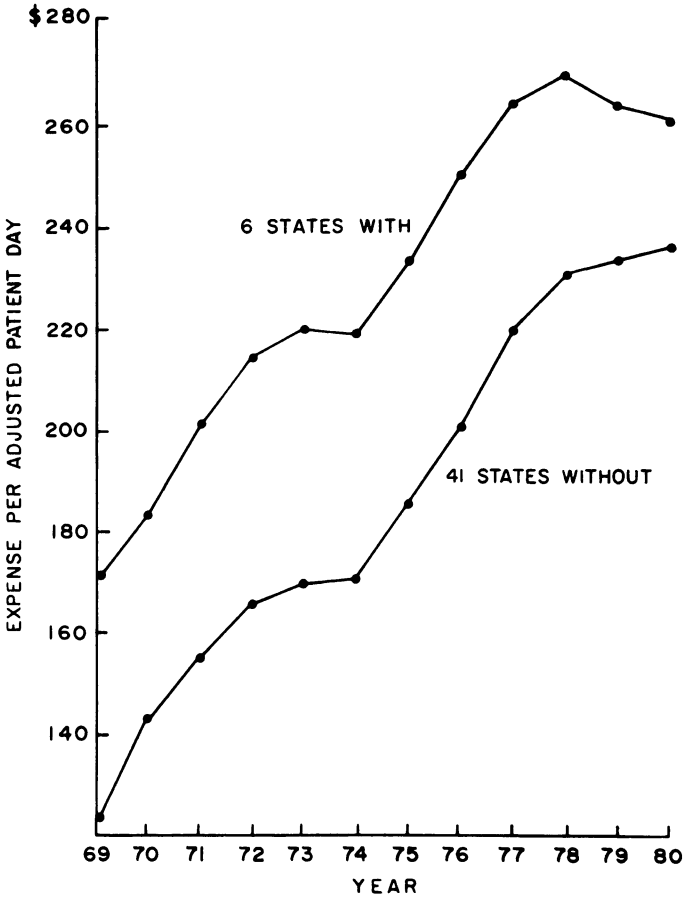

FIG. 2 Hospital expense per adjusted patient day: States with and without mandatory-regulatory rate-setting programs (1980$).

1971. A regression, based on a time series of state cross-sections spanning 1963 through 1980, implies that mandatory-regulatory rate setting has increased length of stay. (The result is significant at the 10 percent level.) However, the relationship disappears when the time period is reduced to 1969–80. One way to reconcile the two types of evidence is to note that most of the relative decline in the 41 states occurred during 1971–75 or before mandatory-regulatory rate setting had a discernible impact on expense per unit of output. This, in combination with the regression results, suggests that these programs per se do not explain the fact that stays were constant in the 6 states during much of the 1970s. Statistically significant effects might have been obtained if a further distinction had been made between mandatory

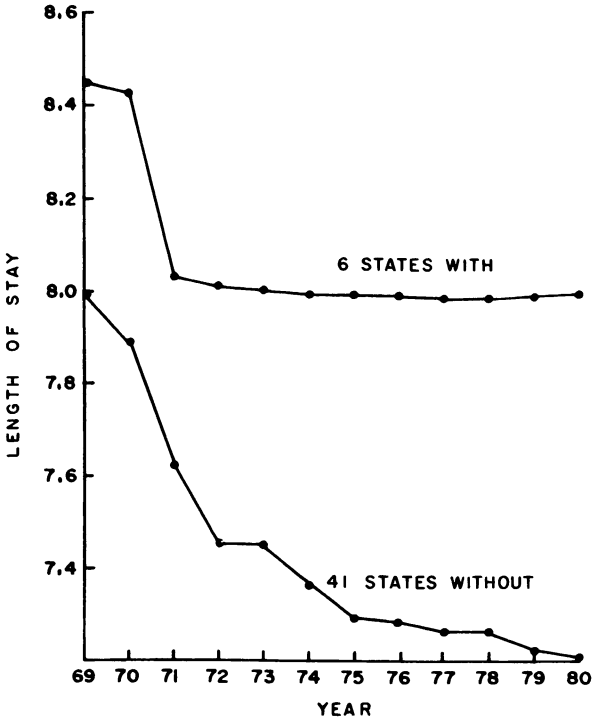

FIG. 3 Length of stay: States with and without mandatory-regulatory rate-setting programs.

rate-setting programs with a per-day payment unit and the charge-based programs. (See results of the Worthington-Piro [1982] study.)

Profitability

There are several recent accounts of losses experienced in hospitals in states with mandatory-regulatory rate-regulation programs. Essentially all have stressed the New York case. (See, for example, Arthur D. Little 1982; Hospital Association of New York State 1979; Mitchell 1982.) The New York experience with mandatory rate regulation is unique. The regressions do not show that mandatory-regulatory programs as a group have affected hospital profits, when a large number of other pertinent factors are held constant. Profitability in the 6 mandatory-regulatory states has been consistently below the other 41, but the two series follow one another quite closely (fig. 4). Both indicate substantial increases in profitability since the trough during ESP period,

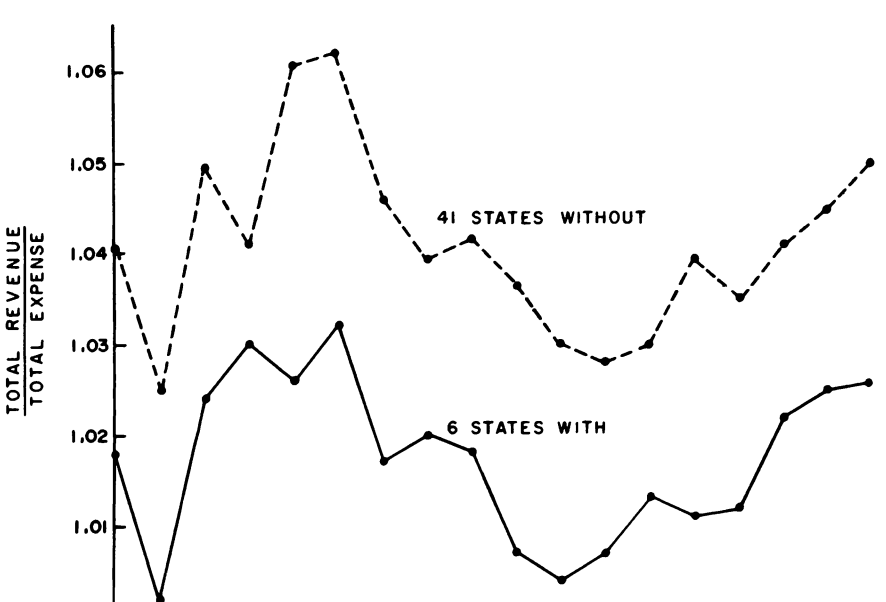

FIG. 4 Hospital profitability: States with and without mandatory-regulatory rate-setting programs. (The data only include private nonprofit hospitals.)

a result the regressions confirm. New York is indeed a special situation as the ratio of total revenue to expense was below 1.0 for the entire decade of the 1970s.

Discussion and Policy Implications

The only real success stories in hospital cost-containment to emerge from the 1970s are the state mandatory-regulatory rate-setting programs, ESP while it lasted, and VE until about 1980. Neither the mandatory-advisory nor the voluntary-regulatory programs show statistically significant cost-containment effects on average. The estimates of average effects may admittedly obscure a *few* individual "gems" who have been successful in cost-containment, but whose effects have been obscured by grouping them with others. Although this study focuses on rate regulation, the regressions also contain variables for certificate of need (CON) and Professional Standards Review Organizations

(PSROs). Neither of these latter programs demonstrates statistically significant cost-reducing impacts on average either.

There are a number of reasons for the apparent unique success of the most stringent form of rate regulation. First, the programs deal directly with the hospital payment system. In contrast, other forms of regulation, such as certificate-of-need, have attempted to reduce payments to hospitals indirectly.

Second, the mandatory-regulatory programs tend to be far more global. Even if the rate setter has not developed incentives to counter every conceivable adverse side effect, the process provides a mechanism for monitoring "undesirable bulges in the balloon." State rate-setting effort and ESP part company here because the bulges and the necessity for frequent revisions were the main reasons for the demise of ESP. A certificate-of-need agency would have no way of knowing whether, after it prevents a hospital from offering a service, the hospital merely reallocates such funds to unregulated items, such as nurse staffing.

Third, since the state has a financial stake in Medicaid, state rate setters have a definite incentive to curb payments to hospitals. Perhaps the same argument could be made for certificate of need, which is also a state program. But CON controls over outlays for Medicaid are far more indirect. Physician participants in PSRO review have no meaningful financial stake in curbing hospital utilization.

Fourth, tough rate-setting programs have been implemented in states with comparatively high hospital cost levels, with political environments relatively favorable to regulation, and with good access to expertise in this field. Of course, if in fact these states are unique, there is indeed a question whether one can really generalize from the above statistical findings. In other words, we know that mandatory-regulatory rate setting succeeded in cost-containment in the states that tried it, but would it have worked so well if the states had been Montana, Tennessee, and Kansas?

The answer to this question must necessarily be somewhat speculative. One is certainly safe, however, in asserting that, without substantial political pressures to contain costs, it is virtually impossible to implement a rate-regulation program with teeth. One western state, Colorado, dropped rate setting in early 1980 because of industry opposition and a general anti-regulatory environment (Klapper and Harrington 1981).

The issue of expertise is far more complex. But there is reason to wonder whether a rather successful program in which rates are set,

based on a detailed review of individual hospital budgets in a rather compact state such as Maryland, can be applied in a substantially larger state or to the nation as a whole. Certainly, there would have to be adjustments in the interest of administrative feasibility.

In spite of these caveats about transferability, the empirical evidence presented here, and in past and ongoing studies of state rate setting, has greater applicability for state rate-setting efforts than for a prospective payment plan for Medicare implemented nationally. The mandatory state programs have rarely been limited to a single payer. Yet this would generally be the case with a Medicare prospective payment plan. Use of explicit case-mix measures as a regulatory tool is a very recent phenomenon. New problems are likely to surface when such measures are implemented nationally. In any event, post-1980 data are necessary for a meaningful evaluation of rate setting combined with an explicit case-mix adjustment, and such data are only now beginning to become available. Medicare has become a relatively "frugal" or "tight" payer (depending on one's perspective), even in a world of retrospective reimbursement. Hence, for this reason too, it is not clear that rate controls over Medicare payments can generate the same savings as a plan for private payers.

The above findings, as well as research by others, do imply that effective hospital cost-containment should start with the rate-regulation concept. There is no need to adopt all of the main features of programs implemented in the 1970s in a program for the 1980s. In fact, rate regulation to date is deficient in a number of respects.

First, the programs have achieved all of their savings by reducing payments to hospitals per day and per case; they have not curbed admissions or length of stay. Without improvements on the latter fronts, cost-containment must be achieved by reducing "inefficiency" and "quality," and, realistically, there are large gray areas between the two.

There are a number of approaches to utilization control: patient cost-sharing; capitation; ceilings on total hospital budgets; and effective utilization review. There are pros and cons to each and a full discussion of the alternatives is beyond the scope of this article. Certain types of capitation arrangements reduce hospital admissions and, hence, total outlays for hospital care (Luft 1978). There is less reliable information on the influence of patient cost-sharing on either utilization

or expenditures for hospital care. This approach can be more or less inequitable, depending on how the cost-sharing arrangements are structured. There is increasing recognition that the choice between regulatory and noncompetitive cost-containment approaches is not an "either/or." Patient cost-sharing and rate-regulation are by no means inconsistent. In fact, judicious use of cost-sharing for hospital care might reduce the complexity of rules needed to ration services.

Ceilings on hospital budgets could definitely reduce spending for hospital care by controlling utilization as well as price; this approach has been used in other countries—such as Canada and Great Britain, in the United States—in Rhode Island and in Rochester (Rochester Area Hospitals' Corporation 1980), and, temporarily, during ESP. If utilization review is to be effective, the hospital and/or the reviewing organization must, unlike PSROs but like capitation plans, have a financial stake in its decisions. Also, all patients should be subject to review. If this is not so, empty beds resulting from one payer's review may be filled with those from another. This does not necessarily mean that a single review team should be responsible for monitoring all admissions.

Second, opponents of rate regulation have emphasized the deleterious effects of at least the tougher programs on hospital quality and capital formation. Quality is extremely difficult to quantify, and satisfactory measures of hospital capital are not available on a statewide basis. For this reason and perhaps because the mandatory-regulatory programs are not yet old enough, one cannot say with an acceptable degree of precision that quality and the condition of hospital plant and equipment have been reduced in states with such programs. However, one can develop scenarios under which this will surely happen, for example, with fairly uniform rates (across hospitals) which hospitals must accept as payment in full and/or tight ceilings on hospital budgets. Patient cost-sharing above the insurer's prospective payment would allow for greater variation in quality and greater satisfaction of individual patient wants, but they admittedly conflict with the values of individuals who stress the risk-reduction features of insurance and "one-tier health care." If hospital rates do not yield a competitive rate of return to investors, there may well be a capital-formation problem in the hospital industry, unless, of course, there are substantial subsidies from governments and private philanthropists.

Third, especially in view of the rapid rise in outlays for hospital care since 1980 and deficits in public sector budgets, there is considerable pressure for a quick fix. The estimates in table 2 imply that it takes years before mandatory rate-setting programs realize their full potential. The Economic Stabilization Program lowered hospital expense per day and per admission for the time it was in effect, but that program was in constant flux repairing deficiencies in its previous version and, for a variety of reasons, was discontinued early in 1974. State efforts have generally evolved over a much longer time period and have not produced statistically significant reductions in payments to hospitals during the first couple of years. An optimistic interpretation of recent history is that much has been learned and an effective program need not require such a gestation period. A more realistic judgment from the evidence, however, speaks for developing a plan that foresees specific changes occurring as the program develops. For example, rates might be established as the basis of a hospital's historical cost or by formula initially with more radical (but perhaps more equitable and efficiency-enhancing) approaches, such as competitive bidding as a method for determining payment per unit, scheduled for a specific time downstream.

Finally, one of the most important policy decisions to be made in implementing rate setting is whether the program is to apply to all sources of payments or just a few. There are both advantages and disadvantages to covering all payers under a single system. On the plus side, this approach eliminates the inequities of "cost-shifting" that occur when charges disallowed by a payer regulated by the system are billed to unregulated payers. Since Medicare and Medicaid apply stringent limits of their own, they are less likely to be the victims of cost-shfiting when they are excluded from rate setting than when charge-paying Blue Cross plans and commercial insurers are excluded.

The most negative feature of universal coverage under rate regulation is the effect it is likely to have on innovation. With price competition eliminated by rate setting, who in the private sector will introduce innovative alternatives to the present system which offer the prospect of substantial savings in spending on hospital care? Certainly the answer to this rhetorical question is that such innovation would be even rarer than at present. Other potential victims are Medicare and Medicaid, which if joined to a universal rate-regulation system, would undoubtedly end up spending more.

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Appendix

Tables A1 and A2 present regression results for the regulatory variables. All of the dependent variables in Table A1 are levels, the empirical counterpart of Model I. All of the dependent variables in Table A2 are annual percentage changes, the Model II concept. Numbers in parentheses below the parameter estimates are standard errors. The full set of results is available from the author on request.

TABLE A1
Expense and Profit Regressions

Explanatory Variable	Dependent Variable							
	1. EAM (63–80)	2. EAM (69–80)	3. EAAM (69–80)	4. EPD (63–80)	5. EPD (69–80)	6. EAPD (69–80)	7. LOS (63–80)	8. PROF (63–80)
ESP	−0.038[a]	−0.034[a]	−0.034[a]	−0.032[a]	−0.034[a]	−0.034[a]	−0.005	−0.008[a]
	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)	(0.006)	(0.005)	(0.003)
VE	−0.055[a]	−0.054[a]	−0.049[a]	−0.057[a]	−0.058[a]	−0.057[a]	0.004	0.011[a]
	(0.007)	(0.006)	(0.007)	(0.008)	(0.008)	(0.007)	(0.006)	(0.004)
S	−0.050[a]	−0.018[b]	−0.025[b]	−0.023	−0.006	−0.012	−0.030[a]	−0.010
	(0.013)	(0.013)	(0.013)	(0.015)	(0.016)	(0.016)	(0.012)	(0.007)
CNP	−0.004	0.001	−0.000	0.010	0.010	0.010	−0.014[a]	−0.005[c]
	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)	(0.006)	(0.005)	(0.003)
CNY	−0.013[b]	−0.007	−0.008	−0.004	0.001	0.000	−0.011[b]	−0.006[b]
	(0.006)	(0.006)	(0.006)	(0.007)	(0.008)	(0.007)	(0.005)	(0.003)
CNO	−0.010[c]	−0.004	−0.002	−0.003	0.001	0.004	−0.009	−0.007[c]
	(0.006)	(0.008)	(0.008)	(0.008)	(0.009)	(0.009)	(0.006)	(0.004)
PRMRY	−0.006	0.003	−0.008	−0.016	0.007	−0.011	0.010	0.001
	(0.015)	(0.014)	(0.014)	(0.018)	(0.017)	(0.017)	(0.014)	(0.008)
PRMRO	−0.048[a]	−0.041[a]	−0.042[a]	−0.068[a]	−0.049[a]	−0.049[a]	0.020	0.000
	(0.015)	(0.014)	(0.015)	(0.018)	(0.018)	(0.018)	(0.014)	(0.008)
PRVRY	−0.007	0.021	0.020	0.006	0.022	0.021	0.000	−0.005
	(0.015)	(0.014)	(0.014)	(0.018)	(0.017)	(0.017)	(0.014)	(0.008)
PRVRO	−0.034[b]	−0.016	−0.011	−0.039[b]	−0.010	−0.006	0.004	−0.001
	(0.014)	(0.014)	(0.014)	(0.017)	(0.017)	(0.017)	(0.013)	(0.008)
PRMAY	0.005	0.009	0.014	0.009	0.018	0.025	−0.004	−0.005
	(0.019)	(0.017)	(0.017)	(0.022)	(0.021)	(0.020)	(0.018)	(0.010)

PRMAO	0.009	0.011	0.020	0.033	0.025	0.032	−0.026	−0.017
	(0.020)	(0.019)	(0.020)	(0.024)	(0.024)	(0.023)	(0.019)	(0.011)
PSRO	0.066[a]	0.069[a]	0.081[a]	0.058[b]	0.055[b]	0.070[a]	0.004	−0.007
	(0.024)	(0.023)	(0.023)	(0.028)	(0.028)	(0.027)	(0.022)	(0.013)
TIME	0.011[a]	—	—	0.014[a]	—	—	−0.003[b]	−0.001
	(0.002)	(—)	(—)	(0.002)	(—)	(—)	(0.002)	(0.001)
TM	—	0.008[a]	0.010[a]	—	0.005[c]	0.006[b]	—	—
	(—)	(0.003)	(0.002)	(—)	(0.003)	(0.003)	(—)	(—)
LDEP	0.75[a]	0.71[a]	0.65[a]	0.73[a]	0.80[a]	0.77[a]	0.70[a]	0.20[a]
	(0.03)	(0.04)	(0.04)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
	$R^2 = 0.99$	$R^2 = 0.99$	$R^2 = 0.99$	$R^2 = 0.99$	$R^2 = 0.98$	$R^2 = 0.98$	$R^2 = 0.94$	$R^2 = 0.52$
	$\bar{R}^2 = 0.99$	$\bar{R}^2 = 0.99$	$\bar{R}^2 = 0.98$	$\bar{R}^2 = 0.99$	$\bar{R}^2 = 0.98$	$\bar{R}^2 = 0.98$	$\bar{R}^2 = 0.93$	$\bar{R}^2 = 0.47$
	F(73,808)	F(73,514)	R(73,514)	F(73,808)	F(73,514)	F(73,514)	F(73,808)	F(73,808)
	= 1309.4	= 594.0	= 490.0	= 872.1	= 388.1	= 345.7	= 172.7	= 11.9

Key: Dependent variables: EAM = expense per admission; EAAM = expense per adjusted admission; EPD = expense per patient day; EAPD = expense per adjusted patient day; LOS = length of stay; PROF = total revenue divided by total expense.

Regulatory variables: ESP = Economic Stabilization Program; VE = Voluntary Effort; S = fraction of hospital revenue covered by Section 1122; CNP = CON program, year of implementation and preceding year; CNY = "young" CON program, one and two years after implementation; CNO = "old" CON program, three years or more after implementation; PRMR = mandatory-regulatory rate-setting; PRVR = voluntary-regulatory rate-setting; PRMA = mandatory-advisory rate-setting; "Y" suffix on PR variables signifies the program is one and two years after implementation; "O" suffix on PR variables signifies program is three or more years after implementation; PSRO = fraction of hospitals with PSRO review times fraction of hospital revenue from Medicare and Medicaid.

Other Explanatory Variables: Y = real per capita income; GP = fraction of patient care physicians who are general practitioners; MD = patient care physicians per 1,000 population; A65 = fraction of population over age 65; DEN = population per square mile; BC = fraction of total hospital revenue covered by Blue Cross; MCAID = fraction of total hospital revenue covered by Medicaid; MCARE = fraction of total hospital revenue covered by Medicare; COM = fraction of total hospital revenue covered by commercial insurance; W = real manufacturing wage; LDEP = lagged dependent variable; TIME = time trend with 1963 = 1; TM = time trend with 1969 = 1. All regressions include Y through W and state dummies not shown (but available from the author on request).

[a] Statistically significant at the 1% level (two-tailed test).
[b] Statistically significant at the 5% level (two-tailed test).
[c] Statistically significant at the 10% level (two-tailed test).

TABLE A2
Annual Change Regressions

Explanatory Variable	Dependent Variable						
	1. ECAPD	2. ECAAM	3. DAAM	4. DAPD	5. DLOS	6. DOPD	7. DPROF
Constant	0.061	0.062	0.038	0.039	0.001	0.089	−0.015
	(—)	(—)	(—)	(—)	(—)	(—)	(—)
T70	0.017[b]	−0.001	−0.001	−0.019[a]	−0.018[a]	0.034	0.009[a]
	(0.007)	(0.005)	(0.006)	(0.007)	(0.006)	(0.022)	(0.003)
T71	0.018[b]	−0.013[a]	0.002	−0.029[a]	−0.030[a]	0.084[a]	0.017[a]
	(0.007)	(0.005)	(0.006)	(0.007)	(0.006)	(0.022)	(0.003)
T72	0.005	0.009	−0.011[c]	−0.025[a]	−0.014[b]	0.027	0.010[a]
	(0.007)	(0.006)	(0.006)	(0.008)	(0.006)	(0.022)	(0.003)
T73	−0.042[a]	−0.051[a]	−0.000	−0.009	−0.009	0.006	0.009[a]
	(0.007)	(0.006)	(0.006)	(0.008)	(0.006)	(0.023)	(0.003)
T74	−0.055[a]	−0.067[a]	−0.001	−0.013	−0.013[b]	0.005	0.014
	(0.007)	(0.006)	(0.007)	(0.008)	(0.006)	(0.024)	(0.003)
T75	0.020[b]	0.011[c]	−0.020[a]	−0.029[a]	−0.009	−0.077[a]	0.017[a]
	(0.008)	(0.006)	(0.007)	(0.008)	(0.007)	(0.025)	(0.003)
T76	0.028[a]	0.024[a]	−0.014[b]	−0.018[b]	−0.004	−0.003	0.024[a]
	(0.008)	(0.006)	(0.007)	(0.009)	(0.007)	(0.026)	(0.004)
T77	−0.036[a]	−0.039[a]	−0.026[a]	−0.029[a]	−0.003	−0.059[b]	0.012[a]
	(0.009)	(0.007)	(0.008)	(0.009)	(0.007)	(0.028)	(0.004)
T78	−0.078[a]	−0.082[a]	−0.017[c]	−0.020[c]	−0.004	−0.029	0.024[a]
	(0.010)	(0.008)	(0.009)	(0.011)	(0.009)	(0.033)	(0.005)
T79	−0.045[a]	−0.053[a]	−0.009	−0.017	−0.008	−0.055[c]	0.022[a]
	(0.010)	(0.008)	(0.009)	(0.011)	(0.009)	(0.033)	(0.005)
T80	−0.053[a]	−0.054[a]	0.003	0.002	−0.002	−0.028	0.021[a]
	(0.010)	(0.008)	(0.009)	(0.011)	(0.009)	(0.033)	(0.005)
S	−0.001	−0.008	0.018[b]	0.010	−0.007	0.053	0.001
	(0.011)	(0.009)	(0.010)	(0.012)	(0.009)	(0.035)	(0.005)

CNP	0.003	0.002	−0.004	−0.005	−0.002	−0.013	−0.001
	(0.004)	(0.004)	(0.004)	(0.005)	(0.004)	(0.015)	(0.002)
CNY	0.002	0.003	−0.004	−0.003	0.001	−0.000	−0.000
	(0.005)	(0.004)	(0.005)	(0.005)	(0.004)	(0.016)	(0.002)
CNO	0.002	0.006[b]	−0.004	−0.000	0.004	−0.012	−0.000
	(0.004)	(0.003)	(0.004)	(0.005)	(0.004)	(0.013)	(0.002)
PRMRY	−0.021	−0.016	−0.006	−0.002	0.005	0.007	−0.001
	(0.013)	(0.010)	(0.012)	(0.014)	(0.011)	(0.042)	(0.006)
PRMRO	−0.036[a]	−0.033[a]	−0.014	−0.011	0.003	−0.035	0.002
	(0.011)	(0.009)	(0.010)	(0.012)	(0.010)	(0.036)	(0.005)
PRVRY	−0.007	0.012	−0.019	−0.010	0.008	−0.023	−0.006
	(0.013)	(0.010)	(0.012)	(0.014)	(0.011)	(0.042)	(0.006)
PRVRO	−0.011	−0.012[c]	−0.005	−0.005	−0.001	−0.022	0.003
	(0.008)	(0.007)	(0.008)	(0.009)	(0.007)	(0.027)	(0.004)
PRMAY	0.011	0.007	0.001	−0.003	−0.004	−0.063	0.002
	(0.017)	(0.014)	(0.016)	(0.019)	(0.014)	(0.055)	(0.008)
PRMAO	0.013	0.004	0.006	0.003	−0.009	0.000	−0.005
	(0.015)	(0.012)	(0.014)	(0.017)	(0.013)	(0.049)	(0.007)
PSRO	−0.012	−0.002	−0.032	−0.023	0.009	−0.108	−0.009
	(0.021)	(0.017)	(0.020)	(0.024)	(0.018)	(0.069)	(0.010)
	$R^2 = 0.57$	$R^2 = 0.63$	$R^2 = 0.13$	$R^2 = 0.08$	$R^2 = 0.10$	$R^2 = 0.20$	$R^2 = 0.16$
	$\overline{R}^2 = 0.56$	$\overline{R}^2 = 0.61$	$\overline{R}^2 = 0.10$	$\overline{R}^2 = 0.04$	$\overline{R}^2 = 0.07$	$\overline{R}^2 = 0.17$	$\overline{R}^2 = 0.12$
	F(22,565) = 34.4	F(22,565) = 43.0	F(22,565) = 3.9	F(22,565) = 2.2	F(22,565) = 2.9	F(22,565) = 6.4	F(22,565) = 4.8

Key: Dependent variables: ECAAM = growth in expense per adjusted admission; ECAPD = growth in expense per adjusted patient day; DAAM = growth in adjusted admissions; DAPD = growth in adjusted patient days; DOPD = growth in outpatient visits; DLOS = growth in length of stay; DPROF = growth in total revenue divided by total expense.
Regulatory variables: See key to table A1.
T70 through T80: Binary variables for years 1970–80.

[a] Statistically significant at the 1% level (two-tailed test).
[b] Statistically significant at the 5% level (two-tailed test).
[c] Statistically significant at the 10% level (two-tailed test).