

Factors Associated with Variation in Financial Condition Among Voluntary Hospitals

Charles Brecher and Susan Nesbitt

This article uses multiple regression analysis to identify factors which affect variations in the financial condition of voluntary hospitals in New York State. Six separate ratios are used to measure financial condition and 18 independent variables are considered. The factors affecting financial conditions were found to vary among dimensions of financial health, and different causal relationships were evident among hospitals in New York City than among those in the rest of the state.

INTRODUCTION

There is substantial variation in the financial condition of hospitals in the United States. While some hospitals suffer financial distress, others, often in the same state or county, remain in relatively sound condition. Observers of this uneven performance have presented several explanations: some say the distressed hospitals have only themselves to blame because they are poorly managed and offer inferior services; others attribute their weaker condition to their continued commitment to serve the poorer residents of their communities despite reduced public financing of these services. The purpose of this article is to identify the multiple factors that may explain the diverse financial

Research reported in this article was supported by a grant from the Commonwealth Fund to New York University. The views expressed are those of the authors and do not necessarily reflect those of the Commonwealth Fund, New York University, or the United Hospital Fund.

Charles Brecher, Ph.D. is Associate Professor in the Graduate School of Public Administration of New York University. Address all correspondence and requests for reprints to Professor Brecher at New York University, 738 Tisch Hall, Washington Square, New York, NY 10003. Susan Nesbitt, Ph.D. is Financial Analysis Manager in the Division of Research, Analysis and Planning, United Hospital Fund of New York.

conditions of voluntary hospitals and to use available evidence to weigh their importance.

The article is divided into three parts. The first reviews the issue of financially troubled hospitals from a national perspective and summarizes the evidence available from national studies relating to the causes of hospital financial distress. The second section presents a framework for analyzing variations in financial condition among voluntary hospitals in New York State and New York City that overcomes some of the limitations of the earlier national studies. The analysis assesses the importance of 18 different factors expected to influence hospital financial condition. The multiple factors are related to four separate dimensions of financial condition—annual operating results, indebtedness, age of plant, and liquidity. The final section presents the findings of the analysis for New York State and New York City.

NATIONAL PERSPECTIVE

Approximately 5 years ago, following a national economic recession, federal officials in the Department of Health and Human Services and congressional leaders were faced with claims from hospitals around the country that they were in “financial distress” and required special assistance. Congressional hearings were conducted in 1980 to examine the plight of these hospitals [1].

The federal officials sought more information before they were willing to support a major program of aid to troubled hospitals. They wanted to know how to identify distressed hospitals using objective criteria rather than the characterization of hospitals by the hospitals themselves. They also wanted to be assured that hospitals in financial difficulties were organizations that performed socially useful functions, such as providing care to the uninsured poor, rather than inefficient organizations with high costs and low occupancy that should not receive aid to perpetuate these undesirable circumstances.

In response to these informational needs, three large-scale national studies of financially stressed hospitals were undertaken. The preliminary results of these studies are now available. While the recent economic recovery and strong pressure to curb federal expenditures have caused both the current administration of the Department of Health and Human Services and the congressional leadership to lose much of their enthusiasm for a new aid program, these studies provide some instructive information regarding the incidence of financial distress among hospitals and the factors causing such problems.

The three studies are those of the American Hospital Association (AHA); of the Urban Institute (UI) in a joint effort with the American Hospital Association; and of researchers at the National Center for Health Services Research (NCHSR). The initial AHA study was based upon survey responses covering the 1977-1979 period from virtually all 5,860 community hospitals in the country; more detailed analysis was performed on a smaller subgroup of hospitals which also responded to a special supplementary questionnaire covering only 1979 [2, 3]. The joint UI-AHA study was based on a survey, covering the 1980 fiscal year, of all hospitals with over 100 beds and a sample of hospitals with fewer than 100 beds [4]. The NCHSR study was based on a variety of data compiled for a representative national sample of 400 general care hospitals [5].

In each case, the first task was to define "financial distress." The researchers generally acknowledged that there were several dimensions of hospital financial condition, including long-term indebtedness, liquidity, and condition of plant, but they each selected a measure of annual operating results as the basis for distinguishing distressed hospitals. The AHA study developed two alternative definitions based on income ratios for the 3-year period 1977-1979: in one case, the distressed hospitals were the 20 percent of all hospitals with the lowest income ratios; in the other case, they were hospitals with both declining income ratios and negative average income ratios for the 3-year period. However, in performing the analysis, the AHA researchers found that the two groups were similar and produced almost identical findings. For simplicity, then, the AHA definition of distress became equated with average operating losses that had grown worse over a 3-year period.

The UI-AHA study also used income ratios to identify distressed hospitals. However, they distinguished between total income and operating income. Operating income reflects only the results of revenues and expenses related to patient care; total income reflects revenues and expenses from all sources. Since many hospitals, especially public hospitals, receive contributions or subsidies not related to patient services, the total income measure or "bottom line" is generally more relevant. Using these measures, the UI-AHA divided hospitals into three categories: "stressed" hospitals, which had deficits after all revenue was taken into account; "shaky" hospitals, which had overall surpluses but had deficits when only operating revenue and expenses were considered; and "sound" hospitals, which were running with operating surpluses.

The NCHSR study used the average total income ratio for the 3-

year period 1973–1975 to identify stressed hospitals. All hospitals with negative average total income ratios were defined as distressed.

In sum, the three studies used slightly different measures to define fiscal stress, but their common basic approach was to rely on one or more years' operating results. Therefore, it is not surprising that the studies all found that similar shares of the nation's hospitals were distressed. The AHA study, almost by definition, found approximately one-fifth of all hospitals to be distressed; the UI-AHA study found 24 percent to be distressed; and the NCHSR study found 27 percent of its sample hospitals to be distressed.

Each of the studies also used similar methods to identify the factors associated with fiscal stress. They compared the stressed group of hospitals with other hospitals in better financial condition. The AHA relied on comparisons between its distressed group and a comparison group of the one-fifth of hospitals with the highest income ratios; the UI-AHA study compared its stressed and sound hospitals; the NCHSR study compared its stressed hospitals to all other hospitals in the sample.

Using similar definitions of stress and similar methodologies, the studies have also produced relatively consistent results. The AHA study considered 37 descriptive features of hospitals and found 13 which differed significantly between the two groups. These 13 specific measures can be placed into four categories—location, control, utilization, and payer mix. With respect to location, distressed hospitals were concentrated in metropolitan areas and in the Middle Atlantic states or Midwestern states and were least likely to be in Central-Southwestern states. The distressed hospitals were more likely to be publicly owned and were less likely to be either nonprofit or investor owned. They were less intensively utilized for inpatient services (i.e., had lower occupancy rates), but provided relatively more outpatient care (i.e., had higher ratios of outpatient visits to inpatient admissions). The payer mix of distressed hospitals included larger shares of income from Medicare and from Medicaid, and larger shares of revenue lost to bad debt and charity care. The distressed hospitals also required a longer period to collect their Medicare revenues.

The UI-AHA study considered 33 characteristics and found significant differences between stressed and sound hospitals for 21. The results with respect to location and control are similar to the AHA study. Distressed hospitals were more likely to be in metropolitan areas and particularly in the nation's 100 largest cities. The distressed hospitals were also more likely to be in regions other than the South and more likely to be publicly owned. Several other AHA findings were

replicated: the distressed hospitals had lower occupancy rates and higher ratios of outpatient to inpatient services. They received a greater share of their revenue from Medicaid and lost a greater share of their revenues to bad debt and charity care. In addition, the UI-AHA study revealed that distressed hospitals were more likely to be in poor neighborhoods, to be subject to state rate-setting programs, and to have greater numbers of interns and residents relative to the volume of services.

The NCHSR study considered 24 characteristics and made separate comparisons for metropolitan and rural hospitals. Among the metropolitan hospitals they found that distressed and sound hospitals differed significantly on 12 measures. Location and control were not among the variables considered, but the NCHSR arrived at findings similar to the AHA and UI-AHA studies with respect to share of revenues from Medicaid, bad debts and charity care, outpatient services, and commitment to graduate medical education.

The principal contribution of the NCHSR study is its consideration of hospitals' patient characteristics as well as organizational and environmental factors. However, they found no significant difference in patient characteristics (age and distribution of diagnoses), or in pattern of treatment including frequency of surgical procedures. The NCHSR reported significantly longer lengths of stay among distressed hospitals. This was also noted in the UI-AHA study but was explained largely by the greater proportion of subacute patients found in the UI-AHA study. However, this analysis seems to be contradicted by the NCHSR finding of no significant differences in the distribution of diagnoses.

The NCHSR also found that distressed hospitals had significantly higher costs per day, costs per admission, payroll costs as a percentage of total costs, and higher-salaried employees as a percentage of total employees. While identical variables were not used in the other studies, these NCHSR findings apparently conflict with the UI-AHA findings of no significant difference in per diem or per outpatient visit costs, and with the AHA and UI-AHA findings of no significant differences in staff to workload ratios. In other words, unlike the two earlier studies, the NCHSR analysis presents evidence that the distressed hospitals may be less efficient than those in better financial condition. However, it should be kept in mind that the NCHSR study is based on data from a relatively early (i.e., 1975-1978) period and that the cost differences are not systematically adjusted for variations in case mix.

The evidence from these studies, and especially the AHA and UI-AHA studies, has been interpreted as providing reassuring answers to

the questions raised by federal officials. Objective standards of operating margins have been used to identify as distressed between 20 and 27 percent of the nation's hospitals. The characteristics of these hospitals, especially urban distressed hospitals, suggest that their problems arise from playing a disproportionate role in caring for the indigent rather than from inefficient management practices. An article presenting the preliminary findings of the UI-AHA study concluded [6, page 1,287]:

The solution to the problem of financial distress lies largely outside the individual hospital. The question of who pays for the care that the hospital provides seems to be much more important for financial health than that of how resources are organized to deliver that care.

This interpretation is supported by much of the available evidence. However, two important limitations should be noted. First, the methods used to gather and interpret the evidence have weaknesses that limit our ability to draw conclusions about the causes of financial stress. Second, national trends evident in these studies may be less relevant for particular areas in New York City and New York State, where distinctive circumstances warrant further analysis. Evidence suggests that, on average, voluntary hospitals in New York State are in a weaker financial condition than their counterparts nationally, but it also indicates wide variation within the state [7].

The methodological limitations of the studies relate to the way in which they measure financial stress and the statistical techniques used to determine which factors are associated with stress. As noted earlier, each of the studies identified distressed hospitals based on their net income for periods of between 1 and 3 years. While few would argue that it is better for a hospital to lose than to make money, this measure cannot be equated with financial distress. Many hospitals, and particularly many of those with operating losses, are not operated for profit and do not seek to maximize annual income. Equally important, such measures do not reflect other significant dimensions of a hospital's financial condition that may offset or add to the problems arising from annual operating deficits. For example, well-capitalized hospitals may be able to overcome even recurring annual deficits in order to take on a special mission or to expand their operations much in the way that private businesses plan to accept losses as they start up or expand into new markets.

To develop a comprehensive assessment of hospitals' financial condition, the Healthcare Financial Management Association has developed 29 separate ratios grouped into five categories—profitability (which includes income ratios similar to those used to define stress)

plus liquidity, capital structure, activity, and others [8]. Hospitals may be viewed as stressed if they are weak in one of these dimensions, but it is preferable to know if they are also weak, rather than strong, in the others before judging them distressed. This multidimensional approach has been applied to an analysis of the financial condition of New York City voluntary hospitals. Four separate dimensions were considered—annual operating results, long-run indebtedness, age of plant, and liquidity. Among the hospitals examined, strong correlations did not exist between measures of each dimension, and relatively few hospitals with annual operating losses were also weak on other dimensions [9]. These local findings reinforce the importance of studying financial health with multiple measures, including ratios relating to dimensions other than annual operating results.

Another methodological limitation of the national studies is the way in which they identify factors related to financial stress. Comparisons of the average values of numerous measures for groups of hospitals categorized as distressed or sound is not a highly meaningful approach to identifying causal relationships. Since the two sets of hospitals differ in many respects, it is not possible to distinguish the contribution of each factor to a full explanation of variations in financial conditions. For example, consider the repeated findings that distressed hospitals are more likely to be in the Northeast, and less likely to be investor owned. These findings reveal little about the relative significance of these factors; moreover, the differences in location and control may be linked. Are there simply fewer investor-owned hospitals in the Northeast? Comparison of means reveals little about the relative importance of multiple factors or the relationships among factors. More sophisticated statistical techniques, such as those described below, are required to address these issues.

Finally, it is important to recognize that the issues which research should address are different for those concerned with voluntary hospitals in a particular area such as New York State than for those concerned with federal policy. For federal policymakers, location, control, and similar characteristics are important factors in pinpointing possible recipients of aid from a special program for distressed hospitals. But for those concerned with managing state programs or operating a voluntary hospital within a state, these characteristics are relatively unalterable and, hence, of less relevance. Analysis of the variation in financial condition of hospitals within a single state or city are more appropriately concerned with aspects of hospital operations that are subject to control or influence by hospital administrators or by state officials. These objectives guided the following analysis of the variation in finan-

cial condition among voluntary hospitals in New York State and New York City.

FRAMEWORK FOR LOCAL ANALYSIS

A suitable framework for analysis of the causes of variation in financial condition among voluntary hospitals in New York State and New York City requires three elements. First, measures of financial condition should be meaningful. As noted earlier, financial condition involves multiple dimensions besides annual operating results, and a range of financial dimensions should be considered. Second, the factors likely to play a significant role in determining a hospital's financial condition should be specified. Each of these factors should be measured accurately. Third, an appropriate method of statistical analysis should be used to identify the factors important in determining each aspect of financial condition and to gauge the relative importance of each significant factor. These elements of the research design are described below.

MEASURES OF FINANCIAL CONDITION

A comprehensive assessment of the financial condition of a voluntary hospital requires measures of four aspects of performance. The first is *annual operating results*. This refers to the extent to which the hospital is providing services for which private or governmental consumers are willing to pay and thereby to provide the hospital with sufficient income to cover its expenses and accumulate new capital. Hospitals whose incomes fall short of their expenses incur losses and must deplete their assets. Hospitals whose incomes exceed expenses are able to establish reserves for harsher times, expand or refurbish their physical plants, purchase new equipment, or add to assets in other ways.

The second dimension is *long-run solvency*. This refers both to the extent to which the hospital has incurred debts and to its ability to repay these debts. Typically, the smaller a hospital's debts, the better its financial condition. However, hospitals may increase their debt without jeopardizing long-run solvency if they have enough income to meet additional loan payments. Thus, to measure long-run solvency, it is necessary to consider both the hospital's level of indebtedness and its ability to repay debts.

The third dimension of financial performance is the condition of the hospital's physical assets or its *age of plant*. Hospitals with newer facilities are in a better financial position because they are less likely to

require long-term loans for renovation and are more likely to have greater future income available for replacement in the form of depreciation. In contrast, hospitals with more aged plants may soon have to borrow for renovations and can derive little future income from depreciation.

The fourth dimension of financial condition is *liquidity*. This is the ability to meet short-term obligations such as payrolls and suppliers' bills with readily available assets such as cash or items easily converted to cash. Hospitals, like businesses or families, should not have to sell or borrow against their fixed assets in order to meet recurring bills.

To measure these aspects of financial condition, analysts generally rely on ratios. Ratios are considered more valuable than absolute dollar amounts because they facilitate comparisons among institutions of different sizes, in different places, and at different times. Ratio analysis has been used in a variety of industrial sectors for many years and recently has been applied selectively to hospitals. Consequently, there exists a "stock" of ratios from which to select those most appropriate for assessing the financial condition of hospitals. The most comprehensive inventory is the 29 ratios identified by the Healthcare Financial Management Association. However, several of these ratios are of limited relevance to our purposes because they focus primarily on management behavior rather than on the overall financial condition of the hospital. Among the remaining ratios, several relate to the same dimension of financial condition and simply measure the same concept in different ways. Consequently, it is possible to identify six measures which adequately gauge the four dimensions of financial condition. These measures are defined in Table 1.

Annual operating results are measured in two ways. The first measure, return to assets, considers net income or the difference between all expenses and all revenues. The second measure, operating margin, considers only expenses and revenues related to the provision of patient services. Generally, a voluntary hospital's net income will be higher than its operating income because the institution may receive philanthropic donations as well as income from activities such as a gift shop. The return to assets ratio measures net income in relation to the hospital's assets and is analogous to a return on investments for a private business. The operating margin measures operating income relative to operating revenues and is analogous to a profit margin for a private firm. Since the return-to-assets measure incorporates a measure of net income including nonoperating revenue and the operating margin incorporates a measure of only operating revenues and expenses, the two measures cover both aspects of annual operating

Table 1: Measures of Hospital Financial Condition

<i>Annual Operating Results</i>	
1. Return to assets ratio	= $\frac{\text{net income}}{\text{total assets}}$
2. Operating margin ratio	= $\frac{\text{operating income}}{\text{operating revenue}}$
<i>Long-Run Solvency</i>	
3. Debt ratio	= $\frac{\text{total debt}}{\text{total assets}}$
4. Cash flow to debt ratio	= $\frac{\text{cash flow}}{\text{total debt}}$
<i>Age of Plant</i>	
5. Cumulative depreciation ratio	= $\frac{\text{cumulative depreciation}}{\text{cost of fixed assets}}$
<i>Liquidity</i>	
6. Current ratio	= $\frac{\text{current assets}}{\text{current liabilities}}$

results. That is, the operating margin considers only sources of revenue derived from operations, while the return on assets reflects other sources of revenue as well.

Adequate measurement of long-run solvency also requires two measures. The debt ratio deals with the hospital's total debts. This ratio indicates the share of all assets required to pay off all debts if the hospital were to liquidate itself. The higher the figure, the greater the hospital's debts. The second measure, the cash flow to debt ratio, reveals a hospital's ability to repay its debts. This indicates the amount of income (cash flow) potentially available to repay debt as a share of all debt outstanding. The lower this figure, the less able a hospital is to repay its debts.

Age of plant and liquidity are each gauged with one ratio. The cumulative depreciation ratio measures age of plant by considering the share of fixed assets which already have been depreciated. The higher this figure, the "older" or more depreciated the hospital. The current ratio measures liquidity. It gauges liquid assets relative to short-term obligations. Generally, it is desirable for liquid assets to exceed short-run liabilities, so current ratios below 1.0 are undesirable and the higher the value above 1.0, the greater the reserves available to pay short-term bills.

Table 2 shows the values for these measures for voluntary hospi-

Table 2: Measures of Financial Condition for Voluntary Hospitals in New York State, 1979-1981

	<i>Number of Hospitals*</i>	<i>Mean</i>	<i>Standard Deviation</i>	<i>Minimum</i>	<i>Maximum</i>
<i>New York State</i>					
Current	207	1.932	2.245	0.283	28.131
Debt	208	0.582	0.289	0.000	1.876
Age of plant	199	0.412	0.125	0.115	0.829
Cash flow to debt	205	0.144	0.217	-0.509	1.529
Return to assets	208	-0.014	0.058	-0.413	0.082
Operating margin	206	-0.048	0.093	-0.907	0.044
<i>New York City</i>					
Current	49	1.366	0.808	0.283	5.518
Debt	50	0.763	0.377	0.000	1.876
Age of plant	49	0.452	0.197	0.115	0.829
Cash flow to debt	49	0.074	0.170	-0.329	0.788
Return to assets	50	-0.046	0.087	-0.413	0.060
Operating margin	50	-0.095	0.163	-0.907	0.033
<i>Rest of State</i>					
Current	158	2.117	2.503	0.577	28.131
Debt	158	0.525	0.228	0.061	1.146
Age of plant	150	0.402	0.103	0.119	0.621
Cash flow to debt	156	0.166	0.226	-0.509	1.529
Return to assets	158	-0.004	0.041	-0.186	0.082
Operating margin	156	-0.033	0.046	-0.215	0.044

Source: See Appendix.

*For which data are available.

tals in New York State. The measures are shown for all voluntary hospitals in the state combined, and separately for voluntary hospitals in New York City and in the rest of the state. The values are averages for the 3-year period 1979-1981. Using 3-year averages gives a more meaningful measure of financial condition than a 1-year figure, because the distortions from unusually good or bad years are moderated.

The data are relatively complete. There are 208 voluntary, short-term hospitals in New York State. For two of the measures, data are available for the entire group. For the other measures, no more than nine hospitals are missing; in all but one case, no more than three hospitals are missing. For the 50 voluntary hospitals in New York City, data were available for all hospitals on three measures and for all but one on the other three measures.

The most important observation about the figures is the considerable variation in financial condition among hospitals in New York

State. For each measure, the range between the minimum and maximum value is enormous. For example, while the average hospital lost 1.4 percent of its assets, one hospital lost the equivalent of over 41 percent of its assets and another had a net income equivalent to over 8 percent of its assets. Similarly, levels of indebtedness varied from a hospital with no outstanding debt to others that were virtually bankrupt in the sense that their debts exceeded their assets by nearly 88 percent (i.e., a debt ratio of 1.88). Large ranges are also evident for the hospitals in New York City and the rest of the state separately.

CAUSAL FACTORS

The enormous variations in hospital financial condition, even within a single state and sub-areas of a state, can be explained by a wide range of factors. Some of the possible determinants of financial condition are characteristics of the environment in which the hospital must operate, while others are characteristics of the hospitals themselves. The environment or "market" characteristics are not directly subject to change by the institution's managers, while hospital officials can generally alter their own operations. However, some aspects of the hospital's environment are subject to change by officials in government. Notably, the reimbursement system is regulated by state government in New York, and this system is subject to modification. Thus, environmental characteristics can be divided into market characteristics and reimbursement system factors, with the former not subject to direct influence by the hospital managers or government officials and the latter subject to change by state policymakers (see Table 3).

Environmental Characteristics

The market characteristics include the nature of the population the hospital seeks to serve as well as the availability of other sources of medical care to that population. Key characteristics of the population are its income and age. Income may affect a hospital's financial condition, because hospitals serving wealthier communities may be in a better position to receive full payment for their services, while those serving poorer communities will have difficulty finding a market for their services among those who can pay for their care themselves or through insurance. The age structure of the population is significant principally because of the importance of the aged population (e.g., those over age 65) as users of hospital care. The larger the share of aged population in the hospital's market area, the better its expected financial condition, because there will be greater demand for its services and

Table 3: Environmental Characteristics Potentially Related to Hospital Financial Condition

<i>Factor</i>	<i>Expected Relationship to Financial Condition</i>	<i>Measurement</i>
<i>Market Characteristics</i>		
1. Income of population	Positive	County per capita income in 1980
2. Age of population	Positive	Percent of population in county over age 65 in 1980
3. Hospital competition	Negative	Other hospital beds per capita in county in 1981
4. Nursing home competition	Negative	Nursing home beds per capita in county in 1980
5. Physician supply	Positive	Office-based physicians per capita in county in 1980
<i>Reimbursement System Characteristics</i>		
6. Cost disallowances	Negative	Percent of hospital expenses disallowed in 1981
7. Outpatient visit payment ceiling	Negative	Ratio of hospital outpatient department and emergency room visits to inpatient services in 1981
8. Waiver for specialty status	Positive	Whether classified as specialty hospital in 1981

because aged consumers are generally covered by Medicare which pays all reasonable costs of care.

The nature of competition from other providers also shapes a hospital's market. Competition potentially comes from two sources—other hospitals and nursing homes. The greater the supply of beds in other hospitals in the area, the greater the competition a particular hospital faces. Thus, a larger supply of competing hospital beds may be associated with a weaker financial condition. Similarly, nursing homes also may replace hospitals for some forms of care, while a relative shortage of nursing home beds may increase demand for hospital services. Thus, a large supply of nursing home beds in the market area also can be expected to cause a weaker financial condition. In contrast, physician supply in the area is expected to improve a hospital's financial position. Since physicians are a leading source of referrals for inpatient care and, in effect, determine the demand for many hospital services, a larger physician supply in the area may be expected to improve a hospital's financial condition.

The New York State reimbursement system has three important features that relate to hospital financial condition. During the period under consideration (1979-1981), the state's Office of Health System Management set hospital payment rates prospectively. Inpatient per diem rates were based on actual costs during a base year, but the reimbursed costs were subject to ceilings or maximums for various categories of cost. Hospital expenditures above the ceilings were "disallowed" and not included in the hospital's per diem rates. During that period, many hospitals suffered some disallowance. The impact of this feature of the reimbursement system can be gauged by the share of a hospital's expenses which were disallowed. The greater the disallowance, the weaker the expected financial condition.

The state's reimbursement system also established a maximum payment for outpatient department and emergency room visits. Many hospitals' actual costs exceeded the maximum payment. Therefore, hospitals with relatively large outpatient workloads can be expected to be in weaker financial condition than those providing less outpatient care. This commitment to outpatient care is measured by a hospital's ratio of outpatient to inpatient services.

The third relevant feature of the state's reimbursement system is the exemption for specialty hospitals from most cost ceilings and many penalties. As a result of this preferred treatment, specialty hospitals generally receive more revenues than would be the case if they were subject to rules more similar to those applied to general care hospitals.

Hospital Characteristics

Decisions of trustees and administrators also have a significant impact on a hospital's financial condition. Managers shape their hospital's operations in ways that may improve or weaken its financial position. Table 4 lists 12 aspects of a hospital's operations that potentially affect its financial performance. These factors are grouped into five categories.

The first category relates to decisions to control the payer mix of patients. The hospital's commitment to charity care, i.e., service to poor patients who lack insurance, may adversely affect its operating results and other financial characteristics. Thus, the greater the hospital's commitment to charity care, the weaker its expected financial condition. However, hospitals can offset losses to some extent by serving patients for whom payment is relatively generous and easy to collect because they have insurance. The most favored payment source is commercial insurance, whose payment rates are not regulated by the

Table 4: Hospital Characteristics Potentially Related to Hospital Financial Condition

<i>Factor</i>	<i>Expected Relationship to Financial Condition</i>	<i>Measurement</i>
<i>Patient Selection</i>		
1. Charity care	Negative	Charity care as a percent of expenditures in 1981
2. Insurance mix	Positive	Blue Cross and Medicare discharges as a percent of all discharges in 1981
<i>Operating Efficiency</i>		
3. Staffing level	Negative	Full-time equivalent employees per unit of workload* in 1981
4. Speed of collections	Positive	Accounts receivable divided by average daily expenses for 1981
5. Housekeeping costs	Negative	Per diem expenses for selected non-nursing and non-medical cost centers in 1981
<i>Service Intensity</i>		
6. Aged patients	Negative	Percent of discharges over age 70 in 1981
7. Length of stay	Negative	Adjusted average length of stay per discharge in 1981
8. Ancillary services	Negative	Ratio of hospital's ancillary service costs per diem for specific diagnoses to ancillary service costs per diem for same diagnosis among all hospitals in 1981
<i>Marketing Effectiveness</i>		
9. Occupancy	Positive	Daily average percent of beds filled in 1981
10. Service to nonlocal residents	Positive	Percent of discharges to residents of zip codes other than hospital's zip code in 1978
<i>Other</i>		
11. Size	Positive	Number of beds in 1981
12. Teaching commitment	Negative	Interns and residents per unit of workload* in 1981

*Workload units are one inpatient day or four outpatient department or emergency room visits.

state. Unfortunately, adequate and reliable data on this revenue source were not available. Therefore, Blue Cross and Medicare were used to gauge revenues from preferred payment sources. It is believed that payments from these sources are correlated with payments from commercial insurance. Therefore, the greater the share of a hospital's patients with Blue Cross or Medicare coverage, the better its expected financial condition.

A second important feature of hospital operations is how efficiently the institution is managed. Three measures reflect different aspects of operating efficiency. Staff levels can be large or small relative to workload; hospitals with lower ratios of staff to service outputs can be viewed as more efficient and as more likely to be in better financial condition. Hospitals also vary in how efficiently (i.e., quickly) they collect their revenues. Hospitals which have a smaller share of their patients' bills in an accounts receivable status can be viewed as more efficient collectors of revenues and, hence, as more likely to be in better financial condition. Hospital efficiency also may be reflected in the costs of services that are relatively fixed in the sense that they do not necessarily vary with the medical conditions of patients. In particular, hospitals with lower costs for basic housekeeping services may be viewed as more efficiently run and, hence, as more likely to be in better financial condition.

The severity of the conditions a hospital treats also is likely to affect its financial condition. For most of their patients, hospitals are paid a per diem rate which does not vary with the patient's condition. While the determination of the rate makes some adjustment for the intensity of services required, it is possible that hospitals serving patients with relatively severe conditions will have more difficulty meeting necessary expenses than those having patients with less intense needs. Service intensity is reflected in three measures. The share of aged patients (over age 70) indicates greater service needs because these patients are more likely to have complications and require additional treatment.

Length of stay reflects the severity of conditions because more complex cases generally require longer periods of hospitalization. The measure used is "adjusted" length of stay. This adjustment eliminates days of care not medically necessary but required while patients await long-term care placements. This adjusted measure more accurately reflects severity than the unadjusted length of stay.

Service intensity is also reflected in the number of ancillary services, such as laboratory and x-ray services, provided to patients. An index indicating whether a hospital falls below or above the average of

all hospitals in the cost of ancillary services provided to patients in specific diagnostic categories is available to gauge the relative intensity of services to patients with these illnesses.

The marketing efforts of hospital managers also may affect the financial condition of the hospitals. Marketing efforts generally are designed to keep beds filled, so the results of these efforts are likely to be evident in occupancy rates. Hospitals with higher occupancy rates are expected to be in better financial condition than those with lower occupancy rates. An additional measure of marketing effort was available for hospitals in New York City. Patient origin surveys for these hospitals indicate the extent to which an institution serves patients living outside the immediate (zip code) area in which the hospital is located. The greater the share of such nonresident patients, the better the hospital's marketing and hence the better its expected financial condition.

Two other aspects of hospital operations are expected to affect financial condition. The larger a hospital, the better its expected financial position because size makes possible economies of scale, facilitates marketing efforts, and increases a hospital's political influence in efforts to receive favorable treatment under government programs including the state rate-setting program. Finally, teaching commitment is expected to affect a hospital's financial status. Teaching missions generally increase a hospital's costs. Therefore, the greater the number of interns and residents (relative to workload), the weaker a hospital's expected financial condition.

Tables 5 and 6 present, respectively, the measures for the environmental factors and the hospital operating characteristics potentially linked to hospital financial condition. The figures are shown for all hospitals in the state as well as separately for New York City and the rest of the state. As with the measures of financial condition, the data are relatively complete and there is substantial variation in the measures among hospitals in each group.

STATISTICAL METHOD

The foregoing figures indicate both a wide variation in the financial condition of hospitals and a wide variation among hospitals in their environment and their internal operations. The purpose of this analysis is to determine if consistent relationships can be shown between each of these characteristics and the measures of financial condition.

An appropriate technique for identifying these relationships is multiple regression analysis. This technique, in essence, identifies the

Table 5: Measures of Environmental Characteristics Potentially Related to Hospital Financial Condition

	New York State					New York City					Rest of State				
	No. of Hosp.	Mean	Standard Deviation	Minimum	Maximum	No. of Hosp.	Mean	Standard Deviation	Minimum	Maximum	No. of Hosp.	Mean	Standard Deviation	Minimum	Maximum
<i>Market Characteristics</i>															
Income per capita (\$)	208	9,830	2,539	6,353	14,500	50	11,305	2,744	8,240	14,500	158	9,363	2,259	6,353	14,340
Aged population share (%)	208	12.5	1.7	8.5	17.0	50	13.5	1.3	10.0	14.9	158	12.2	1.7	8.5	17.0
Hospital competition (beds per capita)	208	0.004	0.002	0	0.010	50	0.006	0.003	0.002	0.010	158	0.003	0.001	0	0.006
Nursing home competition (beds per capita)	208	0.032	0.009	0.018	0.060	50	0.029	0.010	0.022	0.057	158	0.033	0.008	0.018	0.060
Physician supply (M.D.'s per capita)	208	0.001	0.001	0.0004	0.004	50	0.002	0.002	0.001	0.004	158	0.001	0.0005	0.0004	0.002
<i>Reimbursement System</i>															
<i>Characteristics</i>															
Disallowed expenses (%)	206	2.91	4.49	0	33.16	50	1.89	5.05	0	33.16	156	3.24	4.26	0	17.37
Outpatient services (visits per inpatient day)	207	0.112	0.060	0.004	0.436	50	0.141	0.085	0.005	0.436	157	0.103	0.047	0.004	0.364
Specialty status (1 = yes, 2 = 0)	208	—	—	0	1	50	—	—	0	1	158	—	—	0	1

Sources: See Appendix.

Table 6: Measures of Hospital Characteristics Potentially Related to Hospital Financial Condition

	New York State					New York City					Rest of State				
	No. of Hosp.	Mean	Stand. Deviation	Minimum	Maximum	No. of Hosp.	Mean	Stand. Deviation	Minimum	Maximum	No. of Hosp.	Mean	Stand. Deviation	Minimum	Maximum
<i>Patient Selection</i>															
Charity care (%)	201	5.2	4.5	0.1	36.3	50	8.6	7.4	0.1	36.3	151	4.1	2.1	0.2	14.9
Insurance mix (%)	174	67.3	12.3	13.1	91.5	49	61.1	16.6	13.1	91.5	125	69.7	9.2	41.6	89.3
<i>Operating Efficiency</i>															
Staffing (employees per workload)	207	0.010	0.002	0.001	0.020	50	0.010	0.003	0.001	0.017	157	0.010	0.002	0.003	0.020
Speed of collections (days)	206	80.2	33.9	21.2	242.4	50	95.5	38.4	48.5	226.4	157	75.4	30.9	21.2	242.4
Housekeeping costs (\$)	205	54.36	17.61	22.90	159.72	50	68.12	22.41	22.90	159.72	155	49.92	13.03	24.12	105.00
<i>Service Intensity</i>															
Aged patients (%)	208	21.1	7.5	0.03	51.6	50	18.2	6.9	3.3	37.6	158	22.0	7.5	0.03	51.6
Length of stay (days)	206	7.87	1.70	3.51	15.37	48	9.09	1.84	3.51	15.37	158	7.45	1.47	4.30	11.92
Ancillary services (index, 1 = average)	199	0.94	0.14	0.64	1.52	43	1.00	0.16	0.64	1.52	156	0.92	0.13	0.65	1.30
<i>Marketing Effectiveness</i>															
Occupancy (%)	208	85.6	9.9	41.7	106.8	50	86.7	9.0	41.7	101.8	158	85.2	10.2	51.6	106.8
Services to nonlocal residents (%)	--	--	--	--	--	50	12.6	8.0	1.1	36.4	--	--	--	--	--
<i>Other</i>															
Size (beds)	208	261	232	21	1,273	50	469	299	40	1,273	158	195	158	21	1,027
Teaching commitments (interns and residents per workload)	207	0.002	0.003	0	0.023	50	0.0005	0.0003	0	0.0017	157	0.00007	0.00019	0	0.0010

Sources: See Appendix.

extent to which a change in one of the hospital environmental or operational characteristics causes a change in a measure of financial condition. Multiple regression analysis is superior to comparison of means or simple correlation because it measures these relationships for each factor after considering the effect of the other factors. That is, it adjusts for systematic variation among all of the factors under consideration.

However, regression analysis has one important limitation. In order to apply this technique, the independent variables considered cannot be closely related. If they are closely correlated, it is difficult to separate their independent effects. Consequently, a preliminary step in this analysis was to determine if any of the 20 factors identified above is closely linked to one or more of the other factors. Specifically, simple correlations among each of the factors were calculated. The results indicated that there is a strong relationship (i.e., a simple correlation coefficient above .80) between per capita income in a county and the supply of hospital beds as well as physicians in the county. Because of this strong relationship, only one of these three county characteristics could be included. Therefore, hospital beds was retained as the best measure of competition; income and physician supply were dropped from the analysis. The remaining 18 variables did not correlate strongly among themselves.

FINDINGS

The statistical analysis provides answers to two questions: how well do all of the factors considered explain the variation in each dimension of financial condition? What particular factors are significant in explaining the variation in a dimension of financial condition? The answers to each question are presented below.

HOW WELL IS VARIATION EXPLAINED?

The 18 factors included in the analysis provide a reasonably good explanation for statewide variation in three of the six measures of financial condition, a less adequate explanation for two of the measures, and an inadequate explanation for one measure. Table 7 shows the percentage of variation in each ratio explained by the factors included in the analysis. For New York State, this figure is viewed as reasonably good for return on assets (37 percent), the debt ratio (34 percent), and the operating margin (28 percent). The share of varia-

Table 7: Percent of Variation in Measures of Hospital Financial Condition Explained by Environmental and Hospital Operating Characteristics (Figures Based on Unadjusted R^2)

	<i>New York State</i>	<i>New York City</i>	<i>Rest of State</i>
<i>Annual Operating Results</i>			
Return on assets	36.6%	60.2%	28.2%
Operating margin	28.1	47.0	34.1
<i>Long-Run Solvency</i>			
Debt ratio	33.8	60.6	18.5
Cash flow to debt	17.8	35.7	20.9
<i>Age of Plant</i>			
Cumulative depreciation ratio	20.3	49.2	17.4
<i>Liquidity</i>			
Current ratio	9.8	68.6	9.9

tion in age of plant explained by the factors is more modest (21 percent), and this is also true for the measure of ability to repay debt (18 percent). Liquidity is not explained well by these factors.

The combination of factors provides a better explanation within New York City than for the upstate area or for the state as a whole. For hospitals within New York City, the factors together explain at least 35 percent of the variation in each measure of financial condition and almost 60 percent or more of the variation for three of the six measures. In contrast, among hospitals upstate, the factors together explain more than 30 percent of the variation in only one measure. This suggests that the factors considered provide much of the explanation for variation in hospital financial condition within New York City but that additional factors should be considered in future analyses of hospitals upstate.

WHAT FACTORS ARE SIGNIFICANT?

While the combination of factors considered provides a reasonable explanation for most measures of financial condition, not all of the factors play an equally important role. The first distinction is between factors for which the relationship with financial condition is and is not statistically significant. The concept or "test" of statistical significance determines whether the relationship is systematic or random. Relationships are judged to be statistically significant when there is less than a one in ten chance that the relationship is random. Two-tailed tests of significance are used.

Table 8: Measures of Financial Condition for Which Environmental and Hospital Operating Characteristics are Significant Factors

	<i>New York State*</i>	<i>New York City</i>	<i>Rest of State</i>
<i>Market Characteristics</i> †			
Age of population	Cash flow, rate of return	Rate of return, age of plant	None
Hospital competition	Rate of return, age of plant	Not applicable†	Cash flow
Nursing home competition	None	Not applicable†	None
<i>Reimbursement System</i>			
Cost disallowances	(Liquidity)‡	None	(Liquidity)
Outpatient services	None	Rate of return, (age of plant)	None
Specialty status	Debt, rate of return	Rate of return	None
<i>Hospital Patient Selection</i>			
Charity care	None	None	Debt, rate of return, cash flow, operating margin
Insurance mix	Debt, rate of return, operating margin	Debt	None
<i>Hospital Efficiency</i>			
Staffing level	None	None	(Operating margin)
Speed of collections	Operating margin	Cash flow	None
Housekeeping costs	(Rate of return), operating margin, (age of plant)	(Debt), operating margin	Debt, operating margin, (age of plant)

<i>Hospital Services Intensity</i>		
Aged patients	None	None
Length of stay	Liquidity, debt, rate of return	Liquidity, debt, rate of return
Ancillary services	Operating margin	Debt, (cash flow), liquidity
<i>Hospital Marketing</i>		
Occupancy rate	Rate of return, cash flow, operating margin, age of plant	Rate of return, cash flow, operating margin, age of plant
Service to nonresidents	Not applicable	Not applicable
<i>Other</i>		
Size	Rate of return, operating margin, debt	Operating margin
Teaching commitment	None	None

* The New York State equations also included a variable to distinguish hospitals in New York City. This variable was significant for the debt ratio, rate of return, age of plant, and operating margin.

† For New York City, the market measures were combined into one dummy variable for each county.

‡ Items in parentheses indicate relationship opposite to that expected.

Table 8 summarizes the dimensions of financial condition for which each factor plays a significant role. This summary table is derived from the more detailed regression analysis results presented in Tables 9, 10, and 11. These tables present the beta coefficients and their significance levels for each independent variable in three sets of equations—those for each ratio based on statewide data, those for each ratio based on data from New York City hospitals, and those for each ratio based on data for upstate hospitals.

Two general conclusions are evident. First, the factors expected to be significant generally were. With only three exceptions, each of the factors was significant for at least one dimension of financial condition. That is, most of the factors expected to influence financial condition do, in fact, play some role in determining financial condition. Second, the nature of the relationships differs between New York City and the rest of the state. For a given dimension of financial condition, the factors playing a significant role often differ between the two areas. This suggests that the statewide results must be interpreted cautiously because they combine diverse and sometimes conflicting relationships. Therefore, the most important results are those for New York City and the rest of the state separately.

The three factors that are not significant are worth noting. Perhaps most surprising is that a hospital's teaching commitment does not affect its financial condition. When other factors are taken into account, a greater number of interns and residents relative to scale of services does not harm a hospital's financial condition. A number of explanations for this are possible. Hospitals are likely to take into account the financial implications of teaching programs and not undertake programs that could adversely affect their finances. Also, there may not be a net cost to teaching programs when the expenses of supervision are weighed against the services rendered by house staff; alternatively, any added expenses for graduate medical education may be sufficiently covered by third-party payments.

Nursing home competition also did not play a significant role. This suggests that at least within the ranges found in New York State, the availability of nursing home beds does not reduce demand for hospital care. This is possibly related to the high occupancy rates among nursing homes in New York State. Because of the relatively intense use of nursing homes, they may not be drawing patients from hospitals. In fact, the large number of days of hospital care provided by New York hospitals to patients awaiting nursing home placement suggests that this type of competition is not important in many areas of the state.

Table 9: Results of Regression Equations for Financial Ratios for Voluntary Hospitals in New York State

Variable	Operating Margin		Rate of Return		Debt Ratio		Cash Flow to Debt		Age of Plant		Current Ratio	
	b-coeff.	t-score	b-coeff.	t-score	b-coeff.	t-score	b-coeff.	t-score	b-coeff.	t-score	b-coeff.	t-score
ENVIRONMENTAL CHARACTERISTICS												
<i>Market Characteristics</i>												
Aged population share	0.003	0.910	0.004	1.792*	-0.010	-0.891	0.0169	1.692*	-0.005	-0.845	0.0228	0.212
Hospital competition	-2.292	-0.844	-5.754	-2.777†	5.504	0.527	-3.546	-0.402	8.570	1.713*	-27.508	-0.289
Nursing home competition	0.462	0.842	0.222	0.536	2.919	1.400	-1.054	-0.598	0.409	0.405	6.910	0.363
Region	-0.030	-1.762*	-0.039	-3.015‡	0.158	2.435†	-0.069	-1.249	0.071	2.258†	-0.305	-0.513
<i>Reimbursement System Characteristics</i>												
Disallowed expenses	-0.0001	-0.086	-0.0004	-0.348	-0.006	-1.256	-0.002	-0.379	-0.0005	-0.209	0.097	2.062†
Outpatient services	0.130	1.339	-0.110	-1.492	-0.075	-0.202	-0.063	-0.199	0.202	1.111	-3.332	-0.981
Specialty hospital	0.079	2.406†	0.089	3.553‡	-0.345	-2.727‡	0.166	1.556	-0.028	-0.467	1.125	0.974
HOSPITAL CHARACTERISTICS												
<i>Patient Selection</i>												
Charity care	0.098	0.692	0.041	0.381	0.752	1.383	-0.479	-1.004	0.116	0.436	-2.174	-0.438
Insurance mix	0.001	2.165†	0.001	2.465†	-0.007	-3.352‡	-0.0003	-0.159	-0.0004	-0.364	-0.022	-1.137
<i>Service Intensity</i>												
Aged patients	-0.1111	-1.223	0.0634	0.914	-0.0605	-0.173	0.125	0.423	0.121	0.715	0.538	0.169
Length of stay	-0.0002	-0.038	-0.010	-3.156‡	0.049	3.168†	-0.021	-1.581	-0.003	-0.404	-0.376	-2.642‡
Ancillary services	-0.079	-1.757*	0.019	0.568	-0.257	-1.497	0.1718	1.186	-0.070	-0.837	1.934	1.234
<i>Operating Efficiency</i>												
Staffing	0.5274	0.193	1.2768	0.614	-5.992	-0.572	12.391	1.399	4.824	0.844	13.354	0.140
Speed of collections	-0.0003	-1.676*	-0.0002	-1.378	-0.0003	0.538	-0.0008	-1.553	-0.00010	-0.332	-0.002	-0.392
Housekeeping costs	-0.001	-2.780‡	0.0002	0.666	0.0005	0.271	-0.0013	-0.870	-0.0028	3.102‡	0.009	0.544
<i>Marketing</i>												
Occupancy rate	0.129	2.065†	0.178	3.844‡	0.122	0.522	0.728	3.570‡	-0.374	-3.152‡	0.958	0.449
<i>Other</i>												
Size	0.000007	2.204†	0.0008	3.131‡	-0.0002	-1.901	0.00009	0.853	0.00003	-0.411	0.0005	0.467
Interns and residents	-26.332	-1.035	-3.559	-0.184	103.712	1.059	-71.068	-0.852	11.631	0.245	-359.037	-0.401

*Significant at the 10 percent level.

†Significant at the 5 percent level.

‡Significant at the 1 percent level.

Table 10: Results of Regression Equations for Financial Ratios for Voluntary Hospitals in New York City

Variable	Operating Margin		Rate of Return		Debt Ratio		Cash Flow to Debt		Age of Plant		Current Ratio	
	b-coeff.	t-score	b-coeff.	t-score	b-coeff.	t-score	b-coeff.	t-score	b-coeff.	t-score	b-coeff.	t-score
ENVIRONMENTAL CHARACTERISTICS												
<i>Market Characteristics</i>												
Bronx	-0.014	-0.131	-0.067	-0.976	0.137	0.483	-0.124	-0.732	0.272	1.738*	-0.120	0.212
Brooklyn	-0.050	-0.578	-0.053	-0.930	-0.013	-0.055	-0.063	-0.453	0.205	1.585	0.059	0.127
Queens	0.040	0.497	-0.027	-0.511	0.152	0.698	-0.018	-0.141	0.126	1.024	-0.175	-0.405
Manhattan	0.018	0.205	-0.121	-2.088†	0.145	0.608	-0.007	-0.047	0.263	1.943*	0.022	-0.047
<i>Reimbursement System Characteristics</i>												
Disallowed expenses	-0.003	-0.343	0.001	0.272	0.005	0.224	-0.005	-0.360	-0.017	1.351	-0.028	-0.643
Outpatient services	0.018	0.041	-0.327	-1.181	0.836	0.729	-0.378	-0.555	1.194	1.856*	1.941	0.855
Specialty status	0.151	1.631	0.152	2.480†	-0.132	-0.521	0.108	0.722	-0.197	-1.417	0.309	0.616
HOSPITAL CHARACTERISTICS												
<i>Patient Selection</i>												
Charity care	0.297	0.907	0.272	1.260	-0.544	-0.611	0.351	0.663	-0.388	-0.789	-1.125	-0.637
Insurance mix	0.003	1.514	0.0006	0.454	-0.015	-2.783‡	0.001	0.420	0.001	0.415	0.014	1.374
<i>Operating Efficiency</i>												
Staffing	-6.601	-0.740	-4.846	-0.824	-1.175	-0.048	-2.127	0.147	-2.287	-0.077	-60.065	-1.247
Speed of collections	-0.0006	-1.156	-0.0004	-1.242	0.002	1.051	-0.002	-1.818*	0.0006	0.703	0.0004	0.151
Housekeeping costs	-0.003	-1.797*	0.0003	0.352	-0.009	-2.211†	0.003	1.238	-0.004	-1.199	0.012	1.507
<i>Service Intensity</i>												
Aged patients	-0.394	-1.119	-0.024	-0.103	1.630	1.700*	0.228	0.400	0.622	1.178	0.882	0.464
Length of stay	0.002	0.108	-0.015	-1.317	0.047	0.959	-0.024	-0.835	0.037	1.373	-0.180	-1.870*
Ancillary services	-0.229	-1.505	0.047	0.468	-0.005	-0.013	-0.247	-1.002	-0.034	-0.149	-0.557	-0.679
<i>Marketing Effectiveness</i>												
Occupancy	0.074	0.193	0.222	0.873	1.801	1.714*	0.537	0.860	-0.491	-0.846	-1.633	-0.784
Services to nonlocal residents	0.456	1.215	-0.291	-1.175	-0.432	-0.423	-0.010	-0.016	-0.205	-0.341	-1.731	-0.854
<i>Other</i>												
Size	0.00008	0.914	0.0001	2.676†	-0.0004	-1.578	0.0002	1.224	0.0002	1.201	0.0003	0.582
Teaching commitments	34.667	0.463	37.963	0.768	213.789	1.047	-12.517	-0.103	-23.372	-0.174	-21.839	-0.054

*Significant at the 10 percent level.

†Significant at the 5 percent level.

‡Significant at the 1 percent level.

Service to nonlocal residents was not significant in New York City, the only area for which the data were available. This could be attributable to the weakness of the measure; local hospital residents were defined as those living in the zip code in which the hospital is located. This may not be the most appropriate definition of a local market or catchment area for a hospital. Future analysis could consider more meaningful definitions of hospital catchment areas.

Each of the remaining 15 factors was significant for at least one financial ratio. Factors relating to the reimbursement system played an important role in determining the annual operating results of hospitals statewide and in New York City. All but one of the specialty hospitals are located in New York City, and in that area specialty status under the reimbursement system had a favorable impact on rate of return. More surprising is that other reimbursement system factors had little impact on financial condition among hospitals outside of New York City and that cost disallowances improved the liquidity of these hospitals. This suggests that hospitals outside of New York City have adjusted better to the state's regulations and that upstate hospitals in a relatively favorable liquidity position are the ones most likely to spend beyond state-determined ceilings, perhaps because reserves are available to cover disallowances. Outpatient workloads may be less important upstate, because in these areas hospital-based ambulatory care plays a smaller role than in New York City in meeting the overall ambulatory care needs of the population.

Charity care played the expected role in reducing financial health among upstate hospitals. However, in New York City charity care was unrelated to all dimensions of financial condition. This suggests that in New York City, the provision of charity care is not necessarily a cause of financial hardship. This finding may be related to the availability of care at municipal hospitals for persons not served by voluntary hospitals. The "safety valve" of a large public hospital system permits hospitals to adjust their volume of charity care in response to their financial conditions.

Third-party payer mix did not play a significant role among upstate hospitals, but a greater share of favored payers was associated with less debt among New York City hospitals. The relatively small role of third-party payer mix is possibly related to the New York State rate-setting program. During the period under consideration, a state agency set payment rates for Blue Cross and Medicaid, and there was relatively little variation in payment rates among Medicare, Blue Cross, and Medicaid under the regulatory system. The major source of third-party revenue outside this system was commercial insurance.

Table 11: Results of Regression Equations for Financial Ratios in Upstate New York

Variable	Operating Margin		Rate of Return		Debt Ratio		Cash Flow to Debt		Age of Plant		Current Ratio	
	b-coeff.	t-score	b-coeff.	t-score	b-coeff.	t-score	b-coeff.	t-score	b-coeff.	t-score	b-coeff.	t-score
ENVIRONMENTAL CHARACTERISTICS												
<i>Market Characteristics</i>												
Aged population share	-0.0003	-0.130	0.001	0.632	-0.006	-0.471	0.014	1.171	-0.005	-0.912	0.005	0.034
Hospital competition	-1.529	-0.588	-1.621	-0.678	12.607	0.884	-24.456	-1.753*	-2.883	-0.439	-147.738	-0.898
Nursing home competition	0.059	0.139	-0.402	1.054	1.982	0.872	-0.659	-0.296	0.910	0.862	12.941	0.494
<i>Reimbursement System Characteristics</i>												
Disallowed expenses	-0.001	-1.152	-0.001	-1.358	-0.007	-1.344	-0.002	-0.351	0.001	0.392	0.111	1.887*
Outpatient services	0.071	0.894	0.031	0.425	-0.447	-1.024	-0.461	-0.340	-0.061	-0.303	-6.662	-1.323
HOSPITAL CHARACTERISTICS												
<i>Patient Selection</i>												
Charity care	-0.491	-2.711	-0.504	-3.037†	1.636	1.653*	-2.248	-2.316†	0.111	0.220	-11.447	-1.003
Insurance mix	0.00005	0.111	-0.0003	-0.624	-0.004	-1.438	-0.002	-0.741	0.0007	0.562	-0.040	-1.381
<i>Operating Efficiency</i>												
Staffing	4.159	1.859*	2.076	1.018	-10.368	-0.852	17.321	1.447	8.057	1.415	10.078	0.072
Speed of collections	0.00002	0.144	0.00004	0.037	-0.0002	-0.338	-0.0002	-0.228	0.0001	0.380	0.0002	0.027
Housekeeping costs	-0.00008	-1.994	-0.000004	-0.013	0.005	2.216†	-0.003	-1.520	-0.002	-2.411†	0.009	0.369
<i>Service Intensity</i>												
Aged patients	-0.073	-0.998	0.027	0.404	-0.356	-0.888	-0.142	-0.360	-0.050	-0.266	-0.659	-0.143
Length of stay	-0.003	-0.969	-0.006	-1.772*	0.062	3.170†	-0.014	-0.725	-0.001	-0.103	-0.366	-1.632*
Ancillary services	0.002	0.041	0.040	1.150	-0.432	-2.101†	0.447	2.233†	-0.083	-0.848	3.846	1.623*
<i>Marketing Effectiveness</i>												
Occupancy	0.174	4.405‡	0.174	4.518‡	0.014	0.062	0.661	2.824‡	-0.302	-2.671‡	0.808	0.306
<i>Other</i>												
Size	0.00007	1.914*	0.00002	0.487	0.000007	0.035	-0.0001	-0.665	-0.00001	-0.141	-0.0005	-0.206
Teaching commitment	-31.912	-1.478	-9.016	-0.454	0.478	0.004	-77.404	-0.658	3.449	0.063	-551.072	-0.404

*Significant at the 10 percent level.

†Significant at the 5 percent level.

‡Significant at the 1 percent level.

Further analysis might focus on the share of revenues from this source as a determinant of financial condition.

Aspects of hospital operating efficiency play interesting roles in shaping financial condition. As expected, greater speed of collections improved cash flow among New York City hospitals, but this relationship was not significant for upstate hospitals. For upstate hospitals, more efficient housekeeping operations were related to better operating results and less indebtedness. However, lower housekeeping costs were associated with a less favorable debt position in New York City and a more deteriorated plant upstate; also surprising is the lack of relationship between staffing levels and financial condition in New York City and the favorable impact of presumably less efficient staffing on operating results upstate. These unexpected results, like those for charity care, indicate that hospitals may adjust staffing and expenditures for certain cost centers in response to their financial condition rather than that these factors independently determine financial health.

Measures of hospital service intensity also yielded interesting results. Greater numbers of aged patients had no impact on financial condition among upstate hospitals, but were related to greater indebtedness in New York City. The limited role for this factor is somewhat surprising. A possible explanation is that the share of aged patients is considered by the state in setting its payment rates. These adjustments may be sufficient to offset the impact of caring for these more difficult patients.

A similar explanation may account for the unexpected findings for ancillary services. The state also takes this factor into account in setting payment rates. Suitable rate adjustments may explain this factor's lack of significance in New York City. The negative impact of more intense ancillary services among upstate hospitals is evident for debt and liquidity measures.

Length of stay was an important determinant of three dimensions of financial health among upstate hospitals. This confirms the expectation that a greater number of patients who require long periods of hospitalization will weaken a hospital's financial condition. This relationship also was evident in New York City with respect to liquidity, but length of stay was not significant in determining annual operating results or indebtedness among the city's hospitals. The less comprehensive impact of length of stay in New York City is not easily explained. Perhaps the adverse impact upstate reflects these hospitals' inability to avoid penalties imposed by third parties for excessive length of stay, whereas New York City hospitals have more successfully adjusted to these regulations.

Higher occupancy rates showed the expected positive relationship to three dimensions of financial condition upstate. This confirms the expectation that keeping beds filled is important to sustaining financial health. However, in New York City, higher occupancy rates did not show a positive relationship to any aspect of financial health and, surprisingly, higher occupancy rates were related to higher levels of indebtedness. This suggests that for New York City hospitals, insufficient utilization is not a source of financial strain and, in fact, heavily utilized hospitals may be obtaining large loans to expand or upgrade their plants.

Finally, size showed an expected relationship to financial condition among both upstate and New York City hospitals. Among upstate hospitals, operating margins were higher for larger hospitals, and among hospitals in New York City, rates of return were significantly improved for larger hospitals. This suggests that larger institutions are able to achieve some economies of scale and/or that their size provides other political and marketing advantages.

CONCLUSION

This research does not identify any simple explanations for or solutions to the problem of hospital financial distress. Rather, it confirms that financial status is itself a complex concept with diverse dimensions and that the financial condition of hospitals can be understood only by considering numerous factors. These factors include features of the market or environment outside a single institution's control as well as aspects of hospital operations over which the institution's managers have nearly full control. Both sets of factors need to be considered in understanding the financial condition of hospitals.

The mixture of internal and environmental factors shaping financial condition appears to be different for hospitals in New York City than for hospitals in the rest of the state. The factors considered do not provide as good an explanation of financial condition for hospitals in the rest of the state as for those in New York City, and further analysis of these institutions is needed. Increasing occupancy rates appears to be the most important step to improving the financial condition of hospitals outside of New York City. Other changes in hospital operations might also yield improvements in financial condition. These include reduced lengths of stay and lower expenditures for non-medical cost centers such as housekeeping. The decision to provide charity care

also has adversely affected the financial condition of voluntary hospitals outside New York City.

For voluntary hospitals in New York City, some of the most important findings are negative ones. Among the factors apparently *not* responsible for the relatively poor financial condition of some hospitals in the city are high levels of charity care, excessive staffing relative to workload, large teaching commitments, and low occupancy rates. Instead, the factors with the strongest impacts are policies relating to the third-party payment system. Low payments for outpatient care are causing hospitals which exceed permissible cost ceilings and which have high volumes of outpatient care to incur poor annual operating results. Offsetting some of these negative effects is the positive influence of large size and, with respect to indebtedness, added revenues for hospitals able to attract disproportionate numbers of patients with preferred forms of insurance.

Simple cause and effect models of hospital financial viability cannot capture fully the complexity of the problem. While this research provides some important guidance for improving hospitals' financial condition, no statistical analysis is likely to prove capable of capturing the full range of dynamic relationships between a hospital's financial condition, its internal operations, and its changing legal and economic environment. Although it may not be possible to incorporate fully their behavior in statistical models, the adaptability and responsiveness of these durable institutions should not be underestimated.

APPENDIX

DATA SOURCES

Financial Ratios

All financial ratios are three-year averages (mean) for 1979-1981. Figures are based on hospital unrestricted fund accounts only. Data are from Institutional Cost Reports furnished by hospitals to the New York State Department of Health. These data were supplied by the Department of Health, and additional editing was performed by the Hospital Association of New York State and by the authors.

Market Characteristics

1. County per capita income is from *Survey of Current Business* (April 1981), Table 2, p. 56.

2. Aged population is from special tabulations of the 1980 Census prepared by the New York State Data Center, New York State Department of Commerce.
3. Hospital competition was calculated from hospital bed supply data prepared by the New York State Department of Health and 1980 census population figures by county.
4. Nursing home competition was calculated from nursing home bed supply figures in the New York State Department of Health. *Health Facilities Directory*, June 1980 edition; and from 1980 census data by county.
5. Physician supply data are from Center of Health Services Research and Development, American Medical Association. *Physician Distribution and Medical Licensure in the U.S., 1979*. Monroe, WI: American Medical Association, 1980, Table 12, pp. 268-71.

Reimbursement System Characteristics

1. Disallowed expenses are from computer printout supplied by New York State Department of Health, Office of Health Systems Management, Bureau of Hospital Reimbursement. Fiscal Impact Analysis, Table 5, dated January 11, 1982.
2. Outpatient services are emergency room and outpatient department visits reported in the Institutional Cost Report for 1981.
3. Specialty status is based on classifications used in American Hospital Association. *Hospitals-Guide Issue*, 1981 edition.

Hospital Characteristics

1. Charity care is deductions from patient service revenue for charity care and bad debts as reported in the Institutional Cost Report for 1981.
2. Insurance mix data are Blue Cross and Medicare discharges as a percentage of all discharges. These figures are from the Institutional Cost Report for 1981.
3. Staffing data are full-time equivalent employees divided by the combined total of inpatient days and one-fourth of all outpatient department and emergency room visits. Service data are from the Institutional Cost Report for 1981.

4. Speed of collections is calculated from accounts receivable data reported in the Institutional Cost Report for 1981.
5. Housekeeping costs are costs for the following cost centers: maintenance and repairs, laundry and linen, housekeeping, dietary raw food, dietary other, and operation of plant. Figures are from the Institutional Cost Report for 1981.
6. Service intensity data, including the percentage of discharges to persons over age 70, the average adjusted length of stay, and the ancillary service index, were supplied by the Management and Planning Service, Hospital Association of New York State.
7. Occupancy rate data are from the Institutional Cost Report for 1981.
8. Services to nonlocal residents are from *Origin of Patients in New York City Hospitals*. New York: United Hospital Fund, September 1979. Figures are for calendar year 1978.
9. Size is certified beds at the beginning of the year as reported in the Institutional Cost Report for 1981.
10. Teaching commitment is calculated using service data and numbers of interns and residents reported on the Institutional Cost Report for 1981.

REFERENCES

1. Problems Facing Financially Troubled Hospitals, *Field Hearings before the Subcommittee on Health of the Committee on Ways and Means*. House of Representatives, 96th Congress, 2nd Session, Serial 96-98. Washington, DC: U.S. Government Printing Office, 1980.
2. American Hospital Association, Office of Public Policy Analysis. Financially Distressed Hospitals: 1979. Policy Brief No. 26, September 26, 1980.
3. American Hospital Association, Office of Public Policy Analysis. Financially Distressed Hospitals: Associated Factors. Policy Brief No. 40, August 24, 1981.
4. Hadley, J., and J. Feder. Hospitals' Financial Status in 1980. Urban Institute Working Paper No. 3179-03, October 1983.
5. Kelly, J., and J. O'Brien. Characteristics of Financially Distressed Hospitals. Hospital Cost and Utilization Project Research Note No. 3, DHHS Publication No. (PHS) 83-3352, June 1983.
6. Hadley J., R. Mullner, and J. Feder. The financially stressed hospital. *New England Journal of Medicine* 307(20):1283-87, November 11, 1982.
7. Brecher, C., and S. Nesbitt. *The Financial Condition of New York City Voluntary Hospitals*. New York: The Commonwealth Fund, 1983.

8. Cleverly, W. *The Hospital Industry Analysis Report 1982*. Oak Brook, IL: Healthcare Financial Management Association, 1983.
9. Brecher, C., and S. Nesbitt. *Financial Conditions of Voluntary Hospitals in New York City. Second Annual Report to the Commonwealth Fund*, July 1983.