Impacts of Hospital Budget Limits in Rochester, New York

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During 1980-87, eight hospitals in the Rochester, New York area participated in an experimental program to limit total revenue. This article analyzes: increase of costs for Rochester hospitals; trends for inputs and compensation; and cash flow margins. Real expense per case grew annually by about 3 percent less in Rochester. However, after 1984, Medicare prospective payment had an effect of similar size outside Rochester. Some capital inputs to hospital care were restrained, as were wages and particularly benefits. The program did not generally raise or stabilize hospital revenue margins, while the ratio of cash flow to debt trended down. Financial stringency of this program relative to alternatives may have contributed to its end.

INTRODUCTION

During 1980-87, hospitals in the Rochester, New York area (including Monroe County and several less populous adjacent counties) voluntarily participated in an unusual program to limit revenue from all payers. Eight short-term general hospitals and an acute-care unit of a county hospital participated in the Hospital Experimental Payment program (HEP), which was endorsed by local employers, private third-party payers, and county, State, and Federal agencies. Of the 8 short-term general hospitals, one was a large university-based hospital with more than 700 beds, and the other 7 ranged in size from 85-500 beds; these hospitals served a total population of about 900,000 (Taylor, 1987). The program was administered by the Rochester Area Hospitals Corporation (RAHC).

During 1980-84, the first phase of the HEP, total revenue for each hospital was limited to base-year costs, adjusted for general inflation, plus an allowance for changes in cost associated with new equipment and facilities. New capital spending projects were subject to an overall, approved plan for the region. All payers agreed to suspend their usual payment rules and to contribute an agreed portion of the guaranteed budget for the RAHC hospitals (Taylor, 1987; Block, Regenstreif, and Griner, 1987). There were minor changes in the HEP during 1985-86. In January 1987, New York State discontinued its Federal waiver of the Medicare prospective payment system (PPS); subsequently, the RAHC hospitals began to withdraw from the HEP (Pallarito, 1992). By 1988, both the community hospital and individual budget limits had ceased operation.

The HEP involved not only hospital revenue limits, but also other arrangements in the financing and regulation of health care that were unusual in the early 1980s. The major insurers agreed to community-rating of premiums. In addition, a relatively high percentage of the population was enrolled in two large health maintenance organizations. Finally, there were established programs outside hospitals to supply and manage both long-term care and outpatient clinics (Hall and Griner, 1993). These arrangements, and the history of cooperation among business, insurers, and local government, suggest that the voluntary programs adopted in Rochester might not be easily replicated in other areas.

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Several reports in the trade press and refereed journals concluded that health care costs per capita rose more slowly in Rochester than elsewhere in the United States during the early 1980s. Evidence cited included employer spending and Blue Cross/Blue Shield premiums (Taylor, 1987; Hall and Griner, 1993; U.S. General Accounting Office, 1993). A study by the RAHC (1992) indicates that payments to Rochester hospitals were a declining fraction of Blue Cross/Blue Shield expenses in the 1980s, and, therefore, were considered a moderating factor in the overall rise of premiums. Block, Regenstreif, and Griner (1987) offer evidence that the growth of hospital expense per capita in Rochester from 1980-84 was lower than in New York State generally or in the United States as a whole. Mushlin et al. (1988) found that quality of care, in terms of outcomes, did not deteriorate in Rochester hospitals.

The evidence of reduced inflation of costs in Rochester has been cited in the proposal for health care reform by President Clinton, policy analyses by the Prospective Payment Assessment Commission (1993), and scholarly articles (e.g., Altman and Cohen, 1993). The Rochester experience may now become important to States weighing various options for health care reforms. Most proposed reform plans seek to restrain the growth of spending. Competition among insurers is seen as working toward that objective. However, so long as a large proportion of the population continues to choose fee-for-service care, the cost-reducing effects of competition may only accrue slowly. Furthermore, fee schedules and prospective prices are regarded as weak methods of controlling total expense because they address neither the volume of services nor technology advances (U.S. Congressional Budget Office, 1991). Therefore, there is substantial interest in budget regulation for individual providers, the community, or the region (Starr and Zelman, 1993; Aaron and Schwartz, 1993; Altman and Cohen, 1993). This interest leads to questions about the experience in Rochester.

Past studies of economic trends for Rochester hospitals contain some nagging limitations. Studies by Block, Regenstreif, and Griner (1987) and the RAHC (1992) do not rigorously allow for the possible influences of changing case mix, the volume of patients, or other factors on trends of hospital cost, nor do they offer statistical tests of whether capital inputs, labor inputs, and/or staff compensation were reduced. The importance of capital spending constraints has been asserted in several reports (Taylor, 1987; U.S. General Accounting Office, 1993; Berman, 1993), but trends in Rochester hospital investment have not been compared with hospitals outside of the Rochester area. A credible story of control of hospital budget growth should be supported by explicit input (and employee compensation) trends that differ from other hospitals.

In view of the limitations of previous research about the impact of hospital budget limits in Rochester, this article has 3 specific aims: (1) to provide a rigorous analysis of the annual increase of costs for Rochester hospitals compared with a large national data base of other hospitals, controlling for changes in case mix and other important factors (such as the onset of Medicare PPS); (2) to clarify how costs were controlled by examining trends for capital inputs, labor inputs, and labor compensation; and (3) to clarify both the motivation of hospitals to participate in the program and the long-run sustainability of the budget limits by examining the level and stability of hospital net income flows during and after the end of the HEP.

METHODS AND DATA

Three types of analysis are conducted sequentially in accord with the purposes of this article. Each of these is briefly described before proceeding to detailed methods for the cost analysis. Some limitations to the inferences for each type of analysis are noted here or in the discussion of results.

The first analysis is a multivariate regression of the change in expenses at the level of the individual hospital, controlling for other factors. We utilize the Hospital Cost and Utilization Project II (HCUP-2) data base maintained by AHCPR, which contains patient discharge abstracts for more than 400 hospitals between 1980-87. The sample of hospitals was designed to be nationally representative of all short-term, general, non-Federal hospitals with 30 beds or more. Compared with the universe of such hospitals, HCUP-2 hospitals are likely to be somewhat larger, have teaching affiliations, have a lower proportion of investor-owned hospitals, and be located outside the South. More details about the sampling design are given in Coffey and Farley (1988). All eight of the Rochester area hospitals are present in the HCUP-2 data base. Ordinarily, the identities of specific hospitals are kept strictly confidential. For this study however, the Rochester hospitals gave permission to be identified.

The HCUP-2 data base includes all discharges (for all payers) from the sample hospitals. Data elements include information on primary and secondary diagnoses as well as procedures performed on the patient. Hospital characteristics, total expenses, and volume of service are taken from the *Annual Survey of Hospitals* published by the American Hospital Association (AHA) (1977-92). Some characteristics of the population affecting demand for care are measured for the county in which the hospital is located. These measures, as well as data on the availability of physicians and other health care suppliers, are taken from the Area Resource File, a data base issued by the U.S. Bureau of Health Professions. An index of area wages for each hospital in 1986 was produced by HCFA. Although Area Wage Indexes were published for 1984, many changes were later made to the methodology and to the classification of particular hospitals to give more realistic estimates.

The second type of analysis compares trends of Rochester hospitals as a group with the national sample. For each group and each year, a weighted mean is calculated that recognizes differences in hospital size. One input or compensation trend is examined at a time. The weighted group means are charted, and a statistical test is constructed with the null hypothesis that the change from 1980-87 was not different between the two groups. Clearly, influences outside of the Rochester program may help explain differences in trends. However, if no significant differences in input trends can be found, a finding of slower growth of costs in Rochester is not supported. Findings from comparative trends of this sort can also be compared with the viewpoints of the participants, as well as theoretical considerations about the use of collusive power to restrain compensation of employees.

The third type of analysis compares the level and stability of net income for individual Rochester hospitals during and after the HEP. While many forces impact on net income, a pattern of participation in the HEP to collusively raise and stabilize hospital margins may be evident. Also, a rise in margins after the end of the program would suggest why the hospitals preferred to withdraw in 1987. Finally, we examine the trend in the ratio of cash flow to total debt for Rochester hospitals. This measure

is specified in the hospital accounting literature as one of the better predictors of organization survival (Cleverly, 1986). The trend in this ratio should give another perspective on the stringency of the HEP and the sustainability of the program.

There are some gaps in the data on financial performance for these hospitals after 1980. The largest hospital in Rochester did not report certain types of data during the 1980s; missing elements include revenue and the dollar value of fixed assets. The time series of revenue margins for each Rochester hospital were examined and compared using information from HCFA's Medicare Cost Reports for 1984-90. They do not permit a comparison of margins before and during the early phase of the HEP, but they do permit a comparison during the later part of the HEP and afterwards.

Multivariate Analysis of Cost

As one prerequisite for the multivariate analysis of costs, it was necessary to develop case-mix measures. Several measures were examined for this study, but this article will use only one measure: expected length of stay (LOS) based on diagnosis-related group (DRG) mix (LOSDRG). This is a measure of expected "costliness" for a hospital's set of patients. This measure applies the familiar DRG (Version 3) system of patient classification to all patients from 1980-87. L_{it} is the average LOS for patients in DRG i, pooling the data for all hospitals in the national sample for year t. This is the weight to apply to the proportion of cases in DRG i for hospital h in year t, P_{iht}. The index for hospital h in year t is the summation

$$LOSDRG_{ht} = \sum_i (P_{iht} * L_{it}).$$

The weights L_{it} are calculated separately for each year to allow for industry-wide changes in coding practices over time. Alternative weights, such as average charges in each DRG, could be used with the same formula. Using LOS rather than average charges as the weight in the formula has the advantage that the former is more frequently and reliably reported by all hospitals.

While the DRG system has been explicitly developed to predict costliness of patients, there are potentially important problems in using the DRG system. One problem with DRGs is that the classification depends on major treatment decisions, such as the choice between surgical and medical interventions. Hospitals might appear to have a less costly mix of patients simply because the capability to perform some procedures is absent.

Severity of illness is defined according to the Disease Staging system, a commercial patient-classification software product used in a number of research studies (Gonnella, Hornbrook, and Louis, 1984; Coffey and Goldfarb, 1986). In the Disease Staging system, an underlying disease most critical to the patient's life is identified after a review of all the listed diagnoses. This system is less sensitive than DRGs to treatment decisions. An algorithm is used to assign a stage level between 1 and 4 for each disease reported; the assignment of stages is designed to predict mortality of the patient. A disease with stage 1 is limited to a single organ system, with no significant complications and a good prognosis. Stage 2 denotes problems that extend beyond a single organ system and present significantly increased risk of complications. Stage 3 represents multiple organ system impairment, generalized systemic illness, and poor prognosis for survival. Patients assigned to stage level 4 died in

the hospital. An index of severity for the hospital as a whole is created based on the proportion of cases at stage 3 or 4. A stage of 3 or 4 is not a rare event in most hospitals—the national rate reached about 20 percent in 1987.

The dependent variable in our cost analysis for hospital h in year t, C_{ht}, represents expenses per adjusted admission from the AHA (1977-92). Adjusted admissions are a weighted sum of the number of admissions and outpatient visits, using relative revenues as the weights. This standard adjustment can later give rise to a particular type of biased inference. Price markups tend to be higher in outpatient care. Therefore, hospitals expanding their outpatient services more rapidly, all else equal, will have an exaggerated increase in adjusted admissions and hence a lower apparent growth of cost per adjusted admission. This may not be a problem when comparing Rochester with the rest of the Nation. In a check of this potential problem, we found that the trend for outpatient surgery as a proportion of total surgery was parallel to the trend for other hospitals.[1]

The cost measure C_{ht} is deflated by the HCFA Area Wage Index and the Consumer Price Index (CPI) and transformed into log values. The transformation gives errors that are closer to the normal distribution as well as coefficients that are easier to interpret. A multivariate model of the determinants of costs is as follows: r_h is a dummy variable with the value of 1 in the Rochester group and 0 otherwise; C_{ht} is a function of whether the hospital was in the Rochester program (r_h), case-mix measures and k other exogenous hospital characteristics (X_{kht}), the year for each observation T_t, and unmeasured hospital-specific differences in cost. U_{ht} represents the effect of all unmeasured hospital-specific factors that are constant or change very slowly. An equation to test for differing time trends is:

$$C_{ht} = c_0 + \alpha * r_h T_t + \beta * (1-r_h) T_t + \sum_k \gamma_{kt} X_{kht} + U_{ht} + \epsilon_{ht}. \quad (1)$$

The year variable is interacted with the Rochester dummy variable; therefore, if the trends are the same, the estimated values of α and β should be equal.

If the hospital-specific unmeasured factors are correlated with measured variables, estimation of equation 1 by ordinary least squares (OLS) would lead to bias in the results. Moreover, the unmeasured hospital variables do not necessarily have a constant effect. Suppose the hospital-specific difference has a fixed autocorrelation: $U_{ht} = \rho U_{h,t-1}$. The estimation process for the entire model should allow for this autocorrelation.

We estimated the value of $U_h + \epsilon_h$ for 1980 by fitting equation 1 with the following independent variables (X): ownership by State or local government, teaching affiliation, volume of services, case-mix index, region of the country, urban or rural location, market share in the county, hospital market concentration, physician availability per capita in the county, nursing home availability per capita, income per capita, and other environmental variables. Many of these variables do not change over time; for some of the others, we did not have a full set of data for each year for each hospital.

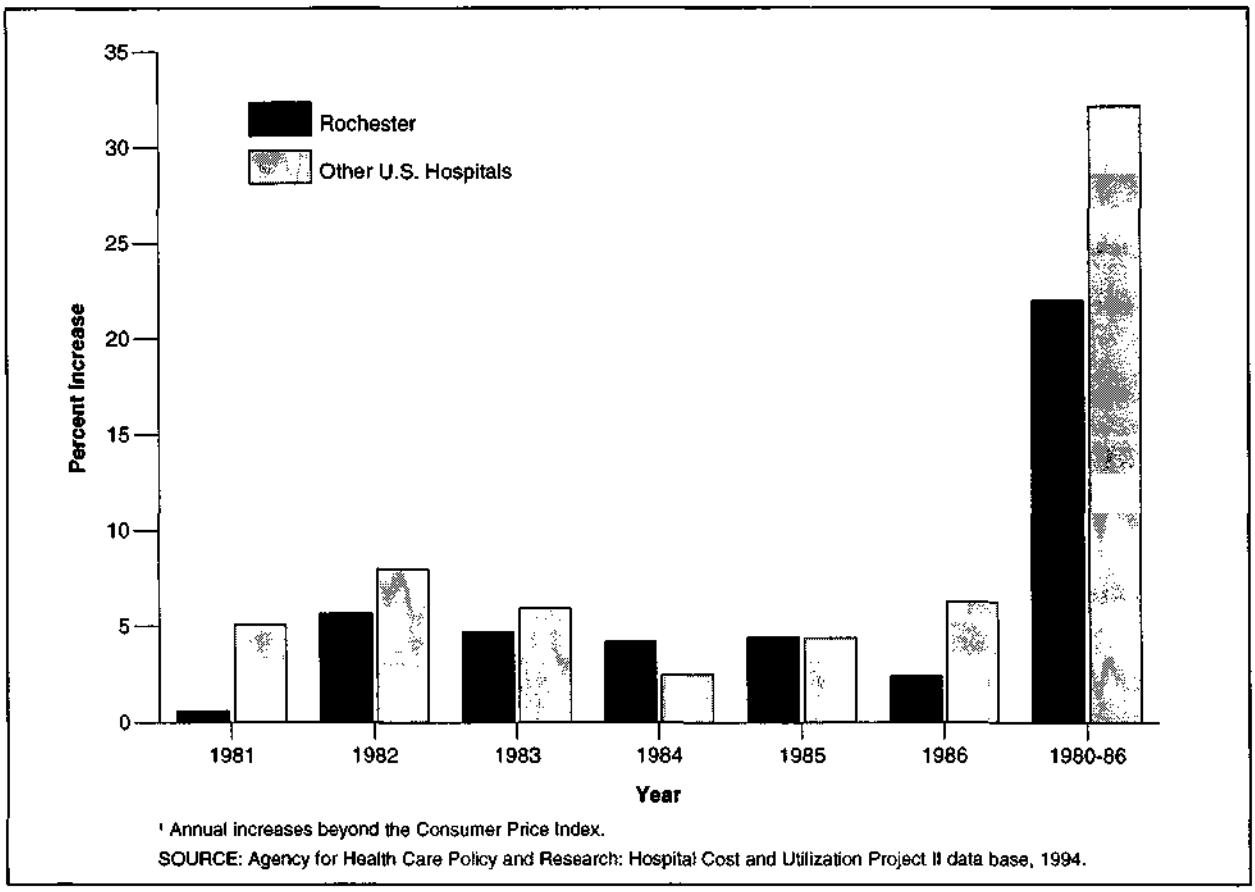
Now consider the annual difference calculation $C_{ht} - C_{h,t-1}$ (denoted ΔC_h) as the dependent variable for analysis. Since C is already transformed into the logarithm, this difference is approximately the percentage change from one year to the next. Taking differences using the first equation, we have:

$$\Delta C_h = \beta + (\alpha-\beta) * r_h + \sum_k \gamma_k * \Delta X_{kh} + (\rho-1) U_{ht-1} + \Delta \epsilon_h. \quad (2)$$

[1]Data available from the authors upon request.

Figure 1

Hospital Expenses per Adjusted Admission:[1] 1981-86



[1] Annual increases beyond the Consumer Price Index.

SOURCE: Agency for Health Care Policy and Research: Hospital Cost and Utilization Project II data base, 1994.

Now (α-β) becomes the difference in rate of growth associated with Rochester hospitals relative to other U.S. hospitals. It would be negative if Rochester had consistently slower growth than elsewhere, after allowing for other variables that change over time, such as case mix. The parameters in equation 2 can be estimated in an iterative manner. First, a particular value of ρ is assumed, so that the series of values for U_{ht} can be generated. From the OLS fit of equation 2, another value of ρ is determined. If the second value is far from the first, the process will require more iterations to approach equality. This methodology is a straightforward extension of a recognized model for only 2 periods, adopted by economists in studies such as Dranove and Cone (1985). This method does not recognize that some market conditions may have changed in Rochester relative to elsewhere and may be confounded with the Rochester dummy variable.

RESULTS

Hospital Expense per Case

Figure 1 compares the increase of cost per case for Rochester hospitals as a group with other hospitals as a group from 1980-86. Lack of data for the largest hospital in 1987 prevented us from including that year. Cost per case is deflated both by the HCFA Area Wage Index for geographic comparability and by the CPI from year to year. Only in 1984 was the increase greater for Rochester than elsewhere. Cumulatively

Table 1

Regression Analysis of Hospital Expenses per Case: 1981-87

Independent Variable	Change in Volume of Cases	No Change in Volume of Cases
Intercept (Constant Rate of Increase)	**.058 (25.87)	**.057 (22.63)
Change in Log of Case-Mix Index LOSDRG	*.056 (1.98)	**.292 (6.12)
Change in Log of Proportion of Cases With Severity Score 3.0 or Higher	.009 (0.92)	.006 (0.59)
Rochester Area Hospital (1 if Yes, Otherwise 0)	**-.031 (-2.77)	**-.033 (-2.79)
Medicare PPS: Non-Rochester Hospitals (1 for 1984 or Later, Otherwise 0)	**-.025 (-8.30)	**-.024 (-7.30)
Change in Log of Adjusted Admissions	**-.346 (-21.30)	— —
Unexplained Hospital-Specific Costliness From Separate 1980 Analysis[1]	**-.078 (-3.28)	**-.093 (-3.67)
R^2	.17	.04
Residual Degrees of Freedom	2570	2571

* $p < .05$.

** $p < .01$.

[1] A separate equation regressed the level of expense per adjusted admission for 1980 on hospital characteristics such as teaching status, regional location, market structure, and other influences. The residuals ("unexplained costliness") for each hospital were assumed to affect the growth of costs in future years, with declining effect each succeeding year. This model is described in the article.

NOTES: Numbers in parentheses are *t*-statistics. PPS is prospective payment system. The dependent variable in this analysis is the change from the previous year in the log of real hospital expenses per adjusted admission. The expense for each hospital-year is deflated by the Health Care Financing Administration Area Wage Index and the Consumer Price Index.

SOURCE: Agency for Health Care Policy and Research: Hospital Cost and Utilization Project II data base, 1994

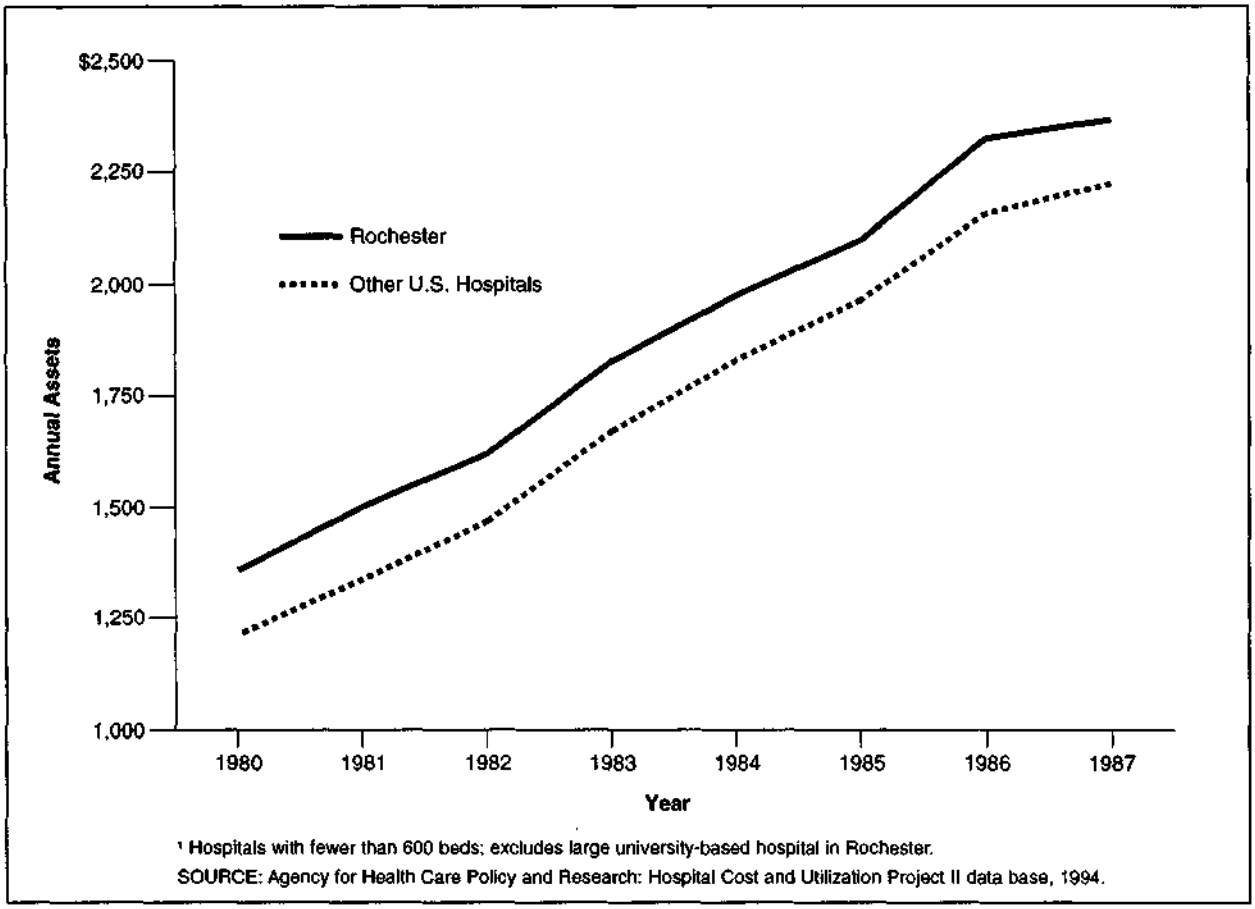
over 6 years, the percentage increase was only about two-thirds as large in Rochester as elsewhere. The Rochester result compares even more favorably with New York State community hospitals as a whole. For all New York hospitals, the cumulative growth of real expenses over this period was 38 percent, compared with 22 percent for Rochester.

Table 1 presents results from fitting equation 2 for hospital costs across all hospitals, with or without the total volume of cases as an independent variable. In both columns of results, the Rochester hospitals are found to have a significantly slower rate of increase, about 3 percent less per year. The effect of Medicare prospective payment outside Rochester was to reduce the growth rate of cost by about 2.5 percent from 1984-87. In order to interpret the coefficients, the following formula gives the percentage effect of a one-unit change in a particular variable: e^b-1, where b is the coefficient of the variable. For values of b below .10, there is little difference between the formula and the value of b itself.

The total volume of cases might be considered an endogenous variable in a more complete model of the determinants of cost. Since it was not feasible to fit such an expanded model, a set of results was produced without the volume of patients. The other coefficients in the second model are protected from any bias by the behavior of the total volume of patients. Results show that the difference between Rochester and other hospitals is not much affected by including volume of cases in the regression. The substantial negative coefficient for volume suggests that hospitals had marginal costs well below average costs during the study period. One change is

Figure 2

Plant Assets per Adjusted Admission:[1] 1980-87



[1] Hospitals with fewer than 600 beds; excludes large university-based hospital in Rochester.

SOURCE: Agency for Health Care Policy and Research: Hospital Cost and Utilization Project II data base, 1994.

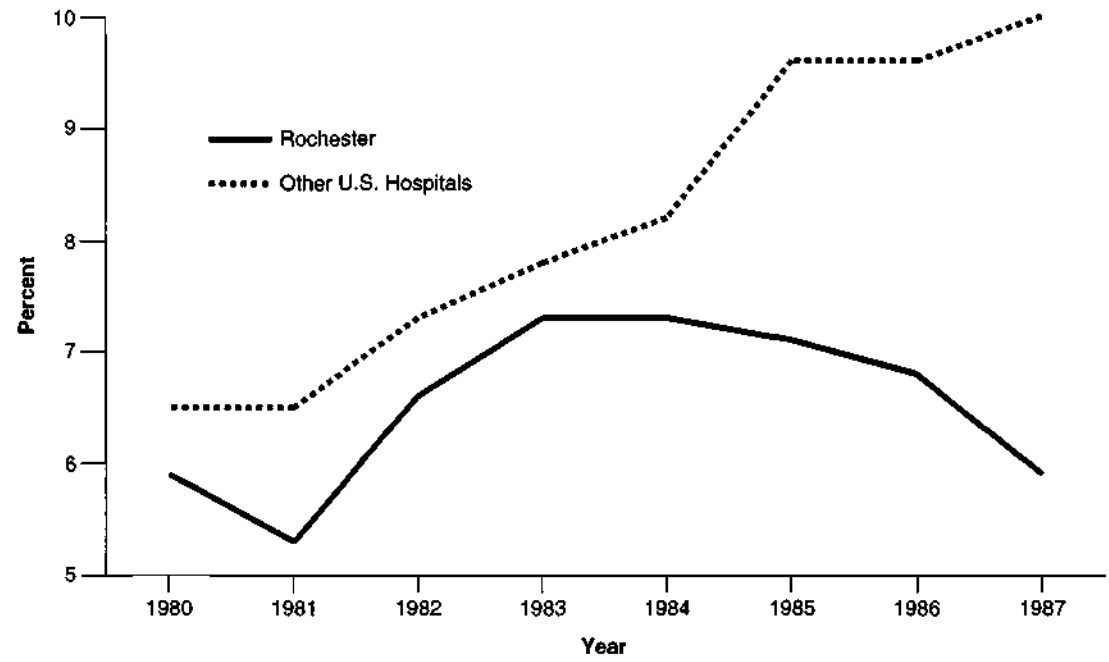
evident between the two columns of results. When the volume of cases is excluded from the estimation model, the effect of the case-mix measure is substantially higher—.292 versus .056. Changes in the severity index had no significant influence on cost growth for either column of results. Finally, the autocorrelation of hospital-specific differences appeared to be about 0.90. Because this parameter ρ is less than 1.0, the estimated effect of unexplained costs in Table 1 is negative—hospitals with above-average costs in one year due to unexplained factors are expected to have a somewhat lesser percentage growth rate of costs in the next year. Over a period of years, the initial importance of the unexplained factors would erode steadily.

Comparison of Input Trends

The first set of comparisons involves capital inputs. It is intrinsically difficult to devise an ideal measure of capital input for the production of hospital services. The HCUP-2 data base and Medicare Cost Reports offer two financial measures of capital input: plant assets net of accumulated depreciation, and current depreciation according to standard accounting practice. The first measure attempts to capture capital assets employed, while the second attempts to estimate capital assets consumed in the production of services. These measures present different types of problems. Neither measure involves the amount of actual use of capital assets. If depreciation rates are set too low to com-

Figure 3

Percent of Patient Days in Intensive Care Units:[1] 1980-87



[1] All available hospitals in sample.

SOURCE: Agency for Health Care Policy and Research: Hospital Cost and Utilization Project II data base, 1994.

pensate for rising replacement cost and obsolescence, then plant assets from an accounting statement will tend to overestimate capital availability in older facilities. Current depreciation presents a different sort of problem. It makes newer hospitals appear to have higher capital input than older facilities if investments are made in lumps—i.e., not simply to meet immediate demands efficiently but also to prepare for expected uses over the life of the assets.

Since the largest Rochester hospital did not report asset data to the AHA (1977-92), Figure 2 compares capital asset trends in the remaining 7 Rochester hospitals with other hospitals under 600 beds in the HCUP-2 data base. To supplement the financial measure of capital assets, Figures 3 and 4 plot the use of a particular capital-intensive resource—intensive care units (ICUs). All hospitals responding to the survey reported this information.

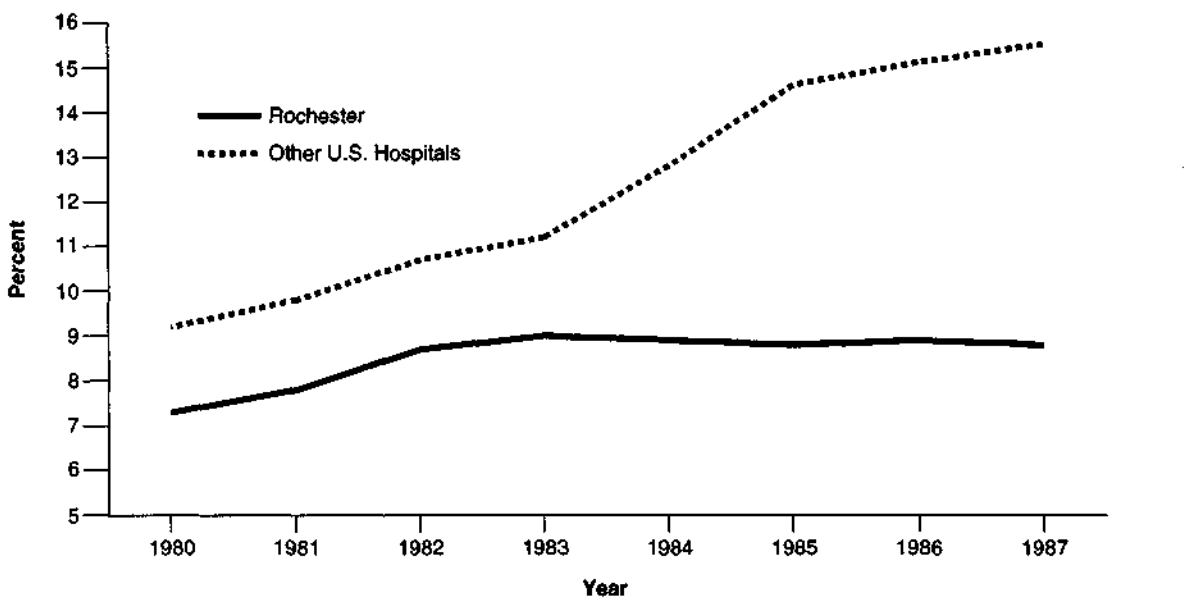
Figure 2 shows essentially no difference in the Rochester hospital trend for plant assets per adjusted admission compared with other hospitals. All data points on this figure are weighted group means. The weight for any hospital, used to create the weighted average in the group to which that hospital belongs, is the number of adjusted admissions. Thus, more weight is given to larger hospitals within either group[2].

The result in Figure 2 was somewhat surprising, in view of all the attention that complemented the budget agreements in the literature on health planning in Rochester. A quite different picture of the use of capital is presented in Figure 3. In

[2] The statistical test for the difference between groups was constructed as follows. Let ΔY^r be the change from 1980-87 of any index for a Rochester hospital. Let ΔY^o be the corresponding change over time for a hospital in the other group. The means of each of these changes, Y^r and Y^o, have independent normal distributions. Under the null hypothesis of no difference in trends, $Y^r - Y^o$ has the t-statistic distribution. This approach was used for all statistical tests of the trends charted in this article, unless otherwise specified.

Figure 4

Intensive Care Unit Beds as a Percentage of Total Occupied Beds:[1] 1980-87



[1] All available hospitals in sample.

SOURCE: Agency for Health Care Policy and Research: Hospital Cost and Utilization Project II data base, 1994.

hospitals outside Rochester, the proportion of days spent in ICUs rose from 6.5 percent in 1980 to 10 percent in 1987, an increase of 54 percent. However, in Rochester hospitals, there was little net change from the beginning to the end of the period. The availability of ICU beds as a percentage of hospital bed capacity is depicted in Figure 4. It would not be surprising if this ratio rose throughout the Nation due to the gradual declines in total number of acute-care beds. The rise in this ratio was remarkably higher outside Rochester, and the difference in trends was statistically significant.

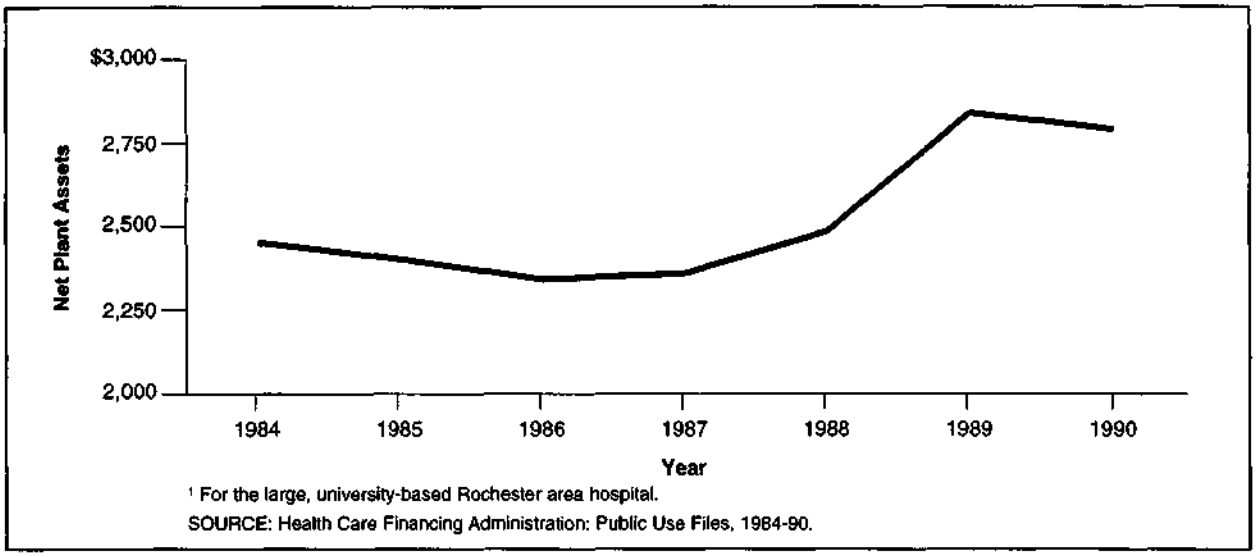
The policies of the large university-based hospital may have been critical to the overall restraint on capital investment in Rochester hospitals. According to published observations by the chief executive of that hospital (Hall and Griner, 1993), teaching programs were set up at the other hospitals to reduce new investment needs at the main teaching facility. Other confirming evidence is found in Medicare Cost Reports. Figure 5 shows a declining trend for assets per discharge in the largest hospital until 1987, with a noticeable surge following the end of the HEP.

A conceivable response by the RAHC hospitals to budget limits would have been to exert collective bargaining power, restrict compensation to employees, and reduce labor inputs. To consider this possibility, employment and compensation measures for Rochester and other hospitals were constructed using data from the AHA (1977-92). As with previous measures, the group means for both Rochester and non-Rochester hospitals are weighted.

Figure 6 shows the trends of the average share of salary expenses in total expenses. If significant collective bargaining power was exercised, the trend for Rochester hospitals should decline relative to the trend for other hospitals. From 1976-79, prior to the start of the Rochester HEP, both groups experienced a modest decline in the share of salary expenses to total

Figure 5

Net Plant Assets per Discharge:[1] 1984-90

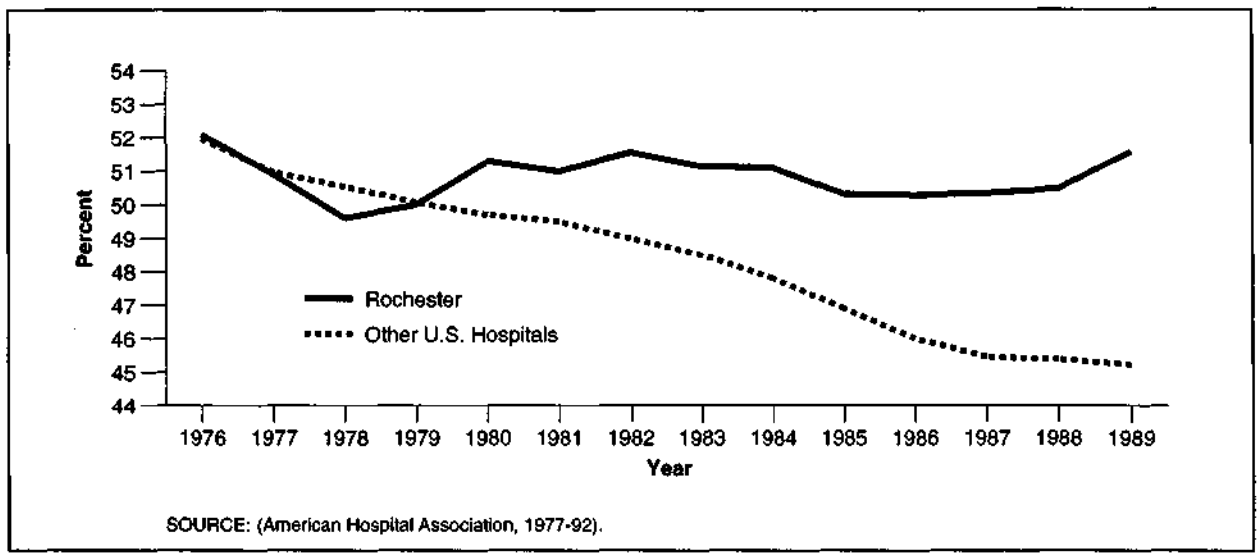


[1] For the large, university-based Rochester area hospital.

SOURCE: Health Care Financing Administration: Public Use Files, 1984-90.

Figure 6

Salary Expense as a Percentage of Total Hospital Expense: 1976-89



SOURCE: (American Hospital Association, 1977-92).

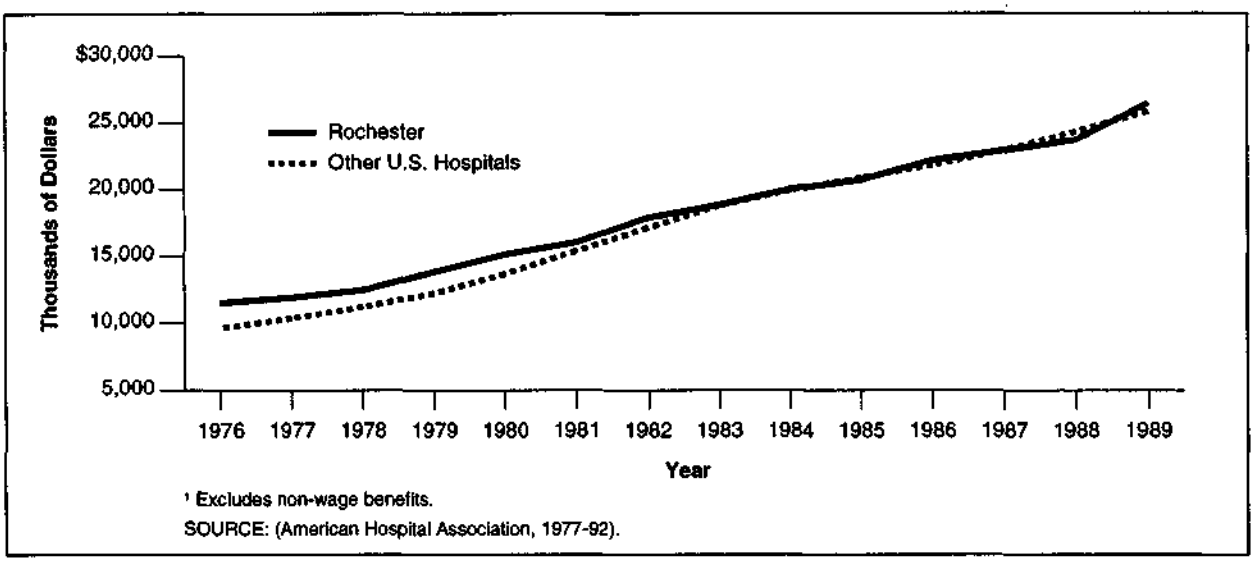
expenses. Thereafter, the share of salary expenses to total expenses was stable for Rochester hospitals, varying only between 50-52 percent. In sharp contrast, the trend for all other hospitals continued its gradual decline, reaching a low of 45 percent in 1989. During the period of budget limits, 1980-87, the slopes of the two trends differed significantly ($p < .01$).[3]

Figure 6 suggests that the cost savings achieved in Rochester were made through proportionately equal reductions in salary and non-salary expenses. However, in light of the declining national trend in the share of salary expenses, we can infer that non-salary expenses were restrained by the

[3] These results might be affected by hospital expenses for contracts with temporary employment agencies. An increasing reliance on temporary agencies could make the reported labor expense appear artificially small. Such contracts represent a very small proportion of total expense for labor in Rochester throughout the period. We do not know if the trend was different in Rochester than elsewhere.

Figure 7

Wage and Salary Compensation per Full-Time Equivalent Employee:[1] 1976-89

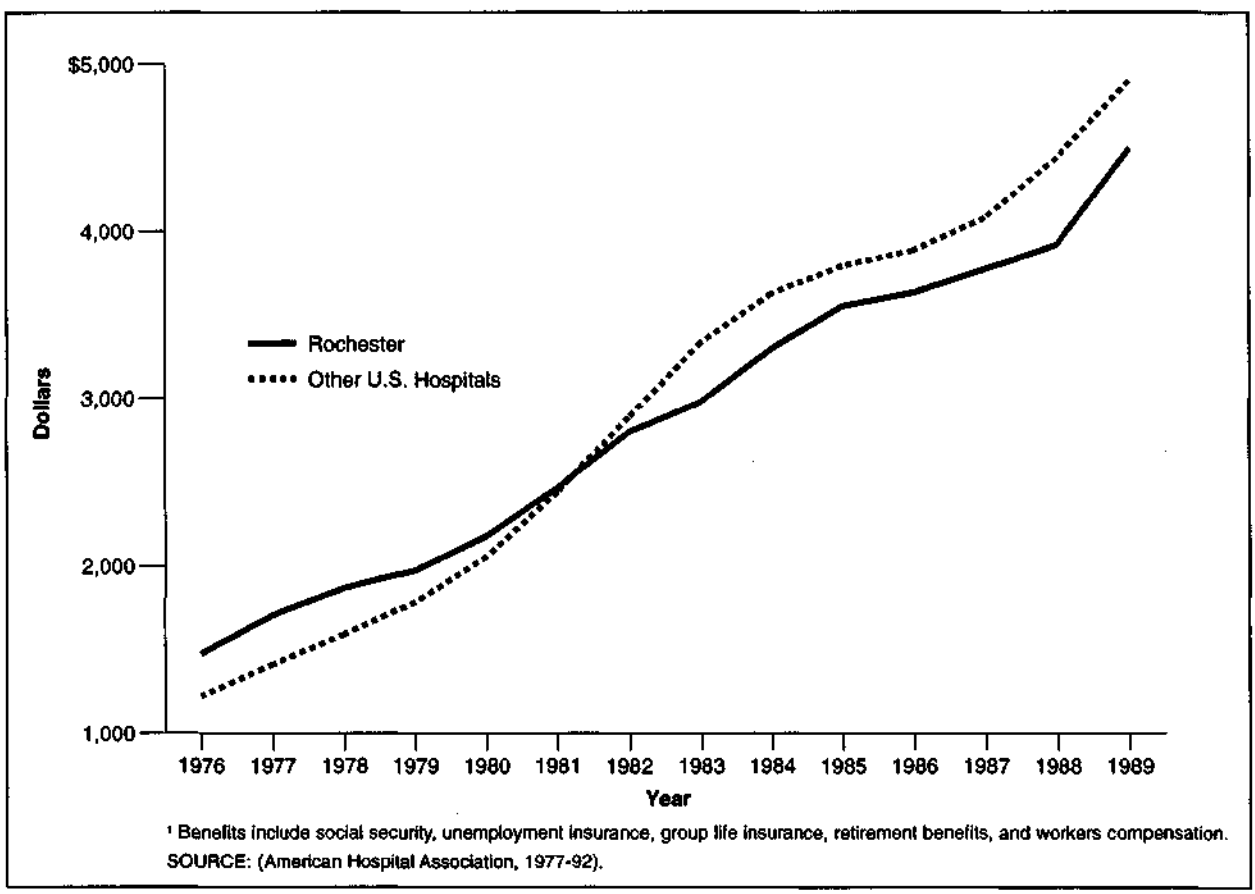


[1] Excludes non-wage benefits.

SOURCE: (American Hospital Association, 1977-92).

Figure 8

Employee Non-Wage Benefits per Full-Time Equivalent Employee:[1] 1976-89

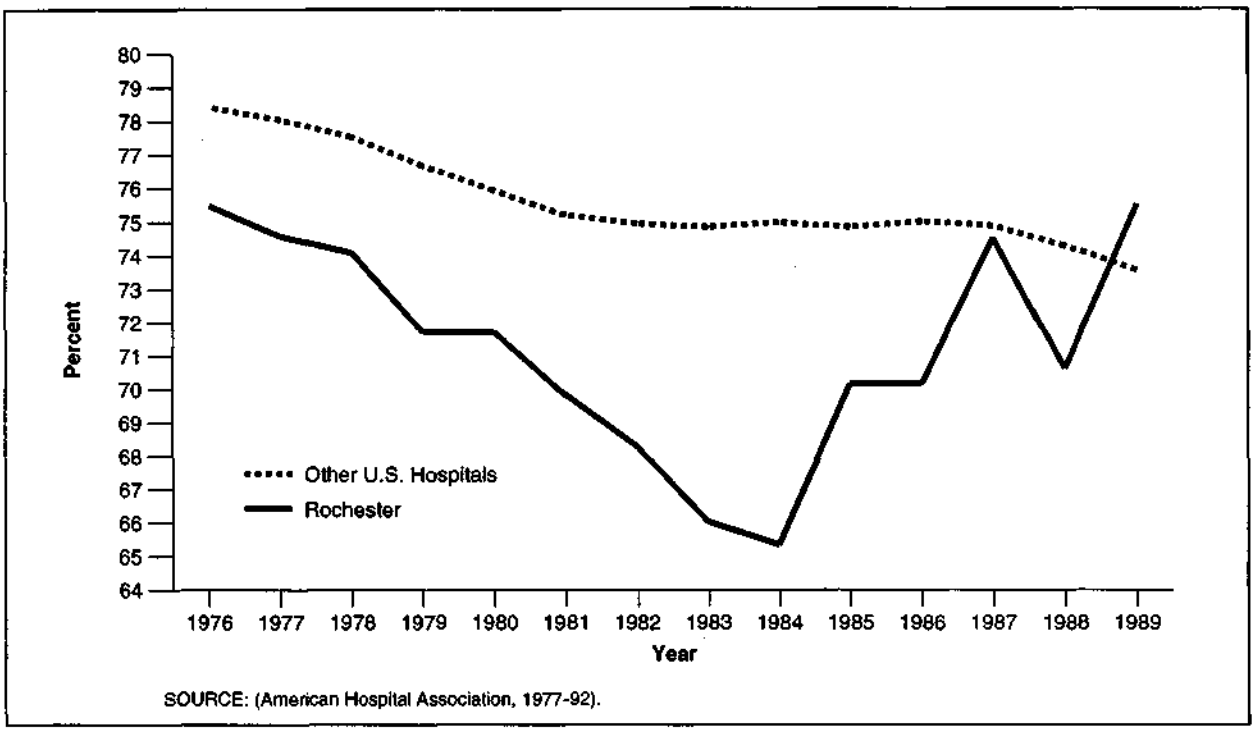


[1] Benefits include social security, unemployment insurance, group life insurance, retirement benefits, and workers compensation.

SOURCE: (American Hospital Association, 1977-92).

Figure 9

Full-Time Employees as a Percent of All Hospital Employees: 1976-89



SOURCE: (American Hospital Association, 1977-92).

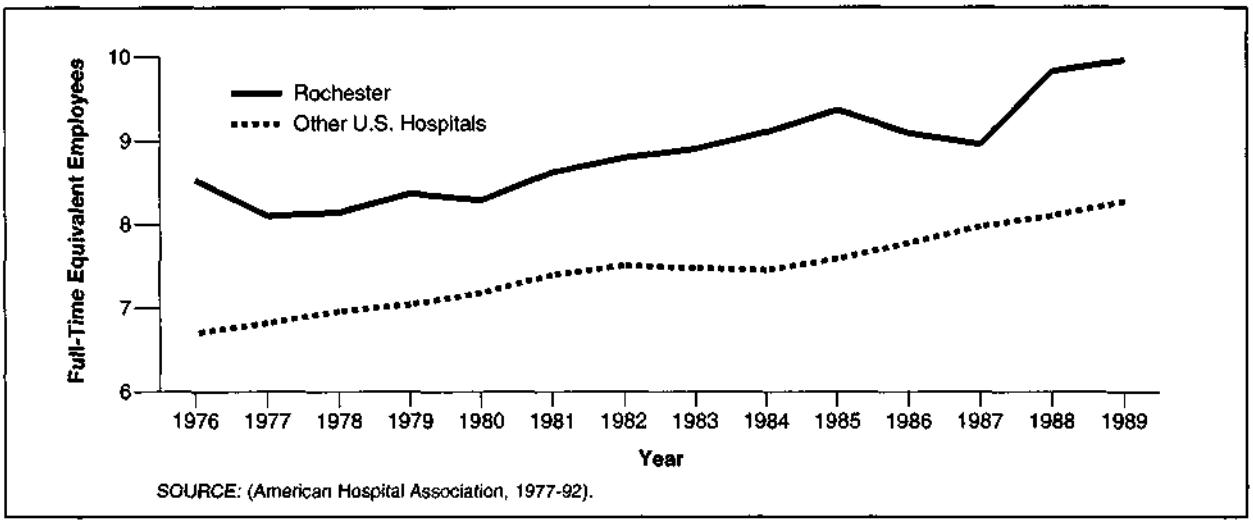
budget limits in Rochester. This finding is consistent with our earlier finding of a slower growth in use of expensive facilities.

Crude measures of employee wages and benefits for Rochester and other hospitals provide suggestive evidence that the growth of employee compensation slowed for Rochester hospitals during the budget agreement. Figure 7 shows the trends of wage and salary expenses divided by the number of full-time equivalent employees (FTEEs) for the two hospital groups. A similar measure, non-wage benefit expenses per FTEE, is presented in Figure 8. In both figures, other U.S. hospital wages and benefits were approximately 90 percent of those offered by Rochester hospitals in the period before the HEP. After 1980, the first year of the HEP, these figures quickly narrowed to 95 percent. Statistical tests offer evidence that the cumulated changes in wages and benefits for the two hospital groups were not significantly different in the period prior to the HEP. However, during the HEP, differences were significant at the levels of $p < .10$ (wages and salaries) and $p < .05$ (non-wage benefits). By the end of the program, wages and benefits in Rochester were lower than or equal to those of other U.S. hospitals.

A partial explanation for the relative decline in benefits per FTEE for Rochester hospitals is found in the way in which Rochester hospitals altered their staffing mix. By employing relatively larger numbers of part-time workers, hospitals might reduce non-wage benefit expenses. Typically, part-time workers are provided a lower level of non-wage benefits. While this may or may not be compensated by higher wages, it appears that net effect was a saving for Rochester hospitals. Figure 9 shows the share of all employees who are full-time employees (FTEs). The level for Rochester hospitals was lower than the level for other hospitals, but the trends were essentially parallel from 1976-80. Thereafter, the trend for all other hospitals

Figure 10

Full-Time Equivalent Employees per 100 Adjusted Admissions: 1976-89



SOURCE: (American Hospital Association, 1977-92).

stabilized at approximately 75 percent, while the trend for Rochester hospitals continued to decline to a low of 65 percent in 1984. Thereafter, the share of FTEs increased to conform with national norms. Similar patterns are observed when nurses and other personnel were analyzed separately. Interestingly, non-wage benefits did not rise in Rochester after 1984, when the proportion of FTEs gradually rose to the level seen elsewhere.

Another possible response by RAHC hospitals to revenue and cost restrictions would be to cut overall labor input per patient. Figure 10 describes the trend of FTEEs per 100 adjusted hospital admissions for the two groups of hospitals. While this measure of service intensity was higher in Rochester, the two trend lines are essentially parallel. Differences between the hospital groups both before or during the HEP were not statistically significant.

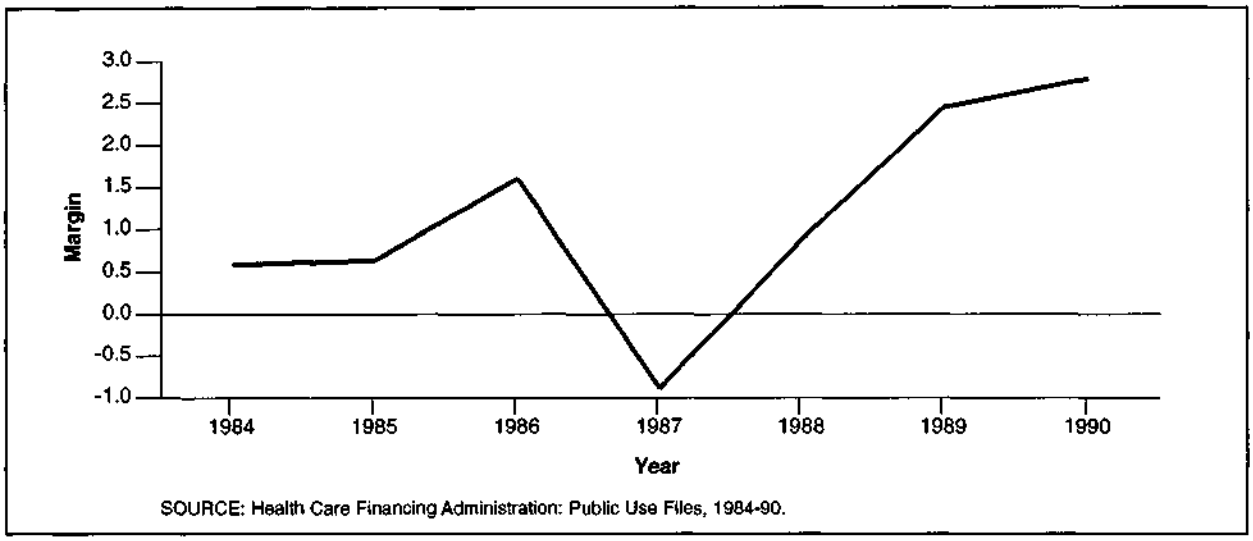
Net Income and Cash Flow

Revenue margins are available in the HCFA Public Use Files corresponding roughly to calendar years 1984-87. All Rochester hospitals use the calendar year as their reporting period. The margin trends during this period show considerable instability for the Rochester hospitals, even controlling for size.

Figure 11 shows the trend of total margin (operating plus non-operating revenue minus total expenses, expressed as a percent of total revenue) for the large university hospital in Rochester. A net loss occurred just at the end of the all-payer HEP. After 1987, margins improved sharply. Margin fluctuations for the other three relatively large hospitals (more than 250 beds) are shown in Figure 12. None of the hospitals shows a trend during the period. Fluctuations were no less severe during the HEP years of 1984-87 than afterward. Figure 13 shows margin data for the four smaller Rochester hospitals. Fluctuations were quite sharp in 1986 and 1987. One hospital did much better after the end of the program. The other three were stable at margins near 0; however, during the HEP, 2 of these 3 had years of large negative margins. In general, it is difficult to argue that any of these hospitals did better under the HEP than afterwards. If anything, fluctua-

Figure 11

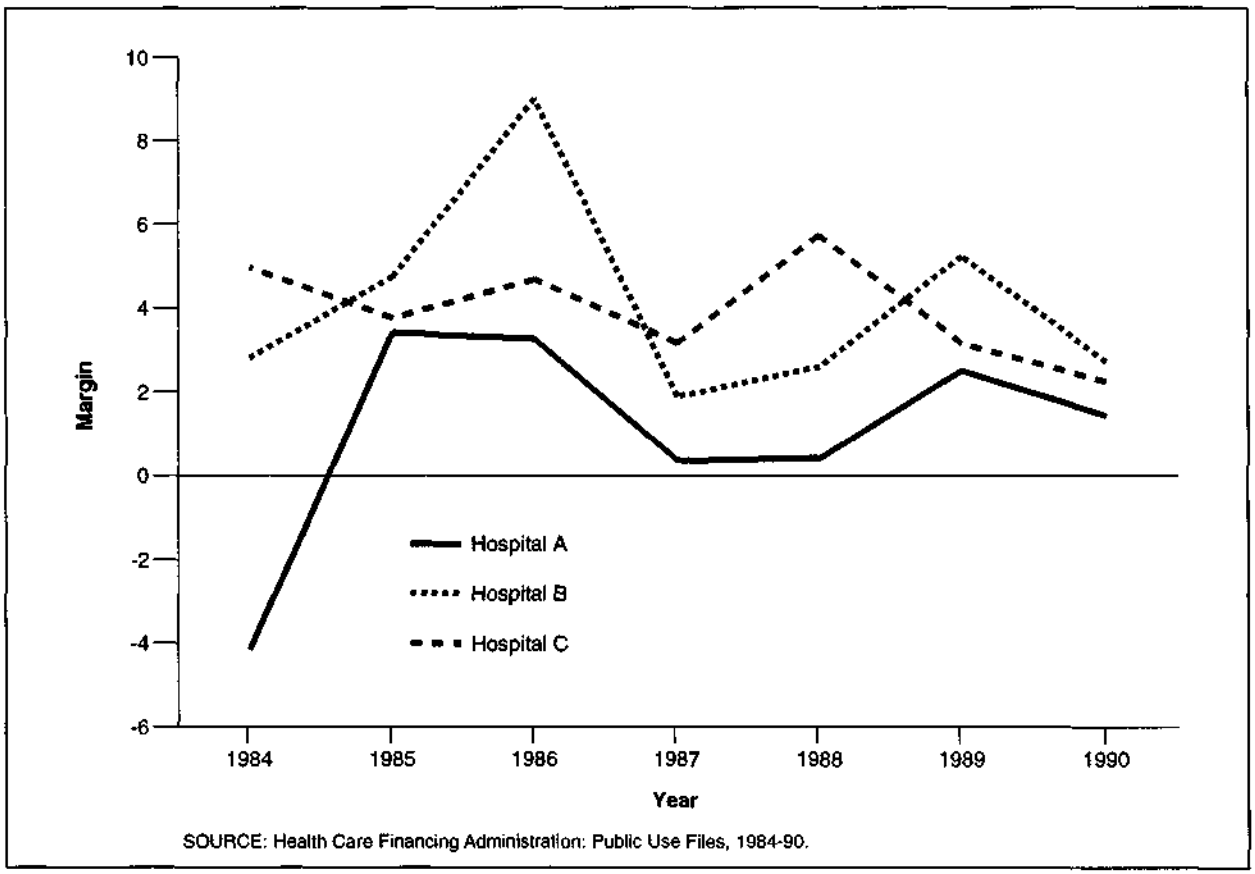
Total Net Revenue Margin for the Large University-Based Rochester-Area Hospital: 1984-90



SOURCE: Health Care Financing Administration: Public Use Files, 1984-90.

Figure 12

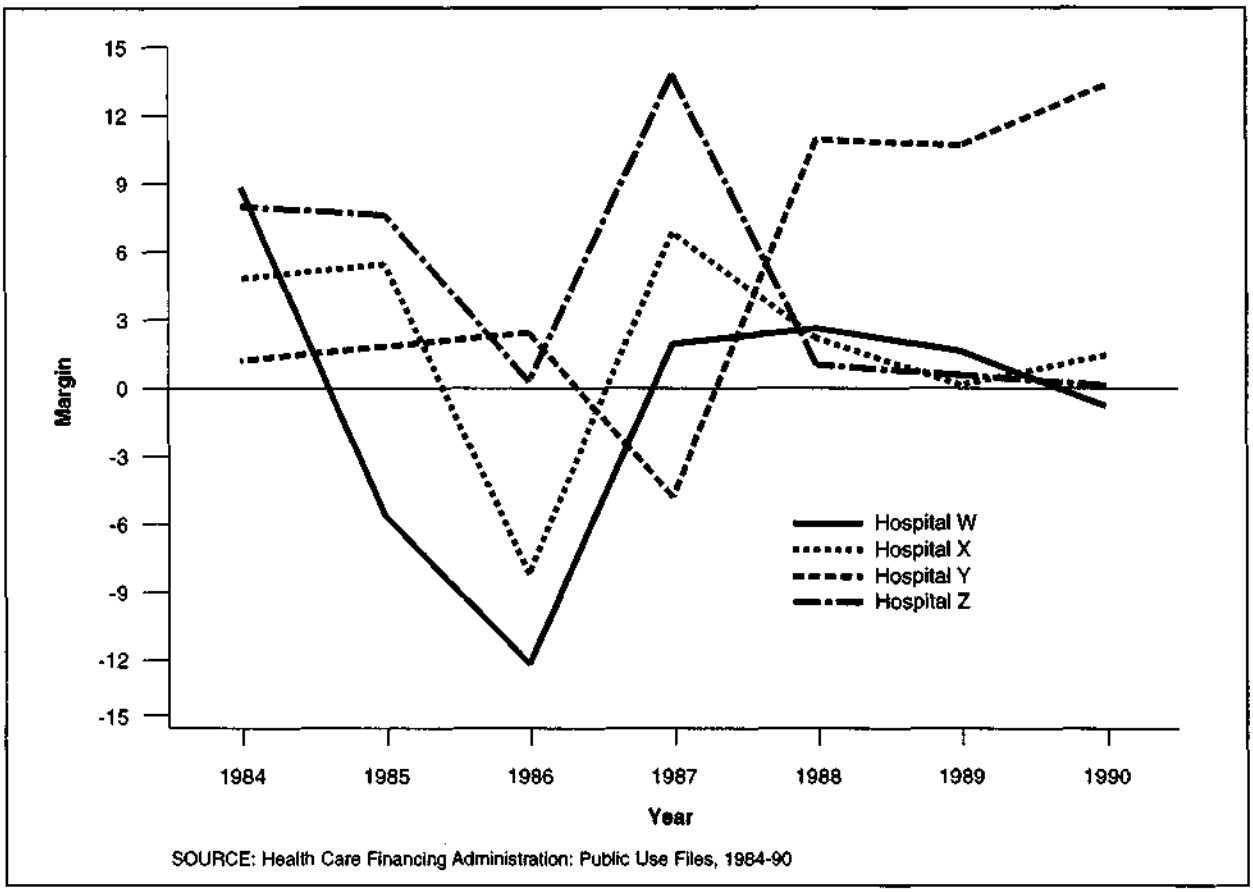
Total Net Revenue Margin for 3 Other Large Rochester-Area Hospitals: 1984-90



SOURCE: Health Care Financing Administration: Public Use Files, 1984-90.

Figure 13

Total Net Revenue Margin for 4 Smaller Rochester-Area Hospitals: 1984-90



SOURCE: Health Care Financing Administration: Public Use Files, 1984-90

tions of margins may have become less severe after the end of the HEP.

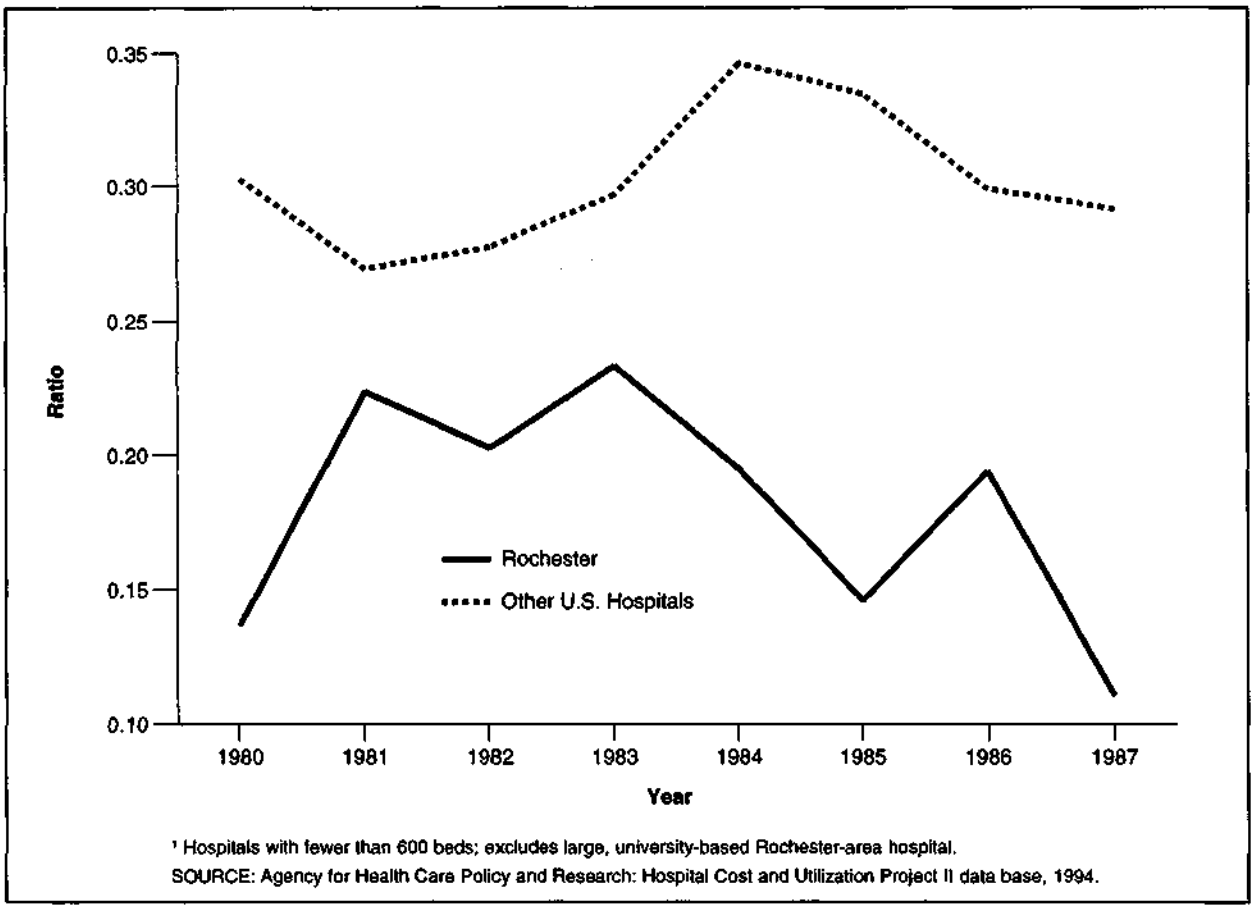
A final piece of comparative evidence about the effect of the HEP on the financial health of the hospitals is shown in Figure 14. These data are from the AHA (1977-92) and exclude the largest Rochester hospital and all other hospitals with more than 600 beds. The ratio of cash flow to total liabilities is a well-known indicator of credit worthiness, as previously discussed. Cleverly (1986) found a ratio of about 0.2 to be an average value for a "normative" set of hospitals. It is clear from Figure 14 that the relative financial health of the seven Rochester hospitals as a group was consistently worse than the average of hospitals elsewhere. During 1981-83, the groups were closer together with regard to cash flow. But by 1987, this ratio had fallen to a disturbing level compared with the textbook norm. Local officials suggest that the budget formulas required some fine tuning to allow for unusual increases in volume in the last year of the program. But whatever the cause of the falling trend after 1983, an option for hospitals to escape the voluntary program to a more generous "fallback" payment system may have become more attractive over time.

DISCUSSION

The Rochester HEP experience was cited by President Clinton in his address to the Congress on health reform, by the U.S. General Accounting Office (1993), by the Prospective Payment Assessment

Figure 14

Ratio of Cash Flow to Total Liabilities:[1] 1980-87



[1] Hospitals with fewer than 600 beds; excludes large, university-based Rochester-area hospital.

SOURCE: Agency for Health Care Policy and Research: Hospital Cost and Utilization Project II data base, 1994.

Commission (1993), and by several authors who favor national or community constraints on the total budgets of hospitals. Now that State legislatures are taking initiatives for health reform, they are interested in any evidence about cost containment and potentially adverse side effects. Several of the findings presented here reinforce past assertions about the impact of the Rochester limits on hospital revenue. Real costs per case were indeed restrained, controlling for case-mix change, severity, and whether individual hospitals had unusually high or low expenses in earlier years due to unexplained factors. Fears about quality change have been allayed elsewhere in the literature (Mushlin et al., 1988).

The construction and use of expensive facilities, such as ICUs, was restrained. Restraints on capital inputs or investments particularly affected the large, university-based hospital. Labor inputs and employee compensation appear to have been modestly affected by the HEP. Compared with all other U.S. hospitals, the growth of wages and benefits for Rochester hospitals slowed. The slower growth of benefits may be initially explained by the reduction of FTEs in favor of part-time workers. However, it is not clear why non-wage benefits remained relatively low after the proportion of FTEs returned to national levels.

Total revenue margins of individual hospitals appeared to be neither consistently high nor stable during the program. These

observations cast doubt on the applicability of an economic model of industry "capture." Possibly this did not occur because the dominant payers for hospital care exerted a countervailing influence. Also, the community-wide budgeting controls with all-payer rates may have led to reduced administrative costs for hospitals.

Medicare prospective payment takes a quite different approach to limiting the growth of payments—restraining prices. The advent of the Medicare PPS in 1984 appeared to reduce the inflation of costs in hospitals outside Rochester by about the same amount that the HEP accomplished within the Rochester area. These two approaches to payment restraint (Medicare PPS and the Rochester HEP) are quite different in other respects. PPS has less intrusive controls on the specific components of hospital spending, particularly capital spending. The HEP, unlike PPS, assured all payers the same rate of increase in payments per case, assured hospitals compensation for care of the uninsured, and provided a forum in which the allocation of capital spending for particular projects could be debated. These features might be desirable, given the equitable treatment of payers, hospitals, and patients.

The voluntary Rochester approach may not be feasible in other geographic areas or over a long period in areas that do not have unattractive mandatory regulation as a fallback option. The national experience with voluntary health planning was not generally successful with regard to cost containment, and many communities other than Rochester with voluntary plans sponsored by business or foundations were not successful in their cost-containment efforts (McLaughlin, Zellers, and Brown, 1989). In the case of Rochester, the ratio of cash flow to total liabilities was reduced to quite low levels by the end of the HEP. The community might then have been forced to deal with more difficult questions of reducing services or quality. We do not know if this specific issue was critical in the ending of the HEP. However, it is known that once the mandatory State system outside Rochester was changed, it seemed to offer preferable opportunities.

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