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School of Allied Health Professions

Virginia Commonwealth University

This is to certify that the dissertation prepared by Janet Lynch entitled The Financial Performance of System Acquired Hospitals has been approved by her committee as satisfactory completion of the dissertation requirement for the degree of Doctor of Philosophy.

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THE FINANCIAL PERFORMANCE OF SYSTEM ACQUIRED HOSPITALS

A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy at Virginia Commonwealth University

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Abstract

This study investigated the financial performance of not-for-profit hospitals in 10 Southern states acquired by either the for-profit or not-for-profit multihospital systems between the years 1978 through 1982. The impact of system affiliation on acquired hospitals was investigated by looking at average financial performance from the two years before acquisition to 1984/1985. Differences between the performance of hospitals acquired by for-profit and not-for-profit multihospital systems were examined as well. With regard to the latter, major findings revealed both for-profit and not-for-profit multihospital systems increased debt in acquired hospitals and made improvements to plant and equipment. For-profit multihospital systems additionally increased profitability and appeared to operate their acquisitions in a more business-like fashion than the not-for-profit multihospital systems did. Comparing acquired hospitals with matched independents revealed that both for-profit and not-for-profit multihospital facilities used more debt and had newer plant and equipment than the not-for-profit independents did. Multihospital systems decreased liquidity in acquisitions as compared with independent not-for-profit hospitals. Only for-profit multihospital system facilities showed increased profitability, and this was largely due to higher prices. Little or no improvement in efficiency was observed in either for-profit or not-for-profit multihospital system hospitals; however, the financial indicators used to measure efficiency proved to be problematic.

CHAPTER 1: INTRODUCTION

Introduction to the Problem

The past decade was one of relatively steady growth for multihospital systems (MHSs) in the United States. Through 1985, growth in both for-profit (FP) and not-for-profit (NFP) systems changed the structure of the health care industry. Not only did MHSs expand horizontally by including more beds and hospitals under their direction, many began to diversify into nursing homes, health maintenance organizations, psychiatric hospitals, home health agencies, freestanding ambulatory care facilities and preferred provider organizations (Johnson, 1986).

Currently, the industry is witnessing the restructuring of many large FP MHSs. In 1987, Hospital Corporation of America (HCA) divested 104 hospitals which formed Health Trust, Inc. (Carlsen, 1988; Southwick, 1988). In a similar move, American Medical International (AMI) recently sold 37 domestic acute-care hospitals to an employee stock ownership plan (Southwick, 1988). While a trend toward downsizing among large systems is emerging, system membership continues to be popular. Regional and local systems continue to evolve.

This is a turbulent period in the history of health care. Rapid change characterizes the industry as hospitals adapt to environmental pressures for cost containment. System membership represents one

adaptation and hope for hospital survival.

From a research perspective, it is useful to know if this hope is realistic. Of particular interest is determining whether or not inclusion in an MHS affects a hospital's financial performance subsequent to acquisition. As described in Chapter 2, systems are theorized to achieve various production efficiencies as well as improved access to capital.

Another interesting question is whether financial performance is related to the ownership of the acquiring system. That is, do acquired hospitals perform differently depending upon whether they are acquired by FP or NFP systems? While numerous theorists suggest FP and NFP organizations exhibit different financial performance, others believe their performance is similar. The different perspectives are reviewed in Chapter 2.

Purpose of the Study

The specific intent of this research was to examine empirically the financial effects of system affiliation on previously independent NFP hospitals which became part of either FP or NFP MHSs. Ratio analysis, which provides a means of focusing attention on critical relationships between components of income statements and balance sheets, was used to measure performance. Liquidity, capital structure, financial activity, and profitability were assessed. Each represents a primary dimension of financial performance as discussed in Chapter 3.

Due to the continuing public policy debate over for-profit health

care (Herzlinger, 1987), special attention was given to the impact of FP MHS purchase on subsequent hospital financial performance. Specifically, this study analyzed the reported financial data of hospitals in a 10 state region where the FP MHSs were active in acquiring acute care hospitals before 1982. Although the sample was dominated by FP purchases, NFP MHS acquisitions in the region were included as well.

The focus of research was on the financial performance of acquired hospitals relative to a matched set of independent NFP hospitals. The central question was whether system affiliated hospitals improved their financial performance relative to the matched set of independent hospitals. The financial performance of system hospitals related to ownership was also explored.

The remainder of this chapter provides background for the research. Multihospital system expansion strategies are described, key terms are defined and the focus of the study is narrowed to consider only hospitals which were purchased (i.e. become owned). Differences between FP and NFP systems and the hospitals within those systems are clarified. Research hypotheses are stated. The chapter concludes with consideration of the significance of the research and its limitations.

Multihospital Systems

Expansion Strategies

Organizations can grow through either internal or external expansion. If internal expansion is pursued, the organization

constructs new facilities. In the case of hospitals, this involves overcoming certain regulatory hurdles such as obtaining a Certificate of Need (CON) to build. Internal expansion can be an extremely slow path to growth (Finkler and Horowitz, 1985). A faster alternative to MHS growth is expansion through business combinations.

In fact, much of the expansion of multihospital systems has occurred through the external approach. Hoy and Gray (1986), for example, document that 80 percent of hospitals newly included in six large investor-owned corporations through 1984 involved purchase or leasing agreements.

Definition of Terms

A multihospital system, as defined by the American Hospital Association (1986), is "two or more hospitals, owned, leased, sponsored, or contract-managed by a central organization" (p. 38). Each type of affiliation represents varying degrees of system influence over the affiliated hospital. To clarify, definitions of each type are given below.

The American Hospital Association (1986) defines institutional contract management as,

> general day-to-day management of an entire organization by another organization, under a formal contract, in which the managing organization reports directly to the board of trustees or owners of the managed organization and the managed organization retains total legal responsibility and ownership of the facility's assets and liabilities. (p. 13)

With respect to hospital management, it is clear that the servicing

organization is fully responsible for the day-to-day operations of the managed hospital but exercises limited influence over policy decisions.

Similar to contract management, a lease arrangement also involves full management without ownership. The primary distinction between a lease and contract management is that both day-to-day management and policy decisions are assumed by the leasing organization. "In essence, the lease transfers possession of hospital property and equipment, for a specified number of years and for a specified rental, along with responsibility for the operation and maintenance of the hospital" (Zuckerman, 1979, p. 9).

With full ownership, an MHS legally owns the affiliated hospital. The MHS, consequently, has no restrictions, other than those which are self-imposed, upon the day-to-day management and policy decisions of the owned facility.

As defined by the American Hospital Association (1986), sponsorship refers to the,

> relationship between a religious or other sponsoring organization and a hospital that may set limits on the activities undertaken within the hospital or is intended to further the objectives of the sponsoring organization but that does not involve ownership or other legal relationships. (p. 57)

With respect to MHSs, the preceding definition suggests a loosely associated group of hospitals with, perhaps, modest system influence.

Only owned hospitals are examined in this study, to prevent obscuring differences between system and independent hospitals which

may result from consideration of too heterogeneous a group of system affiliated hospitals. Owned hospitals are those over which systems have the most influence. If financial benefits are to be realized from system affiliation, it is logical to expect them to be manifest first in these facilities.

For the most part, this research employs Finkler and Horowitz's (1985) definitions to refer to particular forms of business combinations. These authors define a combination as "any situation where two organizations become one organization" (p. 22).

A merger is a special type of combination. In a merger, organization A combines with organization B. The resulting combined entity is organization A or organization B. This contrasts with a consolidation in which organization A combines with organization B, and the combined entity is organization C. In a merger, one organization is absorbed by the other. This research is concerned only with situations in which a hospital is absorbed by an established MHS (i.e. mergers).

In situations where a hospital merges with an FP system, the system is considered the acquiring organization or buyer, and the hospital is referred to as being acquired or as the seller. Acquisition has a technical meaning with respect to taxes. According to Finkler and Horowitz, "An acquisition is a merger or consolidation that is a taxable transaction. A tax-free merger or consolidation is referred to as a reorganization" (p. 23). A reorganization occurs in situations where an NFP hospital combines with an NFP system. This study does not use the term acquisition is its technical sense but

refers to all absorptions of hospitals by systems, whether FP or NFP, as acquisitions.

Comparison of Systems by Ownership

The preceding definitions do nothing to illuminate the differences between FP and NFP MHSs. To the extent that questions may arise regarding the impact of structural and environmental differences on the financial performance of member hospitals, it is useful to review the characteristics of each. At least three noteworthy structural differences exist. Additional environmental differences are documented.

First, FP MHSs were substantially larger, on average, than the NFP MHSs. To illustrate, Table 1 gives the average number of domestic acute care hospitals owned, leased, or contract managed per system between the years 1980 and 1985. FP systems were consistently larger than the NFPs. In 1985, FP MHSs contained, on average, roughly three to six times as many hospitals as the NFP systems.

Second, hospitals in FP systems tended to be smaller than those in the various NFP systems (Table 2). Religious systems, both Catholic and other, tended to have the largest average hospital size with other religious hospitals showing a tendency toward larger hospitals over the years 1980 to 1985.

A third structural difference involves the higher concentration of hospitals and beds in a few large FP organizations. Table 3 gives the average sizes of the four largest systems in each ownership category by beds and hospitals per system. It is readily apparent that the

Table 1: Average Numbers of U.S. Acute Care Hospitals Owned, Leased, or Managed per System, 1980-1985

	1980	1981	1982	1983	1984	1985	Average Annual Growth 1980-1985
For-Profit	20.0	26.5	22.7	29.0	34.2	32.2	9.9%
(number[a])	(29)	(29)	(32)	(30)	(28)	(33)	
Not-For-Profit							
Catholic	6.6	7.0	7.6	8.5	8.9	9.4	7.3%
(number)	(43)	(43)	(26)	(27)	(29)	(40)	
Other Religious	7.0	7.7	7.9	8.0	8.6	7.4	1.1%
(number)	(19)	(19)	(23)	(23)	(21)	(28)	
Secular	5.7	6.6	6.4	6.9	6.4	5.6	-0.4%
(number)	(56)	(56)	(82)	(85)	(84)	(92)	

Sources: Johnson in Modern Healthcare, (1982b; 1983; 1984; 1985; and 1986)

[a]Number of hospitals responding to survey

Table 2: Average Numbers of Acute Care Beds per System Hospital, 1980-1985

	1980	1981	1982	1983	1984	1985	Average Annual Growth 1980-1985
For-Profit (number[a])	140.7 (30)	135.6 (30)	136.2 (32)	142.5 (30)	140.5 (28)	141.3 (33)	0.1%
Not-For-Profit							
Catholic (number)	261.6 (46)	252.3 (46)	232.2 (26)	230.8 (27)	228.3 (29)	250.2 (40)	-0.9%
Other Religious (number)	149.1 (21)	146.0 (21)	174.0 (23)	187.8 (23)	190.9 (21)	204.4 (28)	6.5%
Secular (number)	164.6 (64)	157.9 (64)	151.8 (82)	148.0 (85)	158.3 (84)	176.2 (92)	1.4%

Sources: Johnson in Modern Healthcare, (1982b; 1983; 1984; 1985; and 1986)

[a]Number of hospitals responding to survey

Table 3: Average Sizes of the Four Largest Systems in each Ownership Category, 1980-1985*

	1980	1981	1982	1983	1984	1985	Average Annual Growth 1980-1985
BEDS							
For-Profit	17,583	22,196	21,815	23,617	26,251	28,892	10.4%
Not-For-Profit							
Catholic	4,250	4,427	4,507	4,563	4,572	5,953	7.0%
Other Religious	2,293	2,566	4,130	4,633	4,710	5,599	19.6%
Secular	3,735	4,108	4,035	4,035	3,929	3,841	0.6%
HOSPITALS							
For-Profit	108.3	144.0	145.5	154.8	177.3	184.5	11.3%
Not-For-Profit							
Catholic	15.0	16.3	16.5	17.0	17.0	25.5	11.2%
Other Religious	14.5	16.5	24.5	26.5	26.8	25.5	12.0%
Secular	23.3	28.3	36.3	17.0	26.5	22.3	-0.8%

*Largest systems based on number of U.S. and foreign acute care hospital beds operated.

Sources: Johnson in Modern Healthcare, (1982b; 1983; 1984; 1985; and 1986)

largest FP MHSs were much larger in comparison to the NFP systems. In addition, the FP sector has been dominated by the same four companies over this time span: Hospital Corporation of America, American Medical International, Humana, Inc., and National Medical Enterprises, Inc., in descending order. With this in mind, Table 3 charts the average annual growth rate in hospitals and beds per system for these four companies. The table does not chart the growth of stable groups of NFP systems since the distinction of being among the largest four systems within an ownership class has shifted among systems. While the largest Catholic and other religious systems of 1985 were considerably larger in terms of beds and hospitals than their counterparts in 1980, they were considerably smaller than the FP MHSs.

Environmental differences between FP and NFP systems have also been documented (Changes in the ownership, control, and configuration of health care services, 1986). Most FP system hospitals are located in the "sunbelt" states, high growth states, areas with favorable insurance characteristics, and suburban areas. They are less likely to be located in highly regulated states (i.e., states where hospital rate changes are controlled by government agencies). NFP MHSs, to the contrary, have hospitals located more in keeping with the national distribution of hospitals.

Finally, the growth of NFP MHSs has occurred largely, although not exclusively, through the acquisition of other NFP organizations. Until recently, FP MHSs also grew through the acquisition of other organizations of similar ownership type. Between 1980 and 1984, however, NFP and governmental hospitals began to assume a significant

portion of the acquisitions of FP MHSs (Hoy and Gray, 1986).

While the ownership differences cited above are unmistakable, they are not necessarily related to differences in financial performance. In fact, the financial performance of the two ownership types, particularly in similar environmental circumstances, may be similar. This idea is developed further through the literature review in Chapter 2. For the present, Table 4, which provides the annual revenues of hospitals responding to Modern Healthcare's surveys between 1982 and 1985, shows the NFP MHSs increased their revenues at a faster rate than FP MHSs. While these figures could reflect a particular response bias (e.g., more aggressive NFP hospitals responding to the surveys), another explanation is a more business-oriented approach among NFP MHSs. Fox example, Coyne (1985b) found similarities in financial ratio trends in a sample of FP and NFP MHSs between the years 1978 to 1982. Findings such as Coyne's have led researchers and practitioners to expect increasingly similar behavior from FP and NFP MHSs.

Research Hypotheses

Two hypotheses flow from the overview presented in this chapter. Each is further developed in the chapters which follow.

Hypothesis 1: There is no difference in the financial performance of FP and NFP MHS-acquired hospitals.

Hypothesis 2: Financial performance in MHS-acquired hospitals differs favorably from that of independents.

Table 4: Comparative Growth of Revenues for For-Profit and Not-For-Profit Multihospital Systems, 1982-1985

	1982	1983	1984	1985	Average Annual Growth 1982-1985
Revenues (Millions)					
For-Profit	$8,866.0	$11,131.0	$13,186.7	$15,538.9	20.6%
Not-For-Profit	$15,475.2	$22,348.0	$26,772.2	$32,660.3	28.2%

Sources: Johnson in Modern Healthcare, (1983; 1984; 1985; and 1986)

Significance of the Study

Sweeping changes occurred in the structure of the hospital industry prior to 1985. Many of these changes relate to the growth of MHSs. The increased presence of MHSs and concomitant cost containment pressures in the hospital industry make understanding the impact of systems on acquired hospitals both interesting and important to healthcare researchers, policy makers, and managers.

First, researchers may find this study of interest since it fills a gap in the existing empirical literature. No study to date has examined the impact over time of full system ownership on the financial performance of MHS-acquired hospitals in relation to that of independent hospitals. Further, no study has examined post-acquisition data taken during the years since Medicare began reimbursing providers on a prospective basis. The latter is important since cost-based reimbursement contained few incentives toward financial efficiency and control.

Second, given the promise of improved financial performance associated with system affiliation (Zuckerman, 1979), public policy makers may be interested to know if MHSs can improve hospital financial performance sufficiently to ensure the survival of these institutions in an increasingly cost-conscious environment. This is a particularly timely issue for threatened rural hospitals (Brice, 1988).

From another perspective, this study may be of interest to the Federal Trade Commission and the Justice Department, both are

concerned with the anti-trust implications of mergers. As will be shown, one of the important findings from previous research is that system affiliation is frequently associated with higher charges for services. Higher prices in the absence of improved operating efficiency raise questions about whether combinations in the hospital industry are in the public interest.

Finally, managers of both MHSs and independent NFP hospitals may find this study of interest. System managers can gain insight into the potential financial benefits of expansion strategies via acquisition of freestanding NFP hospitals. Individual hospital managers can find answers to questions about the likely impact of acquisition upon their hospitals.

Limitations

The impact of acquisition upon the financial performance of acquired hospitals was examined. Since the level of analysis is at the hospital rather than system level, no conclusions can be drawn about the effects of merger on system performance. Another limitation is the focus on previously independent NFP hospitals acquired by MHSs. This research did not consider the consequences of acquisition on previously independent FP hospitals. Three additional limitations involve aspects of the research methodology including: (a) the research design, (b) the use of Medicare cost report data, and (c) financial ratio analysis.

First, a significant limitation of the research results from the use of a self-selected sample and nonequivalent control group design

(Campbell and Stanley, 1963). Clearly, study hospitals were self-selected in so far as they were facilities which sought system membership. In a true experimental design, subjects are randomly assigned from a common population to study and control groups (Campbell and Stanley, 1963). In the foregoing manner, pre-experimental sampling equivalence is assured. Unlike the true experimental design, the quasi-experimental design used here does not assure pre-experimental equivalence between study and control groups. A matching procedure was used instead in an effort to assure as much similarity as possible between groups. As a result, there were various threats to the internal and external validity of the study as discussed in Chapter 3.

A second limitation of the research design involves the measurement of financial performance for study and control hospitals in the two years immediately prior to acquisition and in 1984 and 1985. During the years between these pre- and post-acquisition measurements, financial performance is unmeasured. As a result, it is only possible to compare pre- to post-acquisition performance.

Another quasi-experimental design, the multiple time-series, is a stronger alternative to the above (Campbell and Stanley, 1963), but not feasible due to data unavailability and expense. The multiple time-series involves a study and control group with multiple observations leading up to the treatment (i.e., system acquisition) and following immediately thereafter. The multiple time-series allows examination of the slopes of regression lines for performance measures before and after treatment. In this manner, trends in financial

performance can be examined. Statistically significant improvement in performance measures associated with system membership may be suspect if trend analysis suggests these measures were improving prior to acquisition (i.e., if the slopes before and after were unchanged).

A further limitation of the research involves the use of Medicare cost report data. Medicare cost reports, while the best source of available information, were frequently unaudited. As a result, the data could misrepresent a hospital's financial status.

Financial ratios have limitations, as well. While ratios generally minimize the effects of inflation when comparisons are being made across different time periods, they are unable to perform this function when assets, which are recorded at historical cost, are used in the construction of the ratio. During periods of inflation, a bias results which must be considered in their interpretation.

Summary

Although system growth is slowing, this organizational form continues to be popular in the hospital industry. Pressured by third party payers, both governmental and private, hospitals are adapting to cost containment. System affiliation represents one such adaptation. This research sought to ascertain if MHSs were able to bestow upon member hospitals the theorized financial benefits of system affiliation. Further, inquiry was made into whether FP or NFP MHSs were more successful in improving the financial performance of member hospitals.

FP and NFP MHSs differ from one another in certain structural and

environmental respects. The average FP system is larger than the average NFP system; however, the average FP system hospital contains fewer beds. FP MHS hospitals and beds tend to be concentrated in a few large organizations, and the FP MHSs tend to select more favorable environments in terms of growth potential, insurance characteristics, population and regulations. In spite of these differences, recent national surveys show revenue growth among NFP systems exceeding that of the FP MHSs. Additionally, there is reason to believe FP and NFP MHSs are beginning to demonstrate similar financial trends.

In recent years, FP systems have acquired previously independent NFP hospitals. The following chapter reveals that these hospitals tended to be financially distressed. Some interesting questions follow from these observations. First, are systems able to positively impact the financial performance of their acquisitions? Secondly, does ownership status make a difference in performance?

Chapter 2 reviews the literature to provide a theoretical and empirical base for the proposed research. The theorized economic benefits of system affiliation are explored as well as theories regarding the behavior of FP and NFP organizations. Chapter 3 describes the research design and methods. Findings are reported in Chapter 4. Discussion and implications of the research follow in Chapter 5.

CHAPTER 2: LITERATURE REVIEW

Conceptual Framework

Merger is a highly complex and poorly understood phenomenon. Numerous and conflicting theories can be found to explain why organizations merge. Among these are economies of scale, technological advance, market control, pooling of human capital, managerial interest in growth, and a variety of lesser considerations (Bisbee, 1981). Zuckerman (1979) outlines economic, manpower, and organizational benefits to explain MHS growth. Ermann and Gabel (1986) believe "increasing financial pressure upon hospitals to remain solvent has stimulated the growth of multihospital systems" (p. 477).

Attention is confined here to the theorized economic and financial benefits of system membership on acquired hospitals. This section discusses the benefits, reviews one theory of the impact of merger on hospitals over time, and considers whether type of ownership (i.e., FP or NFP) can be expected to influence financial performance. The chapter concludes with a review of empirical research findings.

Economic Benefits

Production Efficiencies

In an early work, May (1971) outlined four theoretical

explanations for hospital mergers. These were selected to correspond with ideas in the general economics literature. Included were: (1) economies of scale, (2) market share, (3) complementarity among items in the product line, and (4) the structure of the market. The first three relate to production efficiencies. The latter refers to an organization's interest in reducing the competition between itself and others and relates to antitrust issues.

Economies of scale or, as they are alternately referred to, increasing returns to scale, are said to arise when, "a particular scale of physical plant produces a doubling of output which does not necessitate a doubling of every input" (May, 1971, p. 68). According to May, economies of scale result from increased utilization of excess capacity, quantity discounts available through mass purchasing, increased specialization, lowered cost of capital, and the statistical law of large numbers. The latter states that "if you observe a large sample from a given distribution, then variance will be smaller relative to the mean than it would be for a small sample" (May, 1971, p. 71). For merged hospitals this may mean less variation in occupancy, for example.

A change in market share resulting from merger allows an acquiring organization the opportunity to expand its delivery of services. If two hospitals which produce complementary services merge, the combined hospital may produce the services more efficiently since an increase in one service will result in an increase in the other.

It is apparent that many of the efficiency characteristics identified by May relate to mergers of geographically proximate

hospitals rather than widely dispersed systems. Another problem in the application of May's ideas to the present work is his definition of economies of scale. May's usage is rather broad. Further, economies of scale, by definition, should result in increased output. Mergers of the type discussed here (i.e., acquisitions by geographically dispersed MHSs) generally do not lead to such an outcome.

For the preceding reasons, the term production efficiencies rather than economies of scale provides the more appropriate description of potential benefits from MHS acquisition. These benefits may result from volume discounts, more efficient use of capital facilities and equipment, more efficient use of highly skilled personnel, utilization of more experienced management, better accounting methods as well as less costly and easier access to capital.

Access to Capital

MHS hospitals enjoy advantages over independent hospitals in securing capital financing. The primary benefit of systems with regard to capital financing is their decreased riskiness. "Systems (both tax-exempt and investor-owned) are perceived as sounder risks because of their larger revenue, asset and equity bases, and debt capacity" (Ermann and Gabel, 1986, p. 477). Investor-owned MHSs have the added advantage of being able to raise capital by issuing stock. While not exclusively a system benefit, Medicare's past practice of guaranteeing a rate of return on equity to FP hospitals gave FP MHSs an opportunity to raise more capital funds through profits (Ermann and

Gabel, 1986, p. 478). These advantages may be partially balanced by the NFP sector's access to financing through tax-exempt bonds.

Economic Impact of Merger Over Time

Cooney, Alexander, Beatzoglou, and Doody (1975) hypothesize that newly formed MHSs, after an immediate post-merger adjustment period, will reach a new state of economic equilibrium. At this new equilibrium position, average costs and prices for services will be relatively lower and output will be relatively higher than those of similar independent hospitals. Costs and prices may be relatively higher during the adjustment period. At the foundation of this theory are the theoretical benefits of lowered costs and increased output attributed to economies of scale. Prices are theorized to decrease as MHS hospitals pass savings on to consumers.

Increased costs during the adjustment period may arise from setup costs, internal personnel friction, and external adverse reaction. Setup costs can include legal and professional fees, any overpayment for assets, or the establishment of a corporate headquarters. Loss of productivity may result from interpersonal friction and various problems inherent in organizational change. Finally, a negative community reaction to merger may result in a costly decline in the consumption of services.

A similar adjustment period has been hypothesized for hospitals acquired by existing MHSs. Added costs may occur as a result of efforts to upgrade an acquired financially distressed institution.

While it is fairly clear that system benefits are likely to take

time to realize, there is less certainty about the length of the adjustment period. Cooney, Alexander, Beatzoglou, and Doody (1975) suggest that the period of adjustment may vary depending upon the particular circumstances surrounding mergers. While they provide no definitive guidelines about length of time, the implication is that economic benefits may take a "long time" to achieve. Johnson (1982a) reports that Hospital Corporation of America's figures indicate that up to five years are required to turn around a distressed institution and 18 months to raise a relatively healthy acquisition to a target level of profitability, which is an 18 percent pre-tax return on assets. Empirically, researchers have used as few as two years (Alexander and Lewis, 1984) and as long as seven (Treat, 1976) to examine the economic benefits of merger.

Theories of For-Profit and Not-For-Profit Behavior

Ownership Structures

Investor-owned corporations are established for the purpose of maximizing stockholders' wealth. The owners elect the organization's board of directors who, in turn, employ top management. Both the board and top management may hold considerable stock in the company.

The NFP corporation is organized differently. There are no owners or the organization is owned by members who are forbidden from sharing in surpluses from operations. Unlike the FP firm, the purpose of the NFP organization is generally not stated in terms of profitability. Instead, its mission may be couched in terms such as providing particular services or being responsive to community needs.

Nevertheless, the NFP organization cannot fulfill its mission without remaining economically viable.

Theories

Most theories developed to explain the behavior of FP and NFP organizations envision the FP form as more efficient than its NFP counterpart. However, as will be shown, there may be ample reasons to expect few differences between NFP and FP hospitals.

Property Rights Theory. This is the dominant theoretical model used to predict differences in economic performance between FP and NFP firms. Under conditions present in a competitive market, property rights theory suggests FP firms will behave in an economically efficient fashion. As described by Register, Sharp, and Bivin (1985), this result derives from the owner's exclusive residual claim to the net revenues of the organization. To ensure that the management operates the firm in an economically efficient profit-maximizing manner, the for-profit owner may extend a partial residual claim to the appointed manager. In the NFP organization, no such mechanism is present. No individual can augment personal income through efficient operation. Consequently, property rights theory predicts the NFP organization will diverge from strict profit maximization.

Unfortunately, property rights theory gives no guidelines to predict the particular form the behavior of NFP organizations will take. To fill this gap a number of theories of NFP hospital behavior have been advanced.

The Not-For-Profit Hospital as a Physicians' Cooperative. The critical assumptions of this model advanced by Pauly and Redisch (1973) are that the physician staff members control hospital operations and assure that the hospital produces services in a manner which maximizes their joint incomes. This model suggests the physician is the "traditional income maximizing economic agent who is 'discovered' in a decision-making role within this not-for-profit enterprise" (p. 211). Under the physicians' cooperative model, quality consciousness can be explained as a synonym for "application of nonphysician labor and capital in physician-income-enhancing ways" (p. 222). Inefficiencies arise because the physicians have little incentive to restrain hospital cost increases.

Not-For-Profits Maximize Quality And Quantity. This model proposed by Newhouse (1970) is based on considerations of the self-interests of the administrators whose performances are assumed to be judged by the prestige of the institution in which they serve. According to the model, administrators attempt to maximize both quantity and quality of services subject to a budget constraint. Inefficiencies arise because the decision-maker chooses a point on the quantity-quality tradeoff curve which is optimal for him but not necessarily socially optimal. That is, the administrator may produce higher quality, defined by Newhouse as more expensive, care than would be produced in a competitive market where consumers make informed decisions.

A somewhat similar theory has been advanced by Reder (1965). He suggests NFP community hospitals "tend to be run as though their

objective was to maximize the weighted number of patients treated (per time period), the 'weights' being the professional prestige of the doctors attending them" (p.480).

A Conspicuous Production Theory. Lee (1971) proposed a model which also suggests that administrators attempt to maximize their own utility. The theory assumes "the utility of hospital administrators is a function of the status of the hospitals in which they serve" (p. 200). The status of the hospital is further assumed "to vary directly with the range of services available and the extent to which expensive and highly specialized equipment and personnel (including M.D.'s) are available" (p. 200).

Lee outlines two results, suggesting inefficiencies, which follow from the conspicuous production model. First, inputs of higher quality than those warranted by production requirements can be expected. Secondly, undue duplication of services, over equipment, and over hiring of staff are predicted.

Not-For-Profits Maximize Cash Flow. Karen Davis (1972), in a model more closely resembling the profit-maximizing model, suggests that the NFP hospital maximizes the difference between revenue and out-of-pocket expenses. These expenses include operating expenses other than depreciation expenses. The cash-flow maximizing hospital is expected to minimize the short-run cost of producing output. The primary distinction between this model and a profit maximizing model is that the quantity of capital services used does not depend "upon a minimum cost criteria, but upon the availability of funds in the past

(including philanthropy, government grants and retained earnings)" (p. 4).

Implications of Environmental Influences

Each of the theories reviewed above attempts to describe the behavior of hospitals based upon the internal organizational characteristics of the institution (i.e., ownership form). While these characteristics no doubt influence the organization's behavior, there may be problems with the application of theories which fail to account for the influence of the external environment or make erroneous assumptions about the environment.

Property rights theory, for example, predicts organizations will behave in an economically efficient fashion in competitive markets. Perfectly competitive markets are assumed to arise under conditions wherein,

> consumers and producers have perfect knowledge; there are large numbers of buyers and sellers in the market; each seller's goods are perfect substitutes for all other seller's goods; and a change in the quantity of goods available doesn't create market power for either buyers or sellers. (Langwell and Moore, 1982, p. 2)

Asymmetric information and barriers to entry suggest that profit-maximizing organizations may not operate efficiently in the hospital industry (Profits and health care: an introduction to the issues, 1986).

An argument can also be made that the distinctions between

organizational ownership types have begun to break down (Profits and health care: an introduction to the issues, 1986). At least ten factors have been identified which influence the breakdown. Four are of importance to this discussion. First, few differences in sources of capital exist today. Charitable donations and government grants to NFP hospitals have been severely limited. Both NFP and FP hospitals obtain most of their capital from retained earnings and debt. With less philanthropy, NFPs have less cushion from competitive pressures. Second, the prohibition against distribution of profits by NFP hospitals is breaking down as legal ways are found to develop incentive plans which differ little from profit-sharing plans. Third, strong values affect the behavior of health care organizations and "may attenuate ownership-related differences" (Profits and health care: an introduction to the issues, 1986, p. 10). Finally, both ownership forms are subject to economic pressures.

With regard to the latter, many believe differences between FP and NFP systems will decrease due to recent changes in the reimbursement environment. Since 1984 Medicare has been reimbursing hospitals on a prospective basis. Other insurance plans have followed Medicare's lead. Price consciousness on the part of employers has increased, as well. As predicted by one NFP CEO, "We are going to see more similarities than differences between the investor-owned and the not-for-profit systems in many areas, and I think that will be the case in both operational and capital financing" (Wegmiller, 1983, p. 49).

Researchers who have studied the financial performance of systems

using data from the era of cost-based reimbursement suggest the changed reimbursement environment warrants continuing evaluation. Renn, Schramm, Watt, and Derzon (1985), for example, state,

> there is the possibility that the economies of scale and production efficiencies promised by theory from the consolidation of hospitals into multi-institutional systems, regardless of ownership, may be achieved in the face of stronger incentives. (p. 233)

All hospitals face an increasingly hostile environment which includes greater competition from other hospitals as well as substitutes, pressure for cost containment, threats of corporate take-over, and issues of legitimacy. Those pressures are likely to overshadow the influence of ownership form. As a result, it is expected that recent data will reveal few differences between the performance of hospitals associated with NFP and FP MHSs.

Review of the Empirical Literature

Eight studies have explicitly examined the financial performance of system affiliated hospitals through the use of financial ratios. Three dealt with the effects of a particular type of system affiliation, contract-management. Two examined hospitals fully owned by systems, and the remaining three considered a variety of forms of MHS affiliation.

This portion of the chapter examines studies which have made contributions to our current understanding of the impact of system affiliation on the financial performance of acquired hospitals. No

effort has been made to be comprehensive in reporting the findings of each study. Instead, findings relevant to the present research are reported and discussed.

The review of the research literature serves two purposes. First, it provides an empirical foundation for the research design and methods presented in Chapter 3. Second, the literature review provides a means of linking the current study with previous research. To accomplish these objectives, the research is grouped by method (i.e. univariate or multivariate analysis) and explored. A summary and discussion of the adequacy of the research methods are presented at the conclusion of each section. Appendix A contains information about the sample, data sources, methods, and findings of each study. With the exception of one, all of the studies reviewed use data from 1982 or before.

Univariate Research

Cross-sectional Studies

Levitz and Brooke (1985), in a study of all short-term, acute care, nongovernment hospitals in the state of Iowa, studied the financial performance of system hospitals in comparison with independent hospitals. A sample of 94 hospitals, 1981 data, and t-tests were employed.

After testing for differences between contract-managed and syster owned hospitals, Levitz and Brooke concluded the two were sufficientl similar to warrant combination for purposes of analysis. Statistically significant results revealed several differences between

system and independent hospitals, however. System affiliated hospitals used greater debt leverage and enjoyed higher measures of operating profitability than independent hospitals. On measures of overall profitability, no statistically significant differences were found. The superior operating profitability of systems appeared to result from the aggressive pricing policies of the MHS hospitals. They marked up prices over expenses significantly higher than the independent hospitals but also had significantly higher deductibles. No differences were observed in liquidity or the efficient use of assets.

In another study using the population of all AHA member hospitals and 1981 AHA data, Coyne (1985a) examined the relative capital structure and profitability of system and independent hospitals. Differences in median measures were examined by ownership (i.e., for-profit, church operated, and other not-for-profit) and system affiliation. While no tests of statistical significance were conducted, Coyne's findings support other research indicating that MHS hospitals, particularly the investor-owned, used greater debt leverage and were more profitable than independent hospitals.

In a study using more recent data, McCue and Lynch (1987) examined parent, or lead, hospitals of 56 small systems and a matched set of 56 independent hospitals. Differences in the average financial performance of MHS and independent hospitals were examined by ownership category. Few statistically significant differences were found. For example, only secular NFP MHS hospitals were found to use more debt than their independent counterparts. They were also

significantly less profitable. In results not published, MHS hospitals were found to differ little by ownership. While this may have resulted partially from the small sample sizes, the finding lends support to the argument that FP and NFP MHS hospitals, in a more price conscious reimbursement environment, are likely to be similar rather than different.

Longitudinal Studies

Wheeler, Zuckerman, and Aderholdt (1982) used a time-series quasi-experimental design to examine the financial performance of FP and NFP hospitals under contract with a single NFP MHS. Data for three pre-contract years and three years during contract-management were taken on each hospital. Differences in average performance before and during contract-management were tested using t-tests. A similar procedure was used to examine the rates of change of profitability indicators before and after contract-management.

Contract-managed hospitals demonstrated a statistically significant improvement in profitability which the researchers believed resulted from increasing revenues and controlling the rate of increase in expenses. Expenses per discharge increased but proportionately less so than revenues per discharge. While statistically significant increases in price and the efficiency with which fixed assets were employed (i.e. fixed asset turnover ratio) were observed, the researchers were reluctant to attribute these effects to contract-management since upward trends were apparent in the variables prior to the introduction of external management. Debt

financing expanded under contract-management, but the difference was not statistically significant. No statistically significant changes in liquidity were observed, but contract-managed hospitals tended to decrease their liquid assets to a level more closely resembling industry standards.

Kralewski, Dowd, Pitt, and Biggs (1984) also used a time-series design to measure the financial effects of contract-management on participating hospitals. Observations for this study were taken in each of the three years prior to the initiation of contract-management and in each of the three years after the contract was in effect. Differences in the average performance for the first and second three year periods were calculated for each hospital and then averaged by group (i.e. contract-managed and non-contract-managed hospitals). Average differences were compared through the use of t-tests. Rates of change were calculated using ordinary least squares regression and average differences between the two groups were tested in an analogous fashion.

The primary finding of this research was that contract-managed hospitals tended to price services higher after the initiation of external management. The result was a significant improvement in profitability. Profitability increased in spite of the fact that not all of the increased billings were collected. This was reflected in a decline among contract-managed hospitals in the percent of gross patient revenues collected while non-contract-managed hospitals remained relatively stable on this measure. Each of the reported results was statistically significant.

Summary

The most consistent findings from the univariate studies suggest system affiliation is associated with higher prices, improved profitability, and greater use of debt. While these results support the theory that system hospitals benefit from improved access to debt capital, no support is found for the position that systems benefit their members through production efficiencies. Instead, the studies suggest that systems improve their operating profitability by charging higher prices.

Several problems are apparent in the research methods used to gain the above results. First, the Wheeler, Zuckerman, and Aderholdt (1982) study examined only one group, contract-managed hospitals. Since no control group was used, restraint must be exercised in attributing the observed effects to contract management. Findings may reflect little more than national trends in hospital performance. Second, cross-sectional research designs were used in three of the studies. Such designs are limited in at least two major respects. Cross-sectional samples may include hospitals affiliated with systems for varying lengths of time. To the extent that length of MHS association affects financial performance, inclusion of newly or recently acquired hospitals may result in confounded or insignificant results. Further, a cross-sectional sample of hospitals gives little information about the effects of system affiliation on member hospitals. Observed differences may be due to selection bias rather than system influence. Longitudinal designs overcome these

problems; however, the use of univariate statistics is a limiting factor in both types of studies.

One problem of univariate statistics occurs when a large number of measures are tested individually for statistical significance and only a few differences are found. These differences may be "nothing more than statistical artifacts attributable to simple random variation" (Johnson and Meinster, 1973, p. 59)—that is, the probability of having tests "indicate a significant difference due to nothing but chance increases rapidly as the number of tests increases" (p. 59). This phenomenon may account for the statistically significant differences found in the McCue and Lynch (1987) study in which 60 t-tests were conducted with only four significant findings.

Another problem with relying on univariate analysis is that performance measures may not be independent of one another. As Johnson and Meinster (1973) point out,

> Significance testing is complicated by two related problems: (1) Some of the performance measures might be highly correlated with one another and (2) some measures might act differently in combination than they would if tested separately. The fact that some of the measures interact upon each other, altering the total effect upon overall performance cannot be detected or accounted for in a univariate analysis. (p. 60)

Multivariate analysis is useful for the preceding reasons.

Multivariate Research

Studies

Two studies (Alexander and Lewis, 1984; Renn et. al., 1985) used multiple regression analysis to measure the effects of ownership and system affiliation on hospital financial performance while controlling for other relevant hospital and environmental variables. A third (McCue and Furst, 1986) profiled the financial characteristics of independent NFP hospitals acquired by the FP MHSs.

Using a large sample and a randomly selected comparison group, Alexander and Lewis (1984) sought to identify the financial characteristics that different MHS ownership types emphasize as part of their general operating and acquisition strategies. To compensate for a lack of longitudinal data, these researchers identified and studied cohorts of hospitals under contract in 1980 for less than two years and greater than two years.

Their statistically significant findings revealed that only FP contract-managed hospitals demonstrated an improvement over non-contract-managed hospitals on measures of efficiency in the use of assets (i.e. fixed asset and total asset turnover ratios). Contract-managed hospitals, particularly those managed by FP companies, used greater debt financing than their traditionally managed counterparts. Regardless of their tenure with management companies, contract-managed hospitals had lower liquidity measures than the comparison group. There were few differences in profitability between contract-managed and non-contract-managed hospitals; however, newly NFP managed

hospitals demonstrated significantly lower profitability and old FP managed hospitals showed significantly higher markups of prices over expenses than non-contract-managed hospitals.

Collectively, these findings suggest that the primary differences between contract-managed and traditionally managed hospitals were in the areas of debt financing and liquidity. However, the latter may reflect more of a predisposition of hospitals with low liquidity toward contract-management than an effect of contract-management. Findings in the areas of efficiency and profitability suggest slight differences between the performance of contract-managed and traditionally managed hospitals.

Renn, Schramm, Watt, and Derzon (1985) also used a large sample and multiple regression analysis to examine the effects of system affiliation and ownership on measures of hospital economic performance. Using 1980 data, their statistically significant findings support other research and identify some ownership related differences observable during the years of cost-based reimbursement.

Investor-owned MHS hospitals were found to earn significantly more revenue from patient services than either independent NFP or MHS NFP hospitals. This was due largely to aggressive pricing. In spite of proportionately lower nonoperating revenues than either of the two reference groups and higher deductibles on revenues from patient care, FP MHS hospitals still managed to be more profitable. Revenues to total assets were higher for both FP and NFP MHS hospitals relevant to independent NFP hospitals, and this measure was higher for FP MHS hospitals relevant to NFP MHS hospitals. With regard to capital

structure, FP MHS hospitals were found to rely more heavily on debt financing than either NFP group.

In a study which differed from previous work, McCue and Furst (1986) profiled the financial characteristics of hospitals acquired by the investor-owned chains from 1978 to 1983. These researchers used factor analysis and logistic regression to measure the relative importance of liquidity, capital structure, age of physical plant, profitability, patient mix, and bed size in predicting FP MHS-acquisition. Statistically significant findings revealed hospitals purchased by the FP chains during the specified time period tended to be smaller and to have lower profitability, relatively older and more depreciated assets, and proportionately greater amounts of debt than non-acquired hospitals.

Summary

Findings from the multivariate studies confirm the univariate conclusion that system affiliation is primarily associated with greater profitability, higher prices, and greater use of debt. Multiple regression analysis offers benefits over univariate methods by allowing researchers to examine performance measures while statistically controlling for relevant hospital and environmental variables known to affect financial performance. The result is more confidence in the findings.

Summary

Through a review of both the theoretical and empirical literature,

this chapter establishes a conceptual framework for investigation into the effects of system membership on hospital financial performance. The theoretical literature suggests that, although costs may increase immediately after acquisition, production efficiencies and improved access to capital are benefits which should accrue to MHS members in the longrun. A number of theories suggest performance may vary by ownership; however, the argument has been made that recent environmental pressures toward cost containment are likely to overshadow the importance of ownership in determining financial performance. Furthermore, property rights theory, which suggests FP organizations are more efficient, may not be directly applicable to the hospital industry.

Although the empirical studies provide little evidence to confirm the realization of production efficiencies, findings suggest system hospitals tend to rely more heavily on debt than independent hospitals. The most consistent finding, however, suggests that MHS hospitals tend to be more profitable in the production of patient services due largely to aggressive pricing.

McCue and Furst (1986) established that NFP hospitals acquired by the FP chains during the period from 1978 to 1983 tended to be financially distressed. Although similar financial characteristics are suspected in the cases of independent NFP hospitals acquired by the NFP MHSs (Ermann and Gabel, 1984), no similar empirical findings exist.

With the exception of one, all of the studies of MHS hospital financial performance used data from 1982 or before. To date, no

study has looked longitudinally at the performance of acquired hospitals including the more cost-conscious period since 1984. At least two interesting questions present themselves. Are MHSs able to bestow upon financially distressed acquisitions the benefits promised by theory? Further, are either FP or NFP MHSs more successful in realizing the theorized benefits of system membership?

On the basis of the literature review, it was hypothesized that MHS-acquired hospitals would realize production efficiencies and improved access to capital. These benefits would be reflected in their balance sheet and income statement accounts following a minimal adjustment period of at least two years.

While the theoretical literature suggests otherwise, no differences were expected in the performance of FP MHS-acquired and NFP MHS-acquired hospitals. This hypothesis followed largely from the observations of industry observers who believe the performances of FP and NFP hospitals are becoming similar in the increasingly competitive and cost-conscious period of the mid-1980s.

Chapter three outlines the analytical procedures used to test the preceding hypotheses. In accordance with previous research, investigation was made into the financial performance of MHS hospitals relative to independent hospitals in the areas of liquidity (i.e., the ability to meet short-term maturing obligations), financial activity (i.e., the efficiency with which assets are employed), capital structure (i.e., relative levels of debt and equity financing), and profitability. Higher liquidity, financial activity and profitability were expected in MHS hospitals, as well as increased levels of debt.

CHAPTER 3: RESEARCH DESIGN

Overview

This chapter describes the analytical methods used to examine the effects of MHS membership on hospital financial performance. It presents the research design, sample selection, and construction of performance measures. Statistical methods for testing the research hypotheses are outlined.

Research Design

A quasi-experimental design was used to study the effects of MHS membership on hospital financial performance. Although true experimental control (i.e., random selection and exposure to "treatments") was not possible, some measure of control was gained by assessing the performance of study hospitals in comparison to that of matched controls. The quasi-experimental design used is a variation of Campbell and Stanley's (1963) "nonequivalent control group design." This is frequently represented by:

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O     X     O
-------------- ,
O           O
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where "O" represents measurement and "X" represents the exposure of a group to an experimental variable or event. The dashed line is

intended to convey the information that groups are not equated by randomization.

The variation used in the present study was:

$$\begin{array}{ccccc} O_1 & O_2 & X & O_3 & O_4 \\ \hline O_1 & O_2 & & O_3 & O_4 \end{array} .$$

Financial performance was measured in each of two years immediately prior to acquisition; these are "O_1" and "O_2". "X" indicates MHS acquisition. There was a gap of at least two years between system acquisition and the post-test financial performance measurements, "O_3" and "O_4". Post-test data came from 1984 and 1985; data for matched control hospitals came from comparable points in time. The gap between pre- and post-testing was necessary to allow hospitals time to realize the hypothesized benefits of system membership. Comparisons were made between average pre- and post-acquisition financial performance.[1]

The control group is considered "nonequivalent" because randomization is the procedure used to ensure "pretreatment equality of groups, within known statistical limits" (Campbell and Stanley,

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[1]Although another quasi-experimental design, the multiple time-series, is a stronger alternative to the design utilized here, the expense and inaccessibility of data rendered that option impractical. The multiple time-series design involves an experimental and control group with multiple observations leading up to the treatment and following immediately thereafter. This design allows examination of the slopes of regression lines for performance measures before and after treatment. In this manner, trends in financial performance can be examined. Statistically significant improvement in performance measures associated with system membership may be suspect if trend analysis suggests these measures were improving prior to acquisition (i.e., if the slopes before and after are unchanged).

1963, p. 6). It is readily apparent that random selection and assignment to treatment groups (i.e., acquired or nonacquired) was not possible in this natural experiment. Matching, with its inevitable limitations, had to suffice.

One potential problem with a matched study design is that the pre-test means of the two groups may differ substantially. When this occurs, it represents the failure of matching to provide the intended equality. Furthermore, as discussed by Campbell and Stanley (1963), unwanted regression effects are virtually assured under those circumstances. That is, the two groups tend to differ on their post-test scores independently of any effects of "X" (in this case, acquisition). The result is a threat to internal validity, as discussed below. For the preceding reasons, it was important to test the equality of pre-test financial measures for study and control groups.

More broadly, weaknesses of the nonequivalent control group design threatened both internal and external validity. Internal validity makes it possible to answer the basic question, "Did the experimental treatment make a difference in the specific instance under study?" External validity deals with the generalizability of findings.

A significant threat to the internal validity of the matched study design resulted from the self-selection of hospitals into the acquired group. Because acquired hospitals were not randomly assigned to system membership and because they probably deliberately sought membership, the assumption of uniform regression between study and control groups was questionable. Selection biases and maturation

could interact to produce differences which were independent of system membership. That is, acquired hospitals could differ from matched hospitals in such a manner that they could be expected to change in different ways over time regardless of system effects.

Furthermore, external validity was threatened by the interaction of selection biases and acquisition. Thus the observed effects of acquisition may be specific to this particular group of hospitals and matches. As a result, findings are not readily generalizable beyond the immediate study sample.

In spite of these limitations, the nonequivalent control group design provided useful information. Most importantly, it controlled for the effects of history or specific events occurring between the first and second sets of measurements in addition to acquisition.

Data Base and Sources

The data base was derived from financial, hospital and market information collected for selected NFP, short-term general medical/surgical hospitals acquired by either FP or NFP MHSs, and for matched independent NFP hospitals. Financial data for two years before purchase and for the system affiliation years of 1984 and 1985 were obtained for each acquisition. Similar data were obtained for independent hospitals in the same years as their matches.

Hospital and market data were used to match acquired and independent hospitals. Balance sheet and income statement information was used to construct twenty-one financial ratios measuring liquidity, capital structure, financial activity, profitability, and age of the

physical plant.

The primary sources of data were the 2552 Medicare Cost Reports which were collected from the Medicare fiscal intermediaries for each hospital included in the study. Financial data from the Medicare Cost Reports were augmented with descriptive data from the American Hospital Association Guide issues (1979; 1980; 1981; 1982; 1983; 1985; and 1986).

Sampling

General Procedure

The geographic region from which hospitals were selected includes Alabama, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, and Texas. The study was limited to the southern region of the United States due to the large number of acquisitions which occurred there, particularly among the FP MHSs, between 1978 and 1982. Confining the study to the Southern region also made it possible to follow-up the McCue and Furst (1986) research which identified hospitals acquired by FP MHSs as financially distressed.

Although the McCue and Furst study (1986) included seven hospitals acquired in 1983, only hospitals acquired before or during 1982 were examined here. This restriction was necessary in order to provide minimal time for hospitals to realize the benefits of system affiliation (i.e., at least two years).

To prevent empirical test bias as a result of regulatory environment, size, ownership, and market characteristics, hospitals

were matched in each of these areas. Matching variables were selected on the basis of their acknowledged or theorized importance in affecting the financial performance of hospitals, and their extensive use in other matched sample studies (Biggs, Kralewski, and Brown, 1980; Kralewski et al., 1984; Lewin, Derzon, and Rhea, 1981; Treat, 1976; McCue and Lynch, 1987). Matching permitted the control of variables thought to influence financial performance. It also minimized the effects of variables extraneous to the purposes of the study.

For example, states vary in the degree of regulation imposed upon hospitals, as well as in general economic environment. Matching acquired hospitals with nonacquired hospitals from the same state prevented any variation in financial performance due to state characteristics rather than system effects. Similar variations occur with respect to population base; rural and metropolitan areas may differ in demand for hospital services and in the amount of competition present. Thus it was important to match hospitals with similar community population characteristics.

The theorized differences between ownership forms have been discussed at length. In the absence of any definitive findings about ownership differences in the current competitive market, acquired hospitals were matched with control hospitals on the basis of pre-acquisition ownership.

Although the argument has been made that size is unimportant when financial ratios are used because ratios "adjust for size through measuring one account relative to another" (Coyne, 1985b, p. 52),

organizations of varying bed sizes may have different characteristics. Larger organizations may realize some economies of scale which could affect earnings and margin ratios. This phenomenon has been observed in banking studies (Johnson and Meinster, 1973; Fischer, 1961). For that reason, hospitals were matched on the basis of bed size.

Because financial ratios are measures of accounts relative to one another, they tend to adjust for the effects of inflation. The exception occurs when assets, valued at historical costs, are used to construct the ratio (Finkler, 1982). Using data for study and control hospitals from the same years also helped control for the effects of inflation between groups. Although the years for which data were gathered varied between pairs, within pairs they were the same.

Selection of Hospitals

Independent NFP hospitals acquired by FP and NFP MHSs between the years 1978 and 1982 in the ten Southern states specified earlier were identified in two ways. First, the McCue and Furst (1986) research provided a ready means of identifying NFP hospitals acquired by FP MHSs. The primary strategy used by these researchers to compile their list of acquired hospitals was a review of the "Under New Management" section of Modern Healthcare. This column has been a regular feature since 1979 and contains information about FP MHS-acquired hospitals.

Since acquisitions by NFP MHSs are not included in Modern Healthcare's column, a second procedure had to be found to identify hospitals which became part of NFP systems before 1982. The Directory of Multihospital Systems (First through Fourth Editions) was used.

Unfortunately, the first year of publication for the Directory of Multihospital Systems was 1980, so its earliest data is from 1979. As a result, it was possible to identify only the hospitals which were added to NFP MHSs from 1980 forward. Each edition of the directory was consulted to identify hospitals newly added to the NFP MHSs in the ten state region under consideration.

From the list of acquired hospitals and acquiring systems compiled in those two ways, only previously independent NFP hospitals were retained for study. Hospitals which were purchased by one system from another were not included. Further, only short-term general medical/surgical hospitals were included.

To avoid any bias which could have occurred as a result of using different sources to identify the acquisition years for hospitals incorporated into the two different types of MHSs (i.e. FP and NFP), those dates were established in the same way for both groups. In each case, the year of acquisition was established by noting when the hospital was first listed as a system member in the Directory of Multihospital Systems. For example, if a hospital was listed as a system member in the 1981 edition (i.e. 1980 data) but not the 1980 edition (i.e. 1979 data), the year of acquisition was taken to be 1980. For hospitals from the McCue and Furst (1986) study which were acquired prior to 1980, the date of acquisition was identified as the year in which ownership changed from NFP to FP as reported in the AHA Guide to the Health Care Field. McCue and Furst used that selection method for identifying acquisitions occurring before the "Under New Management" column appeared in Modern Healthcare.

Once the date of acquisition and the acquiring institution were identified for each potential study hospital, one further step was taken to define the study group. To assure that the experience of acquired hospitals could be traced over the study period and to be certain that the study hospitals were in a position to reap system benefits, only hospitals which remained in the original acquiring system through 1985 were retained for study. Divested hospitals were not retained. Because a certain amount of turbulence is likely when systems are acquired by other systems, potential study hospitals involved in such changes were excluded. This was considered necessary since the turbulence surrounding corporate absorptions of this nature might delay the realization of system benefits.

Of the 43 hospitals identified by McCue and Furst (1986) as acquired by FP MHSs between the years 1978 and 1982, 31 were suitable for analysis by the above criteria. An additional 15 NFP MHS-acquired hospitals were identified for study. The final sample consisted of 29 hospitals acquired by the FP MHSs, 13 acquired by the NFP MHSs, and their respective matches. Four hospitals, two acquired by the FP MHSs and two acquired by the NFP MHSs, were dropped due to the unavailability of minimal data: one Georgia and one Louisiana hospital from the FP MHS group, two Texas hospitals from the NFP MHS group.

Acquired hospitals were paired with independent short term general medical/surgical hospitals on the matching variables of state, ownership, bed size, population, and time. Independent facilities had to have been independent throughout the study period. Hospitals were

matched on the basis of data taken from the year of acquisition. An effort was made to match an acquired hospital with an independent hospital whose bed size was within an interval of plus or minus 50 beds of the acquired hospital's size. According to the procedure used by the AHA on their 1982 Survey data tape, standard metropolitan statistical area (SMSA) size was categorized into 7 groupings: (1) nonmetropolitan areas, (2) 50,000 to 100,000 population, (3) 100,000 to 250,000, (4) 250,000 to 500,000, (5) 500,000 to 1,000,000, (6) 1,000,000 to 2,500,000, and (7) over 2,500,000. A hospital categorized in a particular SMSA group was matched, whenever possible, with an independent hospital in the same category or one category larger or smaller. Matching variables were prioritized as follows: (1) state, (2) ownership, (3) bed size, and (4) population base.

In all cases, matches for acquired hospitals were found in the same state and ownership categories: acquired government hospitals were matched with government hospitals which remained NFP; acquired church and other NFP hospitals were matched with independent hospitals in similar ownership categories. Table 5 identifies the initial ownership of acquired facilities.

Tables 6 and 7 show the success encountered in matching acquired hospitals on the basis of bed size. The average bed sizes of the FP and NFP MHS groups were similar to those of the matched groups and similar to one another (Table 6). On average, FP and NFP MHS-acquired hospitals had four fewer beds than their matches, with a standard deviation of 26 and 21, respectively (Table 7). This suggests good success in matching on the basis of bed size. In no

TABLE 5: Pre-acquisition Ownership of Hospitals

Ownership Type	Acquiring System	
	FP MHS	NFP MHS
Government	19	10
Church	1	1
Secular	9	2

TABLE 6: Average Bed Size of Sample Hospitals in the Year of Acquisition

	FP Acquired	Matched Independent	NFP Acquired	Matched Independent
Average	112	116	120	123
(number)	(29)	(29)	(13)	(13)

TABLE 7: Difference in Bed Size between Acquired Hospitals and their Matches (Acquired minus Nonacquired)

	FP	NFP
Average	-4	-4
Standard Deviation	26	21
Minimum	-72	-33
Maximum	63	52

case did a FP MHS hospital exceed its match by more than 63 beds, or have fewer than 72 beds. NFP MHS hospitals never exceeded their matches by more than 52 beds or had less than 33 beds.

Hospitals were matched on the basis of population base as previously specified, with only three deviations from the rule. In one case, the best match found for an acquired hospital was two SMSA groupings away from that of the acquired hospital. In two other cases, the best match was three SMSA groupings away. Table 8 gives information about the population characteristics of communities where acquired and nonacquired hospitals are located.

One further step was taken, to assure as much as possible, that independent hospitals were not associated with MHSs through contract management. Although the American Hospital Association's computer tapes of the Annual Survey of Hospitals were not available for all years of the study period, the results of the 1982 and 1984 surveys were available. These tapes were consulted, and no hospital was used as a match if the data on the tapes indicated the hospital was under contract management in those years.

Performance Measures

Financial performance was measured through the use of financial ratios. Ratio analysis focuses attention on critical relationships between components of income statements and balance sheets. There is no universally accepted single measure of financial performance, nor an agreed upon relative ranking of performance measures. Instead, there are four generally recognized dimensions of financial

Table 8: Numbers of Hospitals in each Standard Metropolitan Statistical Area (SMSA) Size Group

	SMSA Size *							
	1	2	3	4	5	6	7	Total
FP MHS-Acquired	19		3	3	2	2		29
Matched Independents	21		3	3	1	1		29
NFP MHS-Acquired	8			1		1	3	13
Matched Independents	8			1	1	1	2	13

* 1 = Nonmetropolitan or rural areas
2 = 50,000 - 100,000 population
3 = 100,000 - 250,000
4 = 250,000 - 500,000
5 = 500,000 - 1,000,000
6 = 1,000,000 - 2,500,000
7 = over 2,500,000

performance: liquidity, capital structure, financial activity, and profitability. An additional dimension of interest is the average age of the physical plant. Measures from each dimension provide different critical information.

Indicators used in this research were adapted from the Healthcare Financial Management Association (Cleverley, 1985). Its measures are standards in the field. Formulas for financial indicators are given in Table 9.

Liquidity refers to an organization's ability to meet its short-term maturing obligations. Payrolls, suppliers' bills, and payments to creditors are examples of day-to-day obligations that a financially healthy organization should be able to pay through cash or assets that can be quickly converted to cash. Measures of liquidity used here included the current (CURRENT), quick (QUICK), and acid (ACID) ratios, as well as measures of the number of days accounts were outstanding (DAYSAR), the length of time hospitals took to pay their bills (AVPAY), and the amount of cash available daily (DAYCASH).[2] Favorable improvement in liquidity is measured through increased CURRENT, QUICK, ACID, and DAYCASH ratios and decreased DAYSAR and AVPAY ratios.

Capital structure ratios describe the relative levels of debt and equity financing employed by the institution. These indicators are reviewed by long-term creditors before they extend credit. Measures used were cash flow to service debt (CASHDEBT), as well as indicators

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[2]Formulas for DAYSAR, AVPAY, and DAYCASH are given for hospitals with fiscal years of 365 days. In the few cases in which hospitals reported data for fiscal years with fewer days, the actual number of days is substituted for 365. No fiscal years were less than nine months.

Table 9: Measures of Hospital Financial Performance

Measure of Financial Performance	Definition	Variable Name
LIQUIDITY		
Current Ratio	$\frac{\text{Current Assets}}{\text{Current Liabilities}}$	CURRENT
Quick Ratio	$\frac{\text{Marketable Cash + Securities + Accounts Receivable}}{\text{Current Liabilities}}$	QUICK
Acid Test Ratio	$\frac{\text{Cash + Marketable Securities}}{\text{Current Liabilities}}$	ACID
Days in Accounts Receivable	$\frac{\text{Net Patient Accounts Receivable}}{\frac{\text{Net Patient Service Revenue}}{365}}$	DAYSAR
Average Payment Period	$\frac{\text{Current Liabilities}}{\frac{\text{Operating Expenses - Depreciation}}{365}}$	AVPAY
Days Cash on Hand	$\frac{\text{Cash + Marketable Securities}}{\frac{\text{Operating Expenses - Depreciation}}{365}}$	DAYCASH
CAPITAL STRUCTURE		
Cash Flow to Total Debt	$\frac{\text{Excess of Revenues Over Expenses + Depreciation}}{\text{Current Liabilities + Longterm Debt}}$	CASHDEBT
Equity Financing Ratio	$\frac{\text{Fund Balance}}{\text{Total Assets}}$	FBTA
Total Debt to Equity	$\frac{\text{Total Liabilities}}{\text{Fund Balance}}$	TDFB
Longterm Debt to Equity	$\frac{\text{Longterm Liabilities}}{\text{Fund Balance}}$	LTDFB
Longterm Debt to Net Fixed Assets	$\frac{\text{Longterm Liabilities}}{\text{Fixed Assets}}$	LTDFA

Table 9: Measures of Hospital Financial Performance (cont.)

Measure of Financial Performance	Definition	Variable Name
Financial Activity		
Current Asset Turnover	$\frac{\text{Total Operating Revenue}}{\text{Current Assets}}$	CATURN
Fixed Asset Turnover	$\frac{\text{Total Operating Revenue}}{\text{Net Fixed Assets}}$	FATURN
Total Asset Turnover	$\frac{\text{Total Operating Revenue}}{\text{Total Assets}}$	TATURN
PROFITABILITY		
Markup	$\frac{\text{Net Patient Service Revenue} + \text{Other Operating Revenue}}{\text{Operating Expenses}}$	MARKUP
Nonoperating Revenue	$\frac{\text{Nonoperating Revenue}}{\text{Operating Revenue}}$	NONOPREV
Return on Equity	$\frac{\text{Excess of Revenues over Expenses}}{\text{Fund Balance}}$	ROE
Return on Assets	$\frac{\text{Excess of Revenues over Expenses}}{\text{Total Assets}}$	ROA
Operating Margin	$\frac{\text{Total Operating Revenue} - \text{Operating Expenses}}{\text{Total Operating Revenue}}$	OPMARG
Deductible	$\frac{\text{Deductions}}{\text{Gross Patient Service Revenue}}$	DEDUCT
Age		
Average Age of Plant	$\frac{\text{Accumulated Depreciation}}{\text{Depreciation Expense}}$	AGE

of equity financing (FBTA) and debt financing (TDFB, LTDFB, and LTDFA)[3]. Greater debt utilization is measured through increased TDFB and LTDFB ratios and a lower LTDFA ratio. Improved cash flow to service debt is measured through higher CASHDEBT ratios.

Activity ratios measure the relationship between assets or inputs and revenues or outputs. They are considered measures of how efficiently organizations are able to generate revenues from limited resource bases. Measures used included indicators of the efficiency with which current (CATURN) and total (TATURN) assets were employed and the generation of revenues from property, plant, and equipment (FATURN). Improved efficiency in the use of assets is measured through increased CATURN, TATURN, and FATURN.

Profitability ratios reveal an organization's ability to control expenses and earn a return on its resources. If an organization cannot earn revenue greater than its expenses, its survival is threatened. Several elements of profitability were measured here. The markup of prices over expenses was indicated by MARKUP. DEDUCT provided a measure of the proportion of gross patient revenue that was unlikely to be realized in cash due to contractual allowances, bad debts, or charity care. High markups and low deductibles generally result in high operating margins (OPMARG). OPMARG measured the proportion of operating revenue, net of deductions, retained as income. Nonoperating revenue as a proportion of operating revenue was

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[3]In cases where hospitals had a negative fund balance resulting in a negative TDFB and LTDFB, the negative ratio values were converted to positive values. This conversion did not change the results of the statistical tests but provided more easily interpretable ratios.

given by NONOPREV. High NONOPREV suggests an ability to subsidize poor operating margins. The amount of net income earned per dollar of investment (ROA) and per dollar of unrestricted equity (ROE)[4] were the final measures of profitability. Improved profitability is measured through increased ROE, ROA, and OPMARG ratios. Higher prices (MARKUP), a greater percentage of revenues from nonoperating sources (NONOPREV), and lower deductibles (DEDUCT) are ways of increasing profitability.

The age of the physical plant (AGE) ratio provided a means of assessing the newness of plant and equipment. Older, more depreciated facilities yield larger AGE ratios, which indicate the need for near-term replacement of fixed assets. The favorable direction for movement of the AGE ratio is downward.

Statistical Methods

Comparison of FP and NFP MHS-Acquired Hospitals

The hypothesis that FP and NFP MHS-acquired hospitals perform similarly was addressed first. Hypothesis testing was accomplished through a univariate analysis and proceeded in two steps. First, the average pre-acquisition financial performance of hospitals acquired by the FP, and those acquired by the NFP MHSs were compared on each of the twenty-one ratios to determine if the two types of MHSs selected

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[4] ROE ratios that became positive when both the numerator and denominator were negative were adjusted to reflect the negative implications of having both a negative net income and negative fund balance. That was done by assigning a negative number to the resulting ratio.

hospitals with different financial profiles. Next, changes in the average financial performance of each acquired hospital were computed by subtracting the average value of each ratio in the two years before acquisition from the average value for 1984/1985. Changes in average performance over time were compared for the FP and NFP MHS hospitals to discover if the benefits of MHS membership varied by ownership.

Univariate t tests and trimmed t tests were used to compare the means of FP and NFP MHS hospitals. A key assumption underlying the use of Student's t test is that samples are selected from populations with normal distributions. As Tukey and McLaughlin (1963) point out, most practicing statisticians rarely encounter distributions which are "normal" in behavior. The typical distribution has a shape with tails longer than those of a normal distribution. That proved to be the case with many of the ratio distributions here.

All distributions of financial ratios and changes in ratios were examined for normality. In cases where the assumption of normality seemed justified, Student t tests were used in hypothesis testing. Trimmed t tests were used to test long-tailed distributions.

The trimmed t test is one of two general alternatives to the use of Student's t in the presence of long-tailed distributions. The trimmed t was developed specifically to deal with problems associated with long-tailed distributions. The Wilcoxon rank sum or signed rank tests are the nonparametric alternatives.

Nonparametric statistics make few assumptions about the properties of the parent distribution of a sample. In this sense, they are often spoken of as "distribution-free." In the Wilcoxon procedures, values

are transformed to rank scores and tested.

Trimmed t tests involve no transformation of data. Instead, Student's t test is modified in what has been called "intuitively reasonable ways" (Koopmans, 1981, p. 284)--a trimmed mean, which is simply an ordinary mean with some observations removed, is subjected to a t test. Among the deleted observations are the outliers. Appendix B provides the formulas for calculation of the one- and two-sample trimmed t tests.

In the absence of normality, Tukey and McLaughlin (1963) recommend using the trimmed t. Like the nonparametric procedures, the trimmed t test has the desirable properties of being robust of validity and sensitivity in the presence of long-tailed distributions. The assumption of normality is replaced by the assumption that the probability distribution of the population is symmetric. Under this condition, the mean of the sampling distribution of the trimmed mean equals the population mean.

On the basis of Tukey and McLaughlin's recommendation and because the nonparametric methods have gained limited acceptance outside the statistical community, the trimmed t was used as the primary univariate statistic for tests of long-tailed distributions. However, for each trimmed t test, the appropriate Wilcoxon nonparametric procedure was also performed. The latter provided a verification of trimmed t test findings. In cases where the nonparametric and trimmed t tests differed, the trimmed t findings were accepted as the more conservative. Conservative findings resulted from the manner in which the trimmed t was constructed--that is, trims were performed to remove

only extreme outlier observations, as described in Appendix B.

For those accustomed to Student's t statistic, the trimmed t has the advantages of familiarity and a measure of central tendency, the trimmed mean. On the other hand, the Wilcoxon procedures involve a transformation of the data to rank scores, so no meaningful measure of location is available.

Comparison of Acquired and Independent Hospitals

The financial performance of MHS-acquired hospitals was hypothesized to differ favorably from that of the independents. Improvement in financial performance between the years immediately before acquisition and the system-affiliation years of 1984 and 1985 was expected. A summary of expectations is presented in Table 10.

Specifically, higher liquidity in the form of increased CURRENT, QUICK, ACID, and DAYCASH ratios and lower DAYSAR and AVPAY ratios was expected. Greater general liquidity, improved collection of accounts receivable, and decreases in the time taken to pay bills were expected to follow from the implementation of improved business practices under MHS ownership.

Greater debt utilization was expected in the form of increased TDFB, LTDFB, and LTDFA and lower FBTA resulting from improved access to capital. Increased cash flow to service the added debt was expected to be reflected in a higher average CASHDEBT ratio in later years.

In keeping with hypothesized efficiency benefits of system affiliation, increased efficiency in the use of assets (CATURN,

Table 10: Direction of Hypothesized Movement of Financial Ratios Following System Acquisition

Measure of Financial Performance	Variable Name	Direction
LIQUIDITY		
Current Ratio	CURRENT	Up
Quick Ratio	QUICK	Up
Acid Test Ratio	ACID	Up
Days in Accounts Receivable	DAYSAR	Down
Average Payment Period	AVPAY	Down
Days Cash on Hand	DAYCASH	Up
CAPITAL STRUCTURE		
Cash Flow to Total Debt	CASHDEBT	Up
Equity Financing Ratio	FBTA	Down
Total Debt to Equity	TDFB	Up
Longterm Debt to Equity	LTDFB	Up
Longterm Debt to Net Fixed Assets	LTDFA	Up
ACTIVITY		
Current Asset Turnover	CATURN	Up
Fixed Asset Turnover	FATURN	Up
Total Asset Turnover	TATURN	Up
PROFITABILITY		
Markup	MARKUP	Up
Nonoperating Revenue	NONOPREV	Down
Return on Equity	ROE	Up
Return on Assets	ROA	Up
Operating Margin	OPMARG	Up
Deductible	DEDUCT	Down
AVERAGE AGE OF PLANT		
Average Age of Plant	AGE	Down

FATURN, and TATURN) was expected. However, it was realized that these gross efficiency measures could be affected by improvements in the physical plant and equipment. Large capital improvements have the effect of increasing the denominator of FATURN and TATURN ratios and, hence, reducing their size.

Improved profitability in the form of increased ROE, ROA, and OPMARG was expected under MHS ownership. The higher profits were expected to result partially from increased prices (MARKUP), as demonstrated in past research. Lower deductibles (DEDUCT) were expected to result from decreased charity care, although financial gains in this area could be offset by increased contractual allowances. Nonoperating revenue was expected to decrease under MHS membership; however, that was one area in which FP and NFP MHSs could differ. FP MHS hospitals probably receive fewer gifts than NFP MHS facilities.

Finally, MHS hospitals were expected to make improvements in plant and equipment. The result would be a lower average AGE ratio following acquisition.

Both univariate and multivariate methods were used to investigate the data. A description of the methods follows.

Univariate analysis

The first method of exploring MHS effects used t and trimmed t tests to explore changes in financial performance over time. As described earlier, the distributions of all financial ratios and changes in financial ratios were examined for normality. Student's t

test was used to test variables with distributions which appeared to conform to the assumption of normality. Trimmed t tests were used to examine long-tailed distributions. The Wilcoxon nonparametric procedures were used as a verification of trimmed t results. The analysis proceeded in three steps.

First, the effectiveness of the matching procedure was tested by comparing the pre-acquisition financial performance of acquired hospitals to that of their independent matches. Next, differences in the average performance of acquired hospitals from time one (the two years immediately before acquisition) to time two (1984 and 1985) were examined to determine if changes occur following system membership. Because changes in financial performance can result from industry trends rather than system effects, the performances of acquired hospitals were subsequently examined relative to those of matched independent hospitals.

The performance variables in the analysis are denoted by Y_{ijt} where:

i = the "i th" matched pair of hospitals, i = 1,2,...42.

j = the acquired (j = 1) or independent (j = 2) hospital.

t = the year of observation, t = 1,2,3,4; t = 1 represents 2 years preceding the acquisition of the system hospital; t = 2 represents 1 year preceding the acquisition of the system hospital; t = 3 or 4 represents 1984 and 1985 respectively.

Therefore,

Y_{ijt} = the observation of the performance variable Y in the "t th" year in the acquired (j = 1) or independent (j = 2) hospital of the "i th" pair of hospitals; t = 1 or 2 represents 2 years before acquisition, and t = 3 or 4 represents 1984 and 1985.

While t = 1 or 2 represents the same years for both hospitals within a matched pair, t represents different years across pairs in cases where the system hospitals in the various pairs were acquired in different years. The use of financial ratios is particularly suited to such a situation, since absolute dollar amounts from different years cannot be compared without adjusting for inflation. Because the financial ratios were measures of income and balance sheet data relative to other measures, financial performance for hospitals which joined systems in different years could be compared.

Even so, caution was exercised in the use of ratios which included assets. As discussed by Finkler (1982), financial statements prepared in accordance with generally accepted accounting principles (GAAP) are oriented toward historical cost information. Assets are valued at their cost (less accumulated depreciation) until they are sold or discarded. Thus inflation distorts the ratio values.

The difference in averages for the "i th" hospital in the acquired sample is defined as:

$$\Delta\bar{Y}_{i1.} = 1/2 \left(\sum_{t=3}^{4} Y_{i1t} - \sum_{t=1}^{2} Y_{i1t} \right)$$

Where,

Y_{i1t} = the observation of the performance variable Y in "i th" acquired hospital in the "t th" year.

To test for significant differences in averages before and during system membership, $\Delta\bar{Y}_{i1.}$ was assumed to be a random variable from a normal distribution. A t test with n-1, or 3, degrees of freedom was

used.

The same procedure was used to test for significant differences in averages in the matched independent hospitals. As before, $\triangle\bar{Y}_{i2.}$ was assumed to be a random variable from a normal distribution. The change in averages from the first 2 years to the last 2 years is defined as:

$$\triangle\bar{Y}_{i2.} = 1/2\left(\sum_{t=3}^{4} Y_{i2t} - \sum_{t=1}^{2} Y_{i2t}\right)$$

Where,

Y_{i2t} = the observation of the performance variable Y in "i th" independent hospital in the "t th" year.

T tests were used to determine if the above differences in averages varied significantly between system and independent hospitals. That is,

$$\triangle\bar{Y}_{...} = \triangle\bar{Y}_{.1.} - \triangle\bar{Y}_{.2.}$$

was assumed to be a random variable from a normal distribution and was tested to determine if the differences in averages were significantly different from zero.

Multivariate Analysis

Another method of testing the hypothesis that MHS-acquired hospitals differ from NFP independent hospitals was through pooling cross-sectional and time-series data. The result was a data base which included observations for all hospitals in all years. Using this data base, the relationship between system membership and

hospital financial performance was investigated. Regression analysis provided the primary tool. The question of interest was: "Do NFP MHS or FP MHS hospitals perform differently from independent NFP hospitals on each of the financial ratios after controlling for the effects of variables extraneous to the investigation?"

To answer that question, three steps were taken. First, observations were identified with one of three groups: NFP independent hospitals, FP MHS hospitals, or NFP MHS hospitals. Through analysis of variance (ANOVA), the average performance of hospitals in each group was compared on each of the twenty-one financial ratios. The ANOVAs tested the null hypothesis

$$H_0: \mu_1 = \mu_2 = \mu_3$$

against the alternative that some of the population means were not the same.

The second step identified specific groups which differed from one another. Several statistical tests are available for such a purpose; however, Scheffe's method is preferred in cases where sample sizes differ among groups (Canavos, 1984). In this case, the pooled sample included 252 independent NFP hospitals, 58 FP MHS hospitals, and 26 NFP MHS hospitals. The independent group was large because it included all hospitals in the sample from the pre-acquisition years plus 1984 and 1985 observations for those hospitals which were not purchased. Scheffe's method is additionally useful because it produces at least one statistically discernible contrast when the ANOVA F test rejects the null hypothesis.

Finally, when the ANOVAs suggested differences between an MHS

group and the NFP independent group, regression analysis provided a means of investigating that relationship while controlling for those variables identified earlier as extraneous to the investigation. The justification for a pooled cross-sectional regression analysis was taken from Tuma and Hannan (1984): "if there are three or more waves of observations, and the underlying parameters are constant over the observation period, and the interval between waves is a constant, one can pool all temporal observations and estimate a single set of parameters" (p. 433). Certainly, the first criterion was met. Data were collected for hospitals in the years 1978 through 1982 and 1984 and 1985. Fulfillment of the last two criteria was more questionable; however, it can be argued that since the time frame of this study was fairly short, parameter estimates were unlikely to change from year to year. The lack of equal intervals between waves must be acknowledged as a limitation; however, again, the short time frame may render the failure to meet this criterion less troubling than it otherwise would be.

The control variables included state (re-defined as region), SMSA location (re-defined as metropolitan or rural), and hospital bed size. Time was not included as a control variable since the data base included only observations for MHS hospitals in 1984 and 1985. In trial regressions, time appeared to act as a distorter variable if included.

Twenty-one regression equations were estimated, one for each financial ratio. The general regression model is:

$$Y = b_0 + b_1(BORDER) + b_2(SOUTH) + b_3(METRO) + b_4(BEDS) + b_5(NFPMHS) + b_6(FPMHS) + e$$

where

Y = the financial ratio

b_i = the ordinary least squares parameter estimated as a result of the regression analysis, i = 0,1,2,...,6

BORDER = location in the states of Kentucky or Tennessee

SOUTH = location in the states of North Carolina, South Carolina, Georgia, or Florida

METRO = location in a standard metropolitan statistical area as defined by the Bureau of the Census

BEDS = hospital bed size

NFPMHS = membership in a not-for-profit MHS

FPMHS = membership in a for-profit MHS

e = the error term

The variables BORDER and SOUTH are dummy variables with the deep southern states of Texas, Louisiana, Mississippi and Alabama serving as the reference group. METRO is a dummy variable with rural location as the reference group. The reference group for both NFPMHS and FPMHS is NFP independent.

Summary

This chapter outlined the research design, sample selection, construction of performance measures, and statistical methods used to investigate the effects of MHS membership on hospital financial performance. It described the nonequivalent control group design which was used to investigate the hypothesis that MHS-acquired hospitals differ from similar hospitals which remain NFP independents.

In addition, FP and NFP MHS-acquired hospitals were hypothesized to perform similarly. Methods for testing each hypothesis were described.

All acquired hospitals for which financial data were available in ten Southern states formed the study group. Controls were selected through a matching procedure based on state, ownership, bed size, and community population characteristics. Twenty-one financial ratios measuring liquidity, capital structure, financial activity, profitability, and age of the physical plant comprised the dependent variables.

Univariate student t, trimmed t, and nonparametric tests were the analytical methods used to test whether the average financial performance of FP and NFP MHS-acquired hospitals were equal. Pre-acquisition financial performance and changes in performance over time were compared, to discover if FP and NFP MHSs choose hospitals with different financial characteristics for acquisition, and if they manage those hospitals in ways which have different financial implications.

Univariate and multivariate methods to investigate the effects of MHS membership on hospital financial performance were described. The univariate procedure consisted of three steps and made use of paired student t, trimmed t, and nonparametric tests. First, the pre-acquisition financial performance of acquired hospitals and matched independents were compared to determine the success of the matching procedure. It was important that study and control hospitals had a common starting point from which to assess changes. Next, differences

in the average performance of acquired hospitals from before acquisition to 1984/1985 were examined to see if changes followed after system membership. Finally, comparisons of changes in financial performance of acquired hospitals with changes in matched independents provided a means of distinguishing MHS effects from industry trends. A pooled cross-sectional multiple regression analysis was described as a second method for testing the effects of MHS membership on hospital financial performance while controlling for variables extraneous to the purposes of the investigation.

CHAPTER 4: RESULTS

Overview

Chapter 4 presents the results of hypotheses testing. FP and NFP MHS-acquired hospitals were compared with one another to determine if financial performance varied with ownership. Next, the performance of acquired hospitals was compared with that of independent hospitals. Matched univariate analysis and pooled cross-sectional analysis were used to analyze the data. The matched univariate analysis utilized t tests and trimmed t tests. Trimmed t tests were supported with the results of nonparametric Wilcoxon rank sum and signed rank tests, as appropriate. The results of the latter are contained in Appendix C. Discrepancies between the findings from the trimmed t and from nonparametric tests are discussed in the text.

Comparison of FP and NFP MHS-Acquired Hospitals

No difference in MHS hospital financial performance by ownership was expected. Formally stated, the hypothesis was

> Hypothesis 1: There is no statistically significant difference in the financial performance of FP and NFP MHS hospitals.

In order to test that hypothesis, two steps were taken. First, the pre-acquisition financial performance of hospitals acquired by the FP and by the NFP MHSs were compared with one another to see if the two

MHS ownership forms targeted hospitals with different financial performance (Table 11). Changes in the average financial performance of each acquired hospital were then computed by subtracting the average value of each ratio in the two years prior to acquisition from the average value for 1984/1985. The changes in average performance over time were compared for FP and NFP MHS hospitals to determine if the benefits of MHS membership varied by ownership (Table 12). Results from the nonparametric Wilcoxon rank sum tests, which correspond to the findings in Tables 11 and 12, are provided in Appendix C, Tables 1-C and 2-C respectively.

Average Pre-Acquisition Financial Performance

Table 11 shows no statistically significant differences in pre-acquisition financial performance between hospitals acquired by FP and NFP MHSs. Trimmed t tests are presented for seven ratios (ACID, DAYCASH, CASHDEBT, TDFB, LTDFB, LTDFA, and ROA); however, the t, trimmed t, and nonparametric tests all failed to produce statistically significant results. The implication is that FP and NFP MHSs acquired hospitals with similar financial traits.

Changes in Financial Performance

Contrary to expectations, however, the financial performance of hospitals acquired by FP and by NFP MHSs did not remain the same over time. Examining the changes in financial performance from just before acquisition to 1984/1985 revealed statistically significant differences in liquidity, financial activity, and profitability.

TABLE 11: Comparison of Average Pre-acquisition Financial Indicators For Hospitals Acquired by FP and NFP MHSs

Variable	FP No. Cases	FP Mean	NFP No. Cases	NFP Mean	t-value
LIQUIDITY					
CURRENT	29	2.91	13	2.50	.73
QUICK	29	2.47	13	2.16	.59
ACID	25	.42	11	.25	.89
DAYSAR	29	74.47	13	79.66	-.68
AVPAY	29	47.63	13	64.30	-1.43
DAYCASH	25	16.26	11	13.32	.38
CAPITAL STRUCTURE					
CASHDEBT	23	.29	9	.22	.39
FBTA	29	.60	13	.54	.59
TDFB	23	.70	9	.68	.05
LTDFB	23	.26	9	.40	-.48
LTDFA	23	.28	11	.50	-1.05
ACTIVITY					
CATURN	29	3.54	13	3.64	-.33
FATURN	27	2.54	13	2.47	.19
TATURN	29	1.52	13	1.19	1.36
PROFITABILITY					
MARKUP	29	1.17	13	1.19	-.41
NONOPREV	29	.024	13	.018	.58
ROE	25	.03	11	.04	-.20
ROA	29	.03	13	.02	.56
OPMARG	29	-.007	13	-.02	.67
DEDUCT	29	.15	13	.17	-1.02
AVERAGE AGE OF PLANT					
AGE	28	9.70	13	10.27	-.30

TABLE 12: Comparison of Differences in Average Performance for Hospitals Acquired by FP and NFP MHSs (During Membership minus Before Membership)

Variable	FP No. Cases	FP Mean Difference	NFP No. Cases	NFP Mean Difference	t-value
LIQUIDITY					
CURRENT	25	.87	11	-.95	2.00*
QUICK	25	.44	11	-.78	2.03**
ACID	29	-.46	13	.23	-2.78***
DAYSAR	25	2.34	11	-6.65	.87
AVPAY	25	-6.20	11	39.03	-2.16**
DAYCASH	25	-14.84	11	4.40	-2.24**
CAPITAL STRUCTURE					
CASHDEBT	25	.04	11	-.43	1.42
FBTA	25	-.43	11	-.54	.85
TDFB	25	11.36	11	4.34	1.12
LTDFB	25	10.53	11	3.25	1.21
LTDFA	23	.57	11	.60	-.11
ACTIVITY					
CATURN	23	.49	9	.72	-.46
FATURN	23	-.91	11	1.87	-1.81*
TATURN	23	-.10	9	.37	-.90
PROFITABILITY					
MARKUP	25	.17	11	.06	2.20**
NONOPREV	25	-.02	11	-.01	-1.43
ROE	25	.28	11	-.43	1.78*
ROA	25	.06	11	-.16	2.20**
OPMARG	29	.10	13	-.02	2.48**
DEDUCT	25	.04	11	.05	-.33
AVERAGE AGE OF PLANT					
AGE	24	-7.49	10	-5.75	-.68

* Significant at the .10 level
** Significant at the .05 level
*** Significant at the .01 level or better

Table 12 contains trimmed t tests for all ratios except ACID and OPMARG. In general, the trimmed t and nonparametric tests produced similar results. In two cases, statistically significant differences were observed in the nonparametric analysis but not in the trimmed t tests. Specifically, the Wilcoxon rank sum test shows FP MHS hospitals had a significantly greater increase in cash flow to total debt (CASHDEBT) than NFP MHS hospitals, and NFP MHS hospitals had a greater increase in total asset turnover (TATURN) than FP MHS hospitals. The implication is that the trimmed t tests, as constructed here, tended to produce more conservative results than the nonparametric alternative.

In the area of liquidity, hospitals acquired by the FP MHSs, on average, increased their CURRENT and QUICK ratios but reduced their relative amounts of cash, as indicated by decreases in the average ACID and DAYCASH ratios. This relationship was the reverse of that observed in the NFP MHS-acquired hospitals. FP MHS hospitals also reduced the time they took to pay their short-term obligations (AVPAY). Again, the reverse was true for NFP MHS hospitals.

FP MHS hospitals displayed decreased fixed asset turnover (FATURN), indicating either a decrease in the efficiency with which fixed assets were employed or the use of newer and less depreciated assets. The negative mean differences in AGE indicate that both FP and NFP MHSs revitalized and upgraded plant assets. The slight negative fixed asset turnover change for FP MHS hospitals implies that in 1984 and 1985 newer assets had yet to generate higher revenues. In contrast, NFP MHS hospitals exhibited positive improvement in FATURN,

implying relatively greater generation of revenues from fixed assets.

On average, FP MHS hospitals raised their mark up of prices over expenses (MARKUP) to a greater extent than NFP MHS hospitals did. Concomitantly, profitability, as measured by return on equity (ROE), return on assets (ROA), and operating margin (OPMARG), increased in FP facilities but decreased in NFP MHS hospitals.

Comments

The above findings fail to support the hypothesis that hospitals acquired by the FP and NFP MHSs perform similarly. Although their financial performance at acquisition was not significantly different, they differed significantly from one another on a number of measures in the years following acquisition. The implication is that FP and NFP MHS hospitals were not a homogeneous group. From a financial perspective, the results of operations were quite different.

Comparison of Acquired and Independent Hospitals

The second hypothesis tested was that the financial performance of MHS hospitals differs from that of the NFP independents. Stated in null form, the hypothesis was

> Hypothesis 2: There is no difference in the financial performance of acquired and NFP independent hospitals.

Because the analysis of financial performance by ownership found differences between FP and NFP MHS hospitals, separate tests of the second hypothesis were conducted within each ownership category. The univariate analysis tested Hypothesis 2 by comparing changes in the financial performance of matched pairs over time. The pooled cross-

sectional analysis compared the financial performance of acquired hospitals with that in the group of all NFP independents.

Univariate Analysis

The univariate test of Hypothesis 2 involved three steps. First, the effectiveness of the matching procedure was tested by comparing the pre-acquisition financial performance of acquired hospitals relative to that of their independent matches. Since few statistically significant differences were found in the pre-acquisition years, the implication was that acquired hospitals and their matches were initially similar. Comparable pre-acquisition performance provided a common starting point from which to evaluate changes occurring thereafter. Next, differences in the performance of acquired hospitals from time one to time two were examined to determine if any changes occurred following system membership. Because changes in financial performance can result from industry trends rather than the benefits of system membership, the changes for acquired hospitals were next examined relative to those for matched independent hospitals. At each step, separate analyses were conducted for FP and NFP MHS-acquired hospitals.

Average Pre-Acquisition Financial Performance

Tables 13 and 14 provide the results of statistical tests analyzing differences in average performance prior to acquisition between MHS hospitals and the paired independent facilities. Mean differences between acquired and matched hospitals are reported. The

results of the nonparametric alternative to the paired t test, the Wilcoxon signed rank test, are contained in Appendix C, Tables 3-C and 4-C.

FP MHS-Acquired Hospitals. The selected independent hospitals are fairly comparable matches for the FP MHS-acquired facilities (Table 13); out of twenty-one ratios, only three show statistically significant differences between FP MHS-acquired hospitals and their independent matches. A statistically significant mean difference on the ACID ratio reveals that acquired hospitals had less available cash than their matches did in the years before acquisition. Statistically significant differences in fixed asset turnover (FATURN) and total asset turnover (TATURN) suggest that acquired FP MHS hospitals generated more operating revenue per dollar invested in fixed assets and in total assets, respectively.

Trimmed t tests are presented for TDFB, LTDFB, FATURN, NONOPREV, and ROE. Those results were in general agreement with the results of the nonparametric tests--that is, for tests of mean differences on the five ratios, both the trimmed t and the nonparametric tests produced statistically significant results only for FATURN.

NFP MHS-Acquired Hospitals. Table 14 shows that the only statistically significant difference between NFP MHS-acquired hospitals and their matches was on the deductible (DEDUCT) ratio. On average, acquired hospitals lost a smaller proportion of their gross patient revenue to contractual allowances, bad debt, or charity care.

Trimmed t tests are presented for LTDFB, LTDFA, NONOPREV, and OPMARG. On each of these four ratios, no statistically significant

TABLE 13: Differences in Performance Variable Averages Between FP MHS Acquired Hospitals and Independent Matches in the Years before Acquisition (FP MHS Value minus Independent Value)

Variable	No. of Cases	Mean Difference	t-value
LIQUIDITY			
CURRENT	29	-.72	-1.52
QUICK	29	-.54	-1.32
ACID	29	-.35	-1.74*
DAYSAR	29	2.63	.53
AVPAY	29	3.81	.74
DAYCASH	29	-12.67	-1.45
CAPITAL STRUCTURE			
CASHDEBT	29	.14	.94
FBTA	29	-.03	-.53
TDFB	25	.08	.38
LTDFB	25	-.10	-.57
LTDFA	27	-.05	-.39
ACTIVITY			
CATURN	29	.34	1.46
FATURN	23	.77	3.21***
TATURN	29	.48	2.78***
PROFITABILITY			
MARKUP	29	-.02	-.74
NONOPREV	25	-.001	-.20
ROE	25	-.04	-1.13
ROA	29	-.001	-.07
OPMARG	29	-.01	-.91
DEDUCT	29	-.004	-.29
AVERAGE AGE OF PLANT			
AGE	28	.47	.47

* Significant at the .10 level
** Significant at the .05 level
*** Significant at the .01 level or better

TABLE 14: Differences in Performance Variable Averages Between NFP MHS Acquired Hospitals and Independent Matches in the Years before Acquisition (NFP MHS Value minus Independent Value)

Variable	No. of Cases	Mean Difference	t-value
LIQUIDITY			
CURRENT	13	-.67	-1.20
QUICK	13	-.60	-1.17
ACID	13	-.32	-1.33
DAYSAR	13	.40	.05
AVPAY	13	21.63	1.23
DAYCASH	13	-7.35	-1.04
CAPITAL STRUCTURE			
CASHDEBT	13	.11	.50
FBTA	13	-.12	-1.02
TDFB	13	1.65	1.54
LTDFB	11	.72	1.06
LTDFA	11	.16	.89
ACTIVITY			
CATURN	13	.19	.52
FATURN	13	.52	1.11
TATURN	13	.03	.13
PROFITTABILITY			
MARKUP	13	-.06	-1.18
NONOPREV	9	-.007	-1.06
ROE	13	-.06	-1.02
ROA	13	-.01	-.48
OPMARG	11	.03	.60
DEDUCT	13	-.07	-1.82*
AVERAGE AGE OF PLANT			
AGE	13	-.10	-.06

* Significant at the .10 level

differences between NFP MHS-acquired hospitals and their matches were found, regardless of whether the trimmed t or nonparametric tests were employed.

Changes in Average Financial Performance

Average changes in the financial performance of FP and NFP MHS hospitals from time one (two years prior to acquisition) to time two (1984 and 1985) are reported in Tables 15 and 16, respectively. Corresponding Wilcoxon signed rank tests are contained in Appendix C, Tables 5-C and 6-C.

FP MHS-Acquired Hospitals. Statistically significant differences in the performance of FP MHS-acquired hospitals were apparent on a number of measures. Each of the five dimensions of financial performance revealed changes.

Table 15 shows that, on average, the amount of available cash (ACID and DAYCASH) declined significantly under FP MHS membership. Since overall liquidity did not change significantly, that may indicate more productive use of current assets--that is, FP MHSs may have invested cash.

Most of the capital structure ratios showed statistically significant changes, suggesting greater use of debt under FP MHS ownership. The proportion of equity used to finance assets (FBTA) was significantly lower in later years, while the proportion of debt utilized (TDFB, LTDFB, and LTDFA) was greater.

Only one financial activity or efficiency ratio was changed significantly over time. The number of operating income dollars

TABLE 15: Differences in Performance Variables for FP MHS Hospitals Before and During Membership (During Membership minus Before Membership)

Variable	No. of Cases	Mean Difference (during minus before)	t-value
LIQUIDITY			
CURRENT	29	.73	1.18
QUICK	29	.31	.63
ACID	29	-.46	-3.45***
DAYSAR	29	2.59	.45
AVPAY	25	-6.20	-1.10
DAYCASH	25	-14.84	-3.58***
CAPITAL STRUCTURE			
CASHDEBT	27	.04	.22
FBTA	27	-.43	-6.14***
TDFB	25	11.36	2.83***
LTDFB	27	12.21	2.94***
LTDFA	23	.57	3.80***
ACTIVITY			
CATURN	29	.63	2.19**
FATURN	23	-.91	-1.44
TATURN	27	.14	.40
PROFITABILITY			
MARKUP	27	.17	5.67***
NONOPREV	29	-.02	-4.12***
ROE	25	.28	1.56
ROA	27	.06	1.17*
OPMARG	29	.10	3.76***
DEDUCT	27	.09	1.77*
AVERAGE AGE OF PLANT			
AGE	28	-7.61	-6.08***

* Significant at the .10 level
** Significant at the .05 level
*** Significant at the .01 level or better

TABLE 16: Differences in Performance Variables for NFP MHS Hospitals Before and During Membership (During Membership minus Before Membership)

Variable	No. of Cases	Mean Difference (during minus before)	t-value
LIQUIDITY			
CURRENT	11	-.95	-5.94***
QUICK	11	-.78	-6.50***
ACID	13	.23	1.03
DAYSAR	11	-6.65	-.85
AVPAY	11	39.03	1.37
DAYCASH	13	8.34	.91
CAPITAL STRUCTURE			
CASHDEBT	11	-.43	-1.79
FBTA	13	-.54	-5.23***
TDFB	13	3.86	2.74**
LTDFB	13	2.85	2.28**
LTDFA	11	.60	2.73**
ACTIVITY			
CATURN	9	.72	1.71
FATURN	11	1.87	1.00
TATURN	9	.37	.77
PROFITABILITY			
MARKUP	13	.08	1.27
NONOPREV	11	-.01	-1.67
ROE	11	-.43	-.98
ROA	11	-.16	-1.23
OPMARG	13	-.02	-.46
DEDUCT	13	.05	1.95*
AVERAGE AGE OF PLANT			
AGE	10	-5.75	-3.14**

* Significant at the .10 level
** Significant at the .05 level
*** Significant at the .01 level

generated per dollar of investment in current assets (CATURN) showed a statistically significant increase from time one to time two.

Several changes are apparent in profitability. Prices (MARKUP) rose significantly leading to greater profitability. Higher profitability is reflected by statistically significant positive mean differences in the proportion of operating revenue retained as income (OPMARG) and net income returned on assets (ROA). The impact of price increases is all the more meaningful if changes in NONOPREV and DEDUCT are considered. Nonoperating income as a proportion of operating income (NONOPREV) declined significantly after FP MHS-acquisition, while the proportion of gross patient revenue lost to contractual allowances, bad debts, or charity care (DEDUCT) increased significantly. Ordinarily, without greater markups, those two factors would reduce profitability.

Finally, a statistically significant decrease in the average age of plant (AGE) indicates the upgrading of plant and equipment by FP MHSs. Facilities were less depreciated in post-acquisition years than before purchase.

In the preceding analysis of average differences, the distributions of twelve ratios were trimmed: AVPAY, DAYCASH, CASHDEBT, TDFB, LTDFB, LTDFA, FATURN, TATURN, MARKUP, ROE, ROA, and DEDUCT. In three cases (FATURN, ROE, and ROA), nonparametric tests of those ratios produced results different from the ones reported here. The Wilcoxon sign rank tests suggested FP MHS hospitals decreased their return on fixed assets (FATURN) and improved their return on equity (ROE) following acquisition. The significant improvement in

ROA found with the trimmed t was not corroborated by the Wilcoxon sign rank test.

NFP MHS-Acquired Hospitals. In the data for NFP MHS hospitals, several changes appear in financial performance following acquisition, as shown in Table 16. Liquidity declined from time one to time two, as revealed by the statistically significant decrease in CURRENT and QUICK. Like the FP MHS-acquired hospitals, NFP MHS hospitals reduced their equity financing (FBTA) and increased their use of debt (TDFB, LTDFB, and LTDFA) following system membership. No statistically significant differences occurred in financial activity and profitability except for the deductible ratio (DEDUCT); NFP MHS hospitals lost a significantly greater proportion of gross patient revenue to contractual allowances, bad debts, or charity care (DEDUCT) following acquisition. Finally, NFP MHS-acquired hospitals, like their FP counterparts, invested in new plant and equipment as demonstrated by the statistically significant decrease in AGE.

Trimmed t tests are presented for thirteen ratios: CURRENT, QUICK, DAYSAR, AVPAY, CASHDEBT, LTDFA, CATURN, FATURN, TATURN, NONOPREV, ROE, ROA, and AGE. In all but two cases (CASHDEBT and NONOPREV), results similar to those reported in Table 16 were found when the Wilcoxon sign rank test was performed. The nonparametric tests found that NFP MHS-acquired hospitals significantly reduced cash flow to total debt (CASHDEBT), and nonoperating revenue as a proportion of operating revenue (NONOPREV).

Comments. Increased liquidity, debt, and financial efficiency, as well as improved profitability and investment in plant and equipment,

were expected over time. While both FP and NFP MHSs increased hospital access to debt and revitalized the physical plant, liquidity measures tended to remain unchanged or declined under MHS ownership. Only in FP MHS hospitals did profitability increase significantly. Findings on improvements in financial activity or efficiency are weak.

While the observed significant changes were interesting, they did not in themselves confirm system effects. The remaining question was whether the changes observed in the performance of acquired hospitals differed from changes observed in matched hospitals. If the significant changes observed in acquired hospitals differed from those of their matches, system influence, rather than industry trends, could explain the difference over time.

Changes in MHS Hospital Financial Performance Relative to Independents

Changes in the financial performance of FP and NFP MHS-acquired hospitals relative to that of matched independents are presented in Tables 17 and 18, respectively. Nonparametric Wilcoxon sign rank tests are contained in Appendix C, Tables 7-C and 8-C.

FP MHS-Acquired Hospitals. FP MHS-acquired hospitals differed from their matches in all areas of financial performance. Table 17 reveals statistically significant mean differences in each of the five dimensions of financial performance.

Although no statistically significant change in the CURRENT ratio is shown in Table 15, a significant difference was apparent when FP MHS-acquired hospitals were compared with their matches (Table 17). The implication is that the matched independent hospitals suffered a

TABLE 17: Changes in Performance of FP MHS Hospitals Relative to Matched Independent Hospitals (FP MHS Value minus Independent Value)

Variable	No. of Cases	Mean Difference (during minus before)	t-value
LIQUIDITY			
CURRENT	29	1.22	1.70*
QUICK	29	.58	.90
ACID	29	-.45	-2.05**
DAYSAR	29	-7.47	-.95
AVPAY	27	-10.04	-.97
DAYCASH	29	-24.51	-2.77***
CAPITAL STRUCTURE			
CASHDEBT	29	-.06	-.23
FBTA	27	-.43	-6.14***
TDFB	27	13.45	3.05***
LTDFB	27	12.58	2.99***
LTDFA	23	.54	3.00***
ACTIVITY			
CATURN	29	.78	2.17**
FATURN	23	-1.61	-5.37***
TATURN	27	.11	.33
PROFITABILITY			
MARKUP	27	.06	2.00**
NONOPREV	27	-.02	-2.50**
ROE	25	.22	1.29
ROA	27	.02	.50
OPMARG	29	.05	1.79*
DEDUCT	29	-.02	-.67
AVERAGE AGE OF PLANT			
AGE	28	-5.15	-4.30***

* Significant at the .10 level
** Significant at the .05 level
*** Significant at the .01 level

TABLE 18: Changes in Performance of NFP MHS Hospitals Relative to Matched Independent Hospitals (NFP MHS Value minus Independent Value)

Variable	No. of Cases	Mean Difference (during minus before)	t-value
LIQUIDITY			
CURRENT	13	-.58	-.67
QUICK	11	-1.02	-2.37**
ACID	13	.21	.75
DAYSAR	11	-32.35	-2.21*
AVPAY	11	22.28	1.13
DAYCASH	13	7.49	.69
CAPITAL STRUCTURE			
CASHDEBT	11	-.29	-1.04
FBTA	13	-.42	-3.84***
TDFB	13	2.96	1.91*
LTDFB	13	2.51	1.99*
LTDFA	11	.45	2.25**
ACTIVITY			
CATURN	9	1.19	2.70**
FATURN	11	1.61	.92
TATURN	11	1.03	1.04
PROFITABILITY			
MARKUP	13	-.04	-.34
NONOPREV	11	-.01	-1.00
ROE	11	-.40	-.95
ROA	11	-.12	-.92
OPMARG	13	.0009	.01
DEDUCT	13	.01	.32
AVERAGE AGE OF PLANT			
AGE	10	-5.04	-3.02**

* Significant at the .10 level
** Significant at the .05 level
*** Significant at the .01 level or better

large decline in liquidity as measured by CURRENT. Although FP MHS-acquired hospitals were able to hold their pre-acquisition levels of current assets to current liabilities (CURRENT), their cash holdings declined (ACID and DAYCASH). This is apparent in Table 15. Table 17 shows that the decline in performance on ACID and DAYCASH was more severe than that experienced by the independent hospitals.

With regard to capital structure, the increased debt utilization presented in Table 15 was significantly greater than that of the independent hospitals. This finding is apparent in the statistically significant mean differences in FBTA, TDFB, LTDFB, and LTDFA found in Table 17.

Current asset turnover (CATURN) which increased over time (Table 15), changed significantly more than did that of matched independent hospitals (Table 17). While Table 15 shows no statistically significant difference in the number of operating revenue dollars generated per dollar of fixed asset investment (FATURN), Table 17 shows the average change in FATURN for FP MHS-acquired hospitals was significantly lower than that of matched independent hospitals. The implication is that independent hospitals increased their measures of FATURN considerably. The statistically significant mean difference between FP MHS hospitals and independents on FATURN (Table 17) is probably related to the FP MHS hospitals' use of newer, less depreciated assets. The latter is evident in the negative and statistically significant mean difference on AGE (Table 17).

Although Table 15 shows FP MHS-acquired hospitals increased their return on assets (ROA) and deductions from gross revenues (DEDUCT),

the changes were not significantly different from those in the matched independent hospitals. As a result, it is impossible to distinguish changes in ROA and DEDUCT from industry trends.

For other profitability ratios, however, FP MHS-acquired hospitals were significantly different from their matched independent counterparts. FP MHS hospitals increased their markup of prices over expenses (MARKUP) significantly more than the independents did. Nonoperating revenue as a proportion of net patient revenue fell significantly more than for independents, and the proportion of operating revenue retained as income (OPMARG) rose significantly more.

Trimmed t tests are presented for AVPAY, FBTA, TDFB, LTDFB, FATURN, TATURN, MARKUP, NONOPREV, ROE, and ROA. Nonparametric tests produced similar findings for each of these ratios with the exception of ROE. When tested using the Wilcoxon sign rank test, FP MHS-acquired hospitals had significantly higher changes in return on equity (ROE) than did their matched counterparts.

NFP MHS-Acquired Hospitals. The area of liquidity offers a number of interesting insights into the impact of NFP MHS membership on hospitals. Although Table 16 shows NFP MHS-acquired hospitals had lower liquidity in 1984/1985 as measured by CURRENT, this change was not significantly different from that of the independents, as seen in Table 18. NFP MHS-acquired hospitals reduced their liquidity significantly more than matched independents did as measured by the QUICK ratio (Table 18). Although NFP MHS-acquired hospitals had no statistically significant decrease in their DAYSAR ratio (Table 16), a significant mean difference between system and independent hospitals

is apparent in Table 18. The implication is that for matched independent hospitals the average time that receivables were outstanding increased.

In the area of capital structure, NFP MHS hospitals used debt significantly more than the matched independents did; they showed significant increases over time in TDFB, LTDFB, and LTDFA (Table 16). Those measures also increased significantly more in NFP MHS hospitals than in their independent counterparts (Table 18).

The change in current asset turnover (CATURN) for NFP MHS-acquired hospitals from time one to time two was not statistically significant (Table 16); however, it did differ significantly from the change in CATURN for matched independent hospitals (Table 18). The implication is that the number of operating revenue dollars generated per dollar of investment in current assets dropped over time in the matched independent hospitals.

The change in DEDUCT for NFP MHS hospitals, which was statistically significant (Table 16), failed to be significantly different from the change in the deductibles for matched independent hospitals. This finding implies an industry trend toward increasing deductibles.

Over time, the NFP MHSs replaced the older, depreciated assets of the acquired facilities (Table 16). They improved plant and equipment to a greater extent than the matched NFP independents did. That is apparent in the negative and statistically significant change in the AGE ratio of NFP MHS hospitals relative to their matches (Table 18).

Trimmed t tests are presented for QUICK, DAYSAR, AVPAY, CASHDEBT,

LTDFA, CATURN, FATURN, TATURN, NONOPREV, ROE, ROA, and AGE. Nonparametric tests produced results similar to those presented here, except in the case of NONOPREV. While the trimmed t test found no statistically significant difference in NONOPREV changes between MHS and independent hospitals, the nonparametric test found NFP MHS-acquired hospitals experienced greater declines in nonoperating revenue (NONOPREV) than did the independents.

Comments. System membership appears to have had a favorable financial impact on hospitals purchased by the FP MHSs. As expected, these systems improved facilities, increased access to long-term debt, and raised profitability. Improved profitability was accomplished primarily through higher markups. However, there is some indication of improved efficiency as measured by CATURN. Finally, the FP MHS hospitals reduced their cash holdings; that may be an indication of more productive use of current assets.

There were fewer statistically significant findings with respect to NFP MHS hospitals. As expected, NFP MHSs increased access to debt and made capital improvements to the physical plant. Contrary to expectations, they lowered liquidity levels.

Pooled Cross-Sectional Analysis

Discarding the matching design and pooling all the observations from all years resulted in a data base of 336 observations which could be analyzed in a pooled cross-sectional analysis. There were 252 hospitals which could be classified as independent NFP, 58 FP MHS hospitals, and 26 NFP MHS facilities. The independent NFP group was

large because it included all hospitals in the sample from the pre-acquisition years, plus 1984 and 1985 observations for hospitals which were not purchased.

To further examine differences between MHS and independent hospitals, both analysis of variance (ANOVA) and regression analysis of the pooled observations were performed for each financial ratio. Each ANOVA tested the hypothesis that the average financial performance was the same across the three groups. Results are presented in Table 19. Scheffe's method for multiple comparisons allowed pairwise examinations of group means for the purpose of identifying specific group differences. The results are presented in Table 20. Multiple regression analysis permitted examination of the effects of system membership on financial performance while controlling for extraneous variables. The results are presented in Table 21.

The hypothesis that the financial performance of MHS hospitals does not differ from that of the independents was addressed in two ways: (a) through the Scheffe comparisons of financial performance in MHS and independent NFP hospitals and (b) through the twenty-one regressions of hospital financial performance on system membership and control variables. The Scheffe comparisons of financial performance in FP and NFP MHS hospitals relate to the earlier hypothesis that FP and NFP MHS-acquired hospitals perform similarly. Although that was not the focal point of interest at this stage of the analysis, the findings are presented; they support the earlier results.

The ANOVAs and regressions presented here were done with outlier

observations removed. Outliers were identified by performing the multiple regression analysis, plotting the standardized residuals, and noting any observations with standardized residuals beyond positive or negative 3 (Canavos, 1984). The results of the original regression analysis (i.e., with outlier observations included) are presented in Appendix C, Table 9-C.

ANOVA

The results found in Table 19 suggested the hypothesis of equal means across the three groups of independent NFP, FP MHS, and NFP MHS hospitals could be rejected at the .05 level of statistical significance for all but one of the ratios. The ANOVA for the days in accounts receivable (DAYSAR) ratio produced an F statistic which failed to reach the .05 level of significance.

More information can be obtained from Table 20, which reports the pairwise differences between group means for each ratio. Scheffe's method for multiple comparisons was used to detect differences between group means at the .05 level of statistical significance. When the hypothesis of equal means was rejected through the ANOVA F statistic, Scheffe's method produced at least one statistically discernible contrast at the corresponding level of significance.

Liquidity. FP MHS hospitals held less cash (ACID and DAYCASH) than the group of all NFP independent hospitals. NFP MHS facilities had lower general liquidity (CURRENT and QUICK) than did NFP independent hospitals. They also took longer to pay their bills (AVPAY). These findings, while not totally parallel to those found in

TABLE 19: Average Financial Performance by Group

Variable	Independent NFP Number	Mean	FP MHS Number	Mean	NFP MHS Number	Mean	F
LIQUIDITY							
CURRENT	234	3.08	54	3.29	25	1.71	7.82*
QUICK	228	2.67	55	2.58	25	1.51	6.70*
ACID	225	.61	56	.07	25	.41	20.50*
DAYSAR	233	80.71	56	76.68	25	67.12	2.60
AVPAY	226	51.80	55	55.80	25	85.78	5.91*
DAYCASH	217	25.20	55	1.50	25	18.28	23.58*
CAPITAL STRUCTURE							
CASHDEBT	223	.31	55	.39	24	-.005	6.73*
FBTA	235	.60	55	.19	26	-.006	110.19*
TDFB	235	1.17	52	11.30	26	6.22	47.43*
LTDFB	235	.79	52	10.07	26	4.66	44.82*
LTDFA	231	.43	53	.78	26	1.13	31.28*
ACTIVITY							
CATURN	234	3.27	56	4.18	23	3.63	13.84*
FATURN	228	2.12	54	1.41	23	2.60	6.85*
TATURN	233	1.14	55	1.45	25	2.22	9.30*
PROFITABILITY							
MARKUP	237	1.24	56	1.33	26	1.26	5.79*
NONOPREV	233	.03	57	.002	26	.005	13.93*
ROE	233	.05	53	.30	22	-.15	8.99*
ROA	232	.04	54	.10	23	-.01	8.93*
OPMARG	231	.007	56	.07	26	-.04	14.28*
DEDUCT	232	.18	55	.19	25	.24	4.43*
AVERAGE AGE OF PLANT							
AGE	226	8.89	54	2.21	22	3.05	84.84*

* Significant at the .05 level or better

TABLE 20: Pairwise Differences between Group Mean Financial Performance

Variable	FP MHS Minus NFP Indep	NFP MHS Minus NFP Indep	FP MHS Minus NFP MHS
LIQUIDITY			
CURRENT	.21	-1.37*	1.59*
QUICK	-.10	-1.16*	1.06*
ACID	-.54*	-.20	-.34*
DAYSAR	-4.03	-13.59	9.56
AVPAY	4.00	33.98*	-29.98*
DAYCASH	-23.70*	-6.92	-16.78*
CAPITAL STRUCTURE			
CASHDEBT	.08	-.32*	.40*
FBTA	-.41*	-.61*	.20*
TDFB	10.13*	5.05*	5.08*
LTDFB	9.28*	3.87*	5.41*
LTDFA	.35*	.70*	-.35*
ACTIVITY			
CATURN	.91*	.36	.55
FATURN	-.71*	.48	-1.19*
TATURN	.31	1.08*	-.77*
PROFITABILITY			
MARKUP	.09*	.03	.07
NONOPREV	-.02*	-.02*	-.003
ROE	.25*	-.19	.44*
ROA	.06*	-.05	.11*
OPMARG	.06*	.05	.11*
DEDUCT	.01	.06*	-.05
AVERAGE AGE OF PLANT			
AGE	-6.69*	-5.85*	-.84

* Significant at the .05 level or better

Tables 17 and 18, tend to support the earlier analysis.

FP MHS hospitals differed from NFP MHS hospitals on almost every liquidity ratio. FP MHS hospitals were more liquid (CURRENT and QUICK), in general, but held less cash (ACID and DAYCASH) than NFP MHS hospitals did. They also took less time to pay their creditors than NFP MHS hospitals did. These findings support the earlier analysis reported in Table 12.

Capital Structure. FP MHS hospitals were more highly leveraged (TDFB, LTDFB, and LTDFA) than the NFP independents. Consequently, they displayed less equity financing (FBTA) than NFP independents did. The cash flow to service this debt (CASHDEBT) was not significantly different between the two groups. Considering the greater burden of debt assumed by the FP MHS hospitals, this may mean future solvency problems. Similar patterns were apparent in comparisons between NFP MHS hospitals and NFP independents. The NFP MHS hospitals used more debt (TDFB, LTDFB, and LTDFA) and less equity (FBTA) than independents did. However, they had significantly lower cash flow to service their debt (CASHDEBT) than did the NFP independents. That appears to be an even stronger indication of potential future financial problems than emerged from comparisons between FP MHS hospitals and independents. The preceding findings are similar to those reported in Tables 17 and 18.

From comparison of the two MHS categories, it is clear that FP MHS hospitals used more debt (TDFB and LTDFB) than did NFP MHS hospitals. They also had more cash to service that higher debt (CASHDEBT). Surprisingly, the NFP MHS hospitals had less equity (FBTA) than the FP

MHS facilities had. This financial anomaly seems to be due to the negative average fund balance found in the NFP MHS sector. Interestingly, FP MHS hospitals showed less long-term debt as a proportion of fixed assets (LTDFA) than did the NFP MHS facilities. That may be due to a slightly larger denominator (i.e., more, and perhaps, slightly less depreciated, assets) for this ratio in FP MHS hospitals. While these findings are similar to those found in Table 12, none of the earlier analyses of changes in capital structure ratios reached statistical significance.

Financial Activity. FP MHS hospitals were not as efficient in the use of fixed assets (FATURN) as the NFP independents were. That was, no doubt, due to the newer less depreciated assets (AGE) found among the FP MHS hospitals and the consequently larger denominator that FP MHS facilities had for FATURN. FP MHS hospitals showed a greater return on current assets (CATURN) than did NFP independents. The NFP MHS hospitals were able to generate more revenue on total assets (TATURN) than the NFP independents were. Findings with respect to FP MHS hospitals coincided closely with the findings of Table 17. Findings with respect to NFP MHS hospitals were slightly different, although not contradictory.

In a comparison of MHS hospitals in the two ownership categories with one another, NFP MHS facilities were found to be more efficient in the use of both fixed and total assets (FATURN and TATURN, respectively) than were their FP counterparts. The indication is that NFP MHS hospitals generated more operating revenue per dollar of fixed and total assets. This analysis generally supports the early findings

of Table 12.

Profitability. As expected, FP MHSs received less nonoperating revenue as a proportion of patient and other revenues (NONOPREV) than did the NFP independents. They were also generally more profitable (ROE, ROA, and OPMARG) than the NFP independents and marked up prices over expenses (MARKUP) to a greater extent than the NFP independents did. These findings support and are stronger than those reported in Table 17.

NFP MHSs received less nonoperating revenue as a proportion of patient and other revenues (NONOPREV) than the NFP independents did, and they lost a greater proportion of their patient revenues to charity, bad debts, or contractual allowances (DEDUCT) than did the NFP independents. The NFP MHS hospitals, however, were no more profitable than the NFP independents. Again, the direction of results was the same as presented in Table 18; however, none of the results of the earlier analysis reached statistical significance.

When FP and NFP MHS facilities were compared, three statistically discernible differences appeared. The return on equity (ROE), return on assets (ROA), and operating margin (OPMARG) ratios revealed FP MHS hospitals were more profitable than NFP MHS hospitals. These findings are similar to those of Table 12.

Average Age of Plant. The one ratio which examined the age of the physical plant (AGE), confirmed that systems revitalized plant and equipment. Both FP MHS and NFP MHS hospitals had newer, less depreciated assets than the NFP independents. These results are similar to those presented in Tables 17 and 18.

The MHS facilities did not differ by ownership on the AGE ratio. That is consistent with matched univariate finding (Table 12).

Comments. Differences between the ANOVA and matched univariate tests may be attributed to subtle differences between the two types of analyses. The matched univariate t tests examined changes in performance over time and compared each acquired hospital with its match. The t tests addressed the question of whether MHS-acquired hospitals improved financial performance following acquisition. The pooled ANOVA and regression analyses did not examine changes, but rather asked if MHS-acquired hospitals differed in performance from NFP independents. Statistical controls rather than matched comparisons were used.

Regression

Table 21 contains the results of twenty-one regressions of financial ratios on variables representing region, metropolitan or rural location, bed size, and membership in a FP or NFP MHS. The intent of the analysis was to examine the performance of FP MHS hospitals and NFP MHS hospitals in relation to all NFP independents while controlling statistically for those variables thought to be related to financial performance. Results may differ somewhat from those of the ANOVAs, which used no statistical controls.

The dependent variable in each regression is presented horizontally across the top of Table 21. Independent variables are listed vertically down the left-hand side of the chart. The first page of the table contains liquidity regressions. Page two completes

TABLE 21: Multiple Regression Analysis of the Effects of System Membership on Financial Indicators

	Dependent Variables									
	CURRENT		QUICK		ACID		DAYSAR		AVPAY	
Independent Variables	B (SE)	t	B (SE)	t	B (SE)	t	B (SE)	t	B (SE)	t
BORDER+	-.11 (.27)	-.43	-.20 (.23)	-.89	.02 (.09)	.17	-1.56 (4.40)	-.35	-5.28 (7.13)	-.74
SOUTH+	-.34 (.24)	-1.41	-.41 (.20)	-1.98**	.06 (.08)	.78	-4.96 (3.95)	-1.26	-2.06 (6.46)	-.32
METRO@	-.37 (.22)	-1.70*	-.37 (.19)	-1.96**	-.03 (.07)	-.38	4.89 (3.57)	1.37	14.10 (5.83)	2.42**
BEDS	-.00003 (.002)	-.02	.0008 (.001)	.58	-.0001 (.0005)	-.28	.07 (.03)	2.71***	-.006 (.04)	-.14
NFPMHS#	-1.44 (.37)	-3.88***	-1.24 (.32)	-3.91***	-.18 (.12)	-1.48	-15.43 (6.18)	-2.50***	32.67 (9.96)	3.28***
FPMHS#	.24 (.26)	.92	-.06 (.22)	-.25	-.55 (.09)	-6.36***	-3.46 (4.33)	-0.80	3.49 (7.04)	.50
Intercept	3.37 (.28)	12.04***	2.92 (.24)	12.13***	.60 (.09)	6.47***	73.25 (4.67)	15.69***	50.23 (7.63)	6.59***
F		3.60***		3.74***		6.91***		3.03***		3.21***
R^2		.07		.07		.12		.06		.06

* significant at the .10 level
** significant at the .05 level
*** significant at the .01 level or better

\+ Reference group includes TX, LA, MS, and ALA
@ Reference group is rural
# Reference group is NFP Independent

Table 21: Multiple Regression Analysis of the Effects of System Membership on Financial Indicators

	Dependent Variables									
	DAYCASH		CASHDEBT		FBTA		TDFB		LTDFB	
Independent Variables	B (SE)	t	B (SE)	t	B (SE)	t	B (SE)	t	B (SE)	t
BORDER+	3.63 (3.56)	1.02	.18 (.07)	2.58***	.06 (.04)	1.68*	.09 (1.06)	.08	.36 (.99)	.37
SOUTH+	4.33 (3.22)	1.35	.19 (.06)	2.99***	.005 (.03)	.14	-.08 (.95)	-.08	.16 (.89)	.19
METRO@	-.86 (2.90)	-.30	-.03 (.06)	-.49	-.09 (.03)	-2.80***	1.29 (.86)	1.50	.95 (.80)	1.19
BEDS	.02 (.02)	.76	.0008 (.0004)	1.92*	.0003 (.0002)	1.13	-.01 (.006)	-1.70*	-.009 (.006)	-1.51
NFPMHS#	-5.87 (4.91)	-1.20	-.28 (.10)	-2.92***	-.61 (.05)	-11.56***	4.99 (1.46)	3.42***	3.87 (1.36)	2.85***
FPMHS#	-23.85 (3.48)	-6.86***	.08 (.07)	1.14	-.41 (.04)	-10.81***	10.05 (1.07)	9.38***	9.20 (1.00)	9.21***
Intercept	20.78 (3.80)	5.47***	.10 (.07)	1.37	.58 (.04)	14.57***	1.99 (1.12)	1.77*	1.34 (1.05)	1.28
F		8.21***		4.43***		40.18***		16.59***		15.50***
R^2		.15		.08		.44		.25		.23

* significant at the .10 level
** significant at the .05 level
*** significant at the .01 level or better

\+ Reference group includes TX, LA, MS, and ALA
@ Reference group is rural
\# Reference group is NFP Independent

Table 21: Multiple Regression Analysis of the Effects of System Membership on Financial Indicators

	Dependent Variables									
	LTDFA		CATURN		FATURN		TATURN		MARKUP	
Independent Variables	B (SE)	t	B (SE)	t	B (SE)	t	B (SE)	t	B (SE)	t
BORDER+	-.20 (.07)	-2.67***	.19 (.18)	1.07	-.17 (.22)	-.77	-.21 (.19)	-1.12	.006 (.03)	.24
SOUTH+	-.02 (.07)	-.33	.04 (.16)	.23	-.35 (.20)	-1.76*	-.22 (.17)	-1.30	-.009 (.02)	-.38
METRO@	-.06 (.06)	-1.04	-.07 (.14)	-.46	.45 (.18)	2.43**	-.06 (.15)	-.38	.0008 (.02)	.04
BEDS	.0009 (.0004)	2.01**	-.001 (.001)	-1.26	-.005 (.001)	-3.64***	-.003 (.001)	-2.70***	.001 (.0002)	6.10***
NFPMHS#	.70 (.10)	6.98***	.37 (.26)	1.42	.41 (.32)	1.28	1.05 (.26)	4.06***	.02 (.04)	.55
FPMHS#	.35 (.07)	4.70***	.91 (.18)	5.19***	-.71 (.22)	-3.22***	.31 (.18)	1.70*	.10 (.03)	3.72***
Intercept	.41 (.08)	5.30***	3.38 (.19)	17.70***	2.73 (.24)	11.62***	1.65 (.20)	8.45***	1.13 (.03)	40.41***
F		13.20***		5.34***		5.45***		4.65***		8.70***
R^2		.21		.09		.10		.08		.14

* significant at the .10 level
** significant at the .05 level
*** significant at the .01 level or better

\+ Reference group includes TX, LA, MS, and ALA
@ Reference group is rural
# Reference group is NFP Independent

Table 21: Multiple Regression Analysis of the Effects of System Membership on Financial Indicators

Independent Variables	Dependent Variables: NONOPREV B (SE)	NONOPREV t	ROE B (SE)	ROE t	ROA B (SE)	ROA t	OPMARG B (SE)	OPMARG t	DEDUCT B (SE)	DEDUCT t	AGE B (SE)	AGE t
BORDER+	-.0005 (.005)	-.10	-.004 (.07)	-.06	.02 (.02)	1.35	.01 (.01)	.74	.003 (.01)	.19	-.10 (.57)	-.17
SOUTH+	.02 (.004)	3.53***	.05 (.06)	.82	.04 (.02)	2.91***	.006 (.01)	.50	.01 (.01)	.79	-.95 (.52)	-1.84*
METRO@	.01 (.004)	2.78***	.008 (.06)	.15	-.01 (.01)	-.86	-.02 (.01)	-1.31	-.007 (.01)	-.64	-.51 (.46)	-1.10
BEDS	-.000 (.000)	-2.29**	.0007 (.0004)	1.70*	.0002 (.0001)	1.62	.0003 (.0000)	3.58***	.0002 (.0000)	2.91***	-.008 (.003)	-2.36**
NFPMHS#	-.02 (.007)	-2.50***	-.19 (.10)	-1.84*	-.04 (.02)	-1.77*	-.05 (.02)	-2.39**	.06 (.02)	2.97***	-5.89 (.83)	-7.08***
FPMHS#	-.03 (.005)	-5.35***	.25 (.07)	3.52***	.05 (.02)	3.22***	.06 (.01)	4.47***	.01 (.01)	.78	-6.63 (.56)	-11.84***
Intercept	.02 (.005)	4.64***	-.06 (.08)	-.80	-.002 (.02)	-.09	-.03 (.02)	-2.00**	.15 (.01)	10.12***	10.41 (.62)	16.87***
F	10.38***		3.73***		4.79***		7.21***		3.05***		31.32***	
R^2	.17		.07		.09		.12		.06		.39	

* significant at the .10 level
** significant at the .05 level
*** significant at the .01 level or better

\+ Reference group includes TX, IA, MS, and ALA
@ Reference group is rural
\# Reference group is NFP Independent

the liquidity regressions and begins the capital structure regressions. The third page reports the last capital structure regression, the financial efficiency regressions, and begins the profitability regressions. The last page completes the profitability regressions and reports the regression for age of the physical plant.

Control variables used in each regression include two dummy variables for region (BORDER and SOUTH), one dummy for metropolitan or rural location (METRO), and a continuous variable representing bed size (BEDS). The independent variables of interest are two dummies representing membership in an NFP or FP MHS (NFPMHS and FPMHS). BORDER refers the states of Tennessee and Kentucky, which may be thought of as bordering on the northern region of the country. Border takes on a value of one if a hospital is located in one of the border states, and zero otherwise. In a similar fashion, SOUTH refers to the states of North Carolina, South Carolina, Georgia, and Florida. The reference for both regional dummies is the group of deep southern states: Texas, Louisiana, Mississippi, and Alabama. METRO refers to hospital location in a standard metropolitan statistical area (SMSA). The reference for this dummy is rural location. The reference for both NFPMHS and FPMHS is the group of all NFP independent hospitals.

In general, the regressions tended to support the findings from the ANOVAs reported above. To prevent unnecessary repetition, the account given below briefly presents findings and focuses on any discrepancies between the ANOVAs and regressions.

The Durbin-Watson statistic was used to test each regression for autocorrelation. Autocorrelation may occur in time series data when

successive residuals are positively correlated. When autocorrelation is present, tests of hypotheses involving either the Student's t or the F distribution are not valid (Canavos, 1984). Because the standard errors of the parameters tend to be under-estimated, "there will be a tendency to reject the null hypothesis when, in fact, it should not be rejected" (Pindyck and Rubinfeld, 1981, p. 153). What this means is that a beta coefficient may appear to be significantly different from zero when it is not.

The Durbin-Watson test statistic produces a value which must be compared with upper and lower bounds for testing the hypothesis of no autocorrelation. These bounds are contained in tables found in many statistical textbooks (for example, Canavos, 1984; Pindyck and Rubinfeld, 1981). There is reason for concern about autocorrelation in each of the regressions; however, the Durbin-Watson statistic confirmed the existence of autocorrelation in the regressions for CURRENT, QUICK, DAYSAR, AVPAY, FBTA, LTDFA, CATURN, FATURN, TATURN, MARKUP, NONOPREV, and DEDUCT. In these cases errors are autocorrelated. A transformation of the data to eliminate the problem is the preferred response. Because transformation would have entailed losing too many observations, the decision was made to present the regressions with acknowledgements of their limitations.

Liquidity. Six regressions allowed inferences to be drawn about the behavior of MHS hospitals in relation to NFP independents.

Holding constant for regional and metropolitan location and bed size, NFP MHS hospitals had significantly lower liquidity than independent NFP hospitals (CURRENT and QUICK). The collection period

on accounts receivable (DAYSAR) was significantly lower in NFP MHS hospitals, but those facilities took longer to pay their bills (AVPAY) than did the NFP independents. All these findings are similar to those from the ANOVAs with the exception of that on DAYSAR. No difference at the .05 level of significance was found in average collection period (DAYSAR) across groups in the ANOVA. The discrepancy is probably related to the presence of autocorrelation in the regression analysis. For that reason the DAYSAR regression findings should be discounted.

Like the ANOVAs, regression analysis found FP MHS hospitals held less cash (ACID and DAYCASH) than did independent NFP hospitals. No other liquidity regressions yielded statistically significant findings.

Capital Structure. The regressions corroborated findings from the ANOVAs. NFP MHS hospitals financed their assets with significantly greater proportions of debt (TDFB, LTDFB, and LTDFA) and had lower equity financing (FBTA) and less cash flow to support debt (CASHDEBT) than did NFP independents. FP MHS hospitals also used relatively greater levels of debt and lower levels of equity financing (TDFB, LTDFB, LTDFA, and FBTA) than the NFP independents did.

Financial Activity. Like the ANOVAs, the regressions revealed NFP MHS hospitals earned a significantly higher return on total assets (TATURN) than the NFP independents did. FP MHS hospitals made significantly more efficient use of current (CATURN) and less efficient use of fixed assets (FATURN) than the NFP independents did.

The only regression result which differed from the ANOVAs is the

finding that FP MHS hospitals earned a greater return on total assets (TATURN) than independent NFP facilities did. No difference in TATURN was found between FP MHS and NFP independent hospitals in the Scheffe comparison. The presence of autocorrelation in the regression analysis is the likely explanation. In this case the univariate findings are the more reliable.

Profitability. Similarly to the ANOVA findings, the regressions showed that NFP MHS hospitals realized significantly less revenue from nonoperational sources (NONOPREV) and higher deductibles (DEDUCT) than the independent NFPs did. Contrary to the ANOVA findings, NFP MHS hospitals were shown to be significantly less profitable (ROE, ROA, and OPMARG) than the NFP independents were. Again, autocorrelation is the likely explanation for the differences in findings.

Regression results for the profitability of FP MHS hospitals were the same as the ANOVAs. FP MHS hospitals marked up prices over expenses (MARKUP) more than NFP independents did. They also generated less nonoperating revenue as a percentage of operating revenue (NONOPREV). Finally, they were more profitable than the NFP independents as demonstrated by the return on equity (ROE), return on assets (ROA), and operating margin (OPMARG) ratios.

Average Age of Plant. Both NFP and FP MHS hospitals had newer, less depreciated assets than did the NFP independents. Regression results supported the ANOVAs.

Comments

In general, the pooled ANOVAs and cross-sectional regression

analyses supported the matched univariate findings for the effects of system membership on hospital financial performance. As expected, both FP and NFP MHS hospitals had newer facilities than the NFP independents did. Both types of systems financed plant and equipment with higher levels of debt. Although not observed in the matched univariate analysis, the pooled cross-sectional regression analysis found NFP MHS hospitals had lower cash flow to support debt than NFP independents did.

The FP MHS hospitals, compared to NFP independents, were more profitable--largely because of higher markups. The NFP MHS hospitals, on the other hand, were not significantly different from the independent NFPs on measures of profitability. Although no significant differences were found in the matched univariate analysis, the pooled cross-sectional regression analysis found NFP MHS hospitals to have lower nonoperating revenue and higher deductibles than NFP independents did.

Measures of liquidity showed FP MHS hospitals held less cash than the NFP independents did. NFP MHS hospitals tended to be less liquid than were NFP independents. The pooled cross-sectional regression analysis additionally showed NFP MHS hospitals took longer to pay their bills than the independent NFPs did.

Matched univariate and pooled cross-sectional multiple regression findings showed that FP MHS hospitals generated more revenue from investments in current assets (CATURN) but less revenue from investments in fixed assets (FATURN) than the NFP independents did.

What is perplexing are the financial activity findings with regard

to NFP MHS hospitals. Whereas the univariate analysis of changes in financial performance found NFP MHS hospitals significantly more improved than the NFP independents in the efficiency with which current assets (CATURN) were used, the multivariate analysis found the NFP MHS hospitals had significantly greater efficiency in the use of total assets (TATURN) than did NFP independents. Perhaps the discrepancies relate to differences in the handling of outlier observations in the two analyses and the presence of autocorrelation in the TATURN regression analysis.

Summary

The statistical analysis presented here fails to support the hypothesis that hospitals acquired by the FP and NFP MHSs perform similarly. While their financial performance at acquisition was not significantly different, they differed significantly from one another on a number of measures in the years following acquisition. The implication is that, over time, these FP and NFP MHS hospitals did not compose a homogeneous group. From a financial perspective, the results of operations were quite different. These findings were confirmed by the Scheffe comparisons of FP and NFP MHS hospitals.

Since FP and NFP MHS hospitals were found to perform differently, the hypothesis that MHS hospital financial performance does not differ from that of NFP independents was tested separately within each ownership category. Findings from both the paired univariate t tests of changes in performance and the multivariate pooled cross-sectional analysis suggest that FP MHS hospitals improved their access to debt

and increased their profitability, as predicted. Improved profitability was related more to higher markups than increased efficiency in the use of assets. NFP MHS hospitals also increased their access to debt; however, contrary to expectations, they did not increase profitability.

CHAPTER 5: CONCLUSIONS

Foundations of the Research

The objective of this research was to answer the following questions: (1) Are FP and NFP MHS-acquired hospitals similar in their financial performance? and (2) Are MHSs able to financially benefit their acquisitions? The first question asked whether ownership makes a difference in financial performance. The second question went beyond ownership to inquire into the financial benefits of membership in either a FP or NFP MHS.

A review of the theoretical literature suggested production efficiencies and improved access to capital as benefits of MHS membership. It was not clear, however, whether these benefits could be expected to accrue equally to FP and NFP MHSs. A number of theories suggest NFP organizations are less efficient and less profitable than their FP counterparts. On the other hand, many industry analysts believe the behavior of FP and NFP hospitals is becoming increasingly similar in today's cost-conscious reimbursement environment.

Previous research into the effects of MHS affiliation on hospital financial performance provided little evidence to support the realization of production efficiencies; however, increased debt utilization was well documented. Perhaps the most consistent finding

from studies conducted prior to Medicare prospective payment is that MHS hospitals tend to be more profitable in the production of patient services. Higher profitability has been attributed primarily to aggressive pricing.

The current study went beyond past research into MHS effects by examining the financial performance of a group of fully owned hospitals over time. Indicators of post-acquisition financial performance were taken from 1984 and 1985. In keeping with the theoretical literature on MHS effects, systems were hypothesized to improve the financial performance of acquisitions. Ownership was expected to have little impact.

Discussion of Findings

For-Profit/Not-For-Profit Ownership

The hypothesis that ownership makes no difference in the financial performance of MHS-acquired hospitals was not supported by the research findings. FP and NFP MHS-acquired hospitals were compared on the basis of average pre-acquisition financial performance and changes in average performance between the years just prior to acquisition and 1984/1985.

While there was no evidence to suggest FP and NFP MHSs target hospitals with different financial performance, they appear to operate the acquired facilities differently. On the basis of statistically significant findings, it appears FP MHS hospitals increased their overall liquidity but decreased cash holdings. In contrast, NFP MHS hospitals decreased overall liquidity while increasing relative levels

of cash. FP MHS hospitals shortened the time it took them to pay their bills while NFP MHS hospitals increased their average payment period.

The efficiency with which fixed assets were used decreased in FP MHS facilities but increased in NFP MHS hospitals. Since both FP and NFP MHS-acquired hospitals made capital improvements in plant and equipment, the implication is that FP MHS hospitals had yet to realize higher revenues from their investments.

FP MHS hospitals were able to improve their profitability, while NFP MHS hospitals exhibited decreases in profitability. Both FP and NFP MHS hospitals increased their prices, but FP MHS hospitals did so to a significantly greater extent than NFP MHS hospitals did.

These findings imply FP and NFP MHSs are indeed different. The profiles presented above suggest FP MHSs gave more attention to the bottom line than their NFP counterparts. There is also reason to believe FP MHS hospitals were operated in a more "business-like" manner. Decreased levels of cash in the context of increased overall liquidity may be due to more astute investment of previously nonproductive assets. Quicker payment of bills may have been intended to improve business relations.

No evidence of increased efficiency was available to support the contention of property rights theory. This was largely a function of the indicators used and represents a limitation of the research. FP MHS hospitals were found to increase their profitability through higher prices not increased efficiency in the use of assets. It is inappropriate to conclude, however, that MHS hospitals were

inefficient. Financial activity ratios measuring efficiency in the use of assets are gross indicators with limited applicability to economics theories. Certainly, many factors other than efficiency can effect these ratios. In this case, improvements to plant and equipment probably increased the denominator in the financial activity ratios resulting in smaller measures. Additional efficiency indicators incorporating specific input measures (FTEs and payroll expenses, for example) would be useful in further investigating efficiency.

Differences between FP and NFP MHS-acquired hospitals may be explained in a number of ways. First, The FP MHS sample contained hospitals purchased as early as 1978. The earliest acquisitions in the NFP MHS sample were from 1980. Perhaps the NFP MHS acquisitions did not have sufficient time to realize the improved profitability experienced in the FP sector. Another explanation may be found in the different missions of FP and NFP MHSs. FP organizations have an obligation to increase the wealth of their owners (i.e., the stockholders). NFP MHSs may be more community service oriented. Alternately, NFP MHS hospitals may not be managed as well or may face significantly different markets than their FP counterparts. Additional indicators measuring competition, casemix and payor mix would be helpful in examining the latter.

MHS Effects

In light of the demonstrated ownership differences, the performance of FP and NFP MHS hospitals in relation to NFP

independents was investigated separately. Both univariate and multivariate methods were employed. The univariate analysis involved a matched comparison of average financial performance over time. A pooled cross-sectional multiple regression analysis provided a second test of MHS effects. Table 22 provides a summary of variables found to be influenced by MHS membership in both univariate and multivariate tests.

FP MHS Financial Performance

Between the years 1978 and 1982, the FP MHSs acquired a sizable number of NFP independent hospitals. These were primarily government hospitals and have been described as financially distressed at the time of purchase (McCue and Furst, 1986). Based on theory, positive system effects were expected to follow in the form of higher liquidity measures, increased access to debt, increased financial activity, improved profitability, and replacement of deteriorating plant and equipment (Table 10).

The FP MHS-acquired hospitals turned out to be more liquid prior to purchase than expected. As a result, the only consistently significant liquidity finding ran counter to expectations. FP MHS-acquired hospitals were found to have lower not higher cash holdings (ACID and DAYCASH) than NFP independents. In retrospect, this does not necessarily reflect a negative impact of MHS ownership. Instead, the FP MHSs may have invested previously nonproductive cash and initiated the use of sophisticated cash management techniques.

Greater use of debt was expected and found. Debt (TDFB, LTDFB,

TABLE 22: Variables Affected by MHS Membership *

Variable	FP	NFP
LIQUIDITY		
CURRENT		
QUICK		-
ACID	-	
DAYSAR		
AVPAY		
DAYCASH	-	
CAPITAL STRUCTURE		
CASHDEBT		
FBTA	-	-
TDFB	+	+
LTDFB	+	+
LTDFA	+	+
ACTIVITY		
CATURN	+	
FATURN	-	
TATURN		
PROFITABILITY		
MARKUP	+	
NONOPREV	-	
ROE		
ROA		
OPMARG	+	
DEDUCT		
AVERAGE AGE OF PLANT		
AGE	-	-

* - Indicates MHS membership is associated with lower values on this ratio

\+ Indicates MHS membership is associated with higher values on this ratio

LTDFA) composed a larger proportion and equity (FBTA) a smaller proportion of the capital structure of FP MHS hospitals than of NFP independents.

There was one consistently positive and significant finding in the area of financial activity. FP MHS hospitals were found to earn a better return on current assets (CATURN), or to be more efficient in the use of current assets, than the NFP independents. A significantly lower return on fixed assets (FATURN) was found. Since FP MHSs acquired hospitals with initially high FATURN ratios and later made capital improvements (AGE), this finding is not surprising. Low fixed asset turnover ratios in relation to NFP independents may simply reflect sound business decisions to replace the deteriorating plant and equipment of acquired hospitals.

Higher prices, higher deductibles, and lower nonoperating revenue, along with improved profitability, were expected. In fact, the FP MHS-acquired hospitals were found to mark up prices over expenses (MARKUP) to a greater extent than NFP independents. The result was improved profitability from operations (OPMARG). Income from nonoperating sources (NONOPREV) was lower and may have contributed to the lack of significant differences between FP MHS-acquired hospitals and NFP independents in overall profitability (for example, ROE).

Reflecting upon the findings, it appears the FP MHSs took many of the steps necessary to improve the financial performance of acquired financially distressed hospitals. These systems purchased hospitals in need of improvements to their physical plants. Monies acquired through debt made possible by the MHSs were used to make capital

improvements. Furthermore, the FP MHSs may have had little recourse but to increase prices. For example, it is likely that the government hospitals, which were later purchased by the MHSs, relied heavily upon subsidizes from the community to continue operations. Following acquisition it was probably necessary to replace the lost nonoperating income previously available through gifts and tax revenues . Higher post-acquisition prices in FP MHS hospitals compensated for their lower nonoperating revenues (NONOPREV).

NFP MHS Financial Performance

NFP MHSs purchased hospitals which were not significantly different from those purchased by the FP MHSs. Similar outcomes with respect to increased liquidity, increased access to debt, increased financial activity, improved profitability, and replacement of deteriorating plant and equipment were hypothesized.

Expectations were met in the areas of capital structure and age of the physical plant. NFP MHS hospitals were found to use greater proportions of debt (TDFB, LTDFB, and LTDFA) and less equity (FBTA) than NFP independents. The NFP MHS hospitals also had newer less depreciated assets. Thus like their FP counterparts, the NFP MHSs borrowed to make capital improvements in the aging facilities they purchased.

Contrary to expectations, the NFP MHS hospitals were found to have lower liquidity (QUICK) than NFP independents. No significant differences were consistently found in the areas of profitability and financial activity. Profitability, as investigated here, involved

traditional accounting measures. It is important to remember, however, that NFPs may return value to their owners, "the community", in other ways. These may include, for example, support of educational and research activities, charity care, on-the-job training programs, and emergency room services (Long, 1976).

The failure to observe more significant differences between the financial performance of NFP MHS and independent hospitals may be due to the small sample size. An alternate explanation could be that NFP MHS acquisitions all occurred between 1980 and 1982. For a description of the number of FP and NFP MHS acquisitions by year see Appendix C (Table 10-C). Perhaps more time is needed to see the impact of NFP MHS membership on the profitability and financial activity of acquired hospitals. The preceding explanations would suggest that NFP MHSs have an impact on acquisitions which was not observed in this study. Perhaps the reverse is true. Because the missions of NFP MHS and NFP independent hospitals are similar, one could speculate that NFP MHS hospitals had higher costs related to community service. These higher costs prevented improvements in profitability and financial activity. The findings of the present study do not allow us to detect the correct explanation.

Limitations and Directions for Future Research

One of the primary weaknesses of the current research was the relatively weak linkages between theory and operational measures. Theory suggests FP organizations are more efficient than NFP organizations. Further, there are various explanations for the

inefficiency of NFP organizational forms. Efficiency measures selected for examination here proved to be poor indicators. No provision was made to test the different hypotheses about the origin of inefficiency in NFP health care organizations. Future research should concentrate upon developing clearer connections between theory, hypotheses, and operational measures.

Also with regard to efficiency, only gross financial indicators of this construct were available. The incorporation of efficiency indicators reflecting management decisions on staffing and other individual inputs would be useful in understanding any efficiency strategies employed by the MHSs.

Another weaknesses of this research was the relatively short periods between acquisition and follow-up for NFP MHS hospitals. This was due to an inability to identify NFP MHS purchases prior to 1980. To correct this problem, it would be useful to follow both groups of hospitals for a longer period. The minimal time for realizing system benefits is presently unknown.

It would be useful too to employ confirmatory factor analysis to develop measurement models of financial performance. In this fashion, the latent underlying dimensions of financial performance could be established.

Finally, the MHSs have experienced varying degrees of success in improving the financial performance of individual hospitals. It would be useful and interesting to identify the components of specific turnaround strategies. Are there different kinds of turnaround strategies? Does the successfulness of the strategy depend upon the

situation?

Implications

This study takes a retrospective look at the financial performance of NFP hospitals acquired by the MHSs. Although the number of acquisitions have slowed in recent years, the findings reported here have implications for at least two different areas of contemporary policy formation. These are anti-trust policy and the future of small rural hospitals.

There is increasing anti-trust activity in the hospital industry. As a result, it is useful for the Federal Trade Commission and Justice Department to understand more about the financial strategies typically employed by MHSs in improving the performance of acquisitions. A frequently asked question is whether hospital mergers are in the public interest. This study did not address the competitive impact of mergers; however, it confirmed a consistent finding from past research. MHSs tend to raise prices in acquired hospitals. Higher prices following acquisition suggest the need for continuing surveillance of merger activity. Although this study was unable to answer questions about efficiency gains, it suggests the need to closely monitor suspect mergers and inquire into potential savings from increased efficiency.

The second area for policy applications follows from the observation that the majority of study hospitals were financially distressed small rural facilities. With the increasing prevalence of financial distress in the hospital industry and rising closure rate,

one of the primary reasons to study MHS hospital performance is to determine the viability of system membership as a vehicle for hospital survival. Those hospitals hardest hit by the economic pressures of today's health care environment are small rural facilities. Of the 79 hospitals which closed in 1987, half served rural communities (Brice, 1988). Since these hospitals are frequently more dependent on Medicare, prospective payment hits them hardest. The more than 300 hospitals classified as sole community providers are a primary public policy concern.

The results of this study suggest that acquiring MHSs, particularly the FP MHSs, take steps to resolve the financial problems of acquisitions. However, these steps are not likely to be cost containing, at least not in the short run. The twin strategies of financing newer hospital plants and increasing prices raises, rather than lowers, hospital costs. These are not strategies which offer hope for financially troubled rural hospitals in today's environment.

MHSs are currently little interested in rural acquisitions. Many acquired rural hospitals have been sold. This is amply illustrated by the number of acquired hospitals identified by McCue and Furst (1986) but unavailable for follow-up here due to divestiture.

To protect rural hospitals, especially sole community providers, more favorable reimbursement treatment will almost certainly be necessary. In order for a hospital to maintain the trust of the community so necessary in the provision of medical care, steps must be taken to assure a sound financial base. Favorable reimbursement policies could once again make these hospitals attractive

acquisitions. MHS membership could bestow some of the benefits observed here. Judging from the slow down in mergers, this scenario is unlikely in the absence of definitive public policy decisions. In light of the anti-trust issues discussed above, any encouragement of MHS membership should be met with continuing public scrutiny.

Appendix A

Empirical Studies on the Effect of MHS Affiliation on Hospital Financial Performance

Author	Sample & Data	Methods	Findings
Wheeler et. al. (1982)	10 NFP hospitals under contract with a single NFP MHS; audited hospital financial reports	Longitudinal; Univariate	Improved profitability and reduced rate of increase in expenses; increased prices and improved efficiency in the use of fixed assets (i.e. fixed asset turnover) were also observed but these trends were in existence prior to initiation of the contract
Levitz & Brooke (1983)	All short-term, acute care nongovernment hospitals in the state of Iowa (20 system & 74 independent); 1981 AHA Annual Survey	Cross-sectional; Univariate	MHS hospitals used greater debt leverage, priced services higher, had higher deductibles & showed higher measures on some profitability ratios than the independent hospitals
Kralewski et. al. (1984)	20 NFP hospitals under contract with IO MHSs and a matched set of 20 traditionally managed hospitals; AHA data tapes	Longitudinal; Univariate	CM hospitals priced services higher and showed greater profitability following contract management than did the non-CM hospitals during the same time period; CM hospitals showed a greater decline in the percent of gross patient revenues collected

Appendix A (continued)

Author	Sample & Data	Methods	Findings
Alexander and Lewis (1984)	407 managed acute care community hospitals and 401 randomly selected independent hospitals; 1980 AHA Survey, 1981 Validation Survey of MHSs, 1980 & 1982 Area Resource Files	Cross-sectional; Multivariate	CM hospitals, particularly IO, used more debt than non-CM hospitals; CM hospitals, regardless of time under contract, tended to have lower liquidity; Old NFP managed hospitals reduced the collection period on accounts; Old IO CM hospitals were more efficient (i.e. higher fixed asset and total asset turnover ratios); new NFP managed hospitals had lower profitability; old IO managed hospitals charged higher prices
Coyne (1985)	Population of all AHA member hospitals; 1981 AHA data	Cross-sectional; Univariate	MHS hospitals, particularly the IO used greater debt leverage and were more profitable than the independent hospitals
Renn et. al. (1985)	A stratified random sample of 561 hospitals including MHS, non-system, IO, NFP, & government hospitals; 1980 Medicare Cost Reports, HCFA data, 1980 AHA Annual Survey; Area Resources File	Cross-sectional; Multivariate	IO MHS hospitals had higher prices and were more profitable than independent or system affiliated NFP hospitals; IO hospitals, both system and independent, used more debt leverage; Revenues to total assets were higher for both IO & NFP MHS hospitals relative to independents

Appendix A (continued)

Author	Sample & Data	Methods	Findings
McCue & Furst (1986)	50 NFP hospitals acquired by IO chains and 50 randomly selected nonacquired NFP hospitals; 1978 - 1982 data acquired through Medicare Cost Reports & the FAS data base	Cross-sectional; Multivariate	Acquired hospitals differed from nonacquired hospitals by being smaller and having older more depreciated assets, lower profitability, and greater debt usage
McCue & Lynch (1987)	Parent hospitals of 56 small systems and a matched set of 56 independent hospitals; 1984 balance sheet & income statement data from state agencies or Medicare fiscal intermediaries	Cross-sectional; Univariate	NFP church MHS hospitals had lower liquidity but a higher current asset turnover ratio than independent NFP church hospitals; Secular NFP MHS hospitals used more debt but were less profitable than other NFP independent hospitals

Appendix B

Following Koopmans' (1981) example, 5 or 10 percent trims were employed in this research. The following procedure was used to detect the need for a trimmed t test and construct the test for single samples:

(1) The sample distribution was examined to detect violations of normality, particularly, the presence of extreme outliers. The SAS PROC UNIVARIATE PLOT NORMAL procedure was used. SAS prints the sample interquartile range given as $Q_3 - Q_1$, where Q_3 is the observation for which 75 percent of the remaining observations had lower values and Q_1 is the value for which 25 percent of the remaining observation had lower values. Extreme outliers were defined as values which were more than 3 times the interquartile range below Q_1 or above Q_3. If extreme outliers were not detected and the distribution resembled a normal distribution as given by the SAS stem and leaf plot, normal probability plot and W (Normal) statistic, student's t was used in tests of statistical significance. If extreme outliers were detected, steps (2) through (7) were taken to construct trimmed t tests.

(2) Sampling distributions were trimmed in such a manner as to remove extreme outliers. In all cases, this involved either a 5 or 10 percent trim. A 5 percent trim was accomplished by removing 5 percent of the observations from each side of the data set. Similarly, a 10 percent trim was obtained by removing 10 percent of the observations from each side of the sample.

(3) The trimmed mean ($\bar{X}$) was calculated after the most extreme points were removed from both sides of the data set.

(4) In order to construct the denominator of the trimmed t test, a measure of the standard deviation had to be computed. Intuitively, it seems appropriate to take the standard deviation of the trimmed sample. As demonstrated by Tukey and McLaughlin (1963), a procedure which leads to a more accurate use of Student's t distribution makes use of the standard deviation of the Winsorized sample.

(5) The Winsorized sample was obtained by replacing trimmed values in the data set with the value of the point next in line to be removed if one more point were removed. Replacement was made on both sides of the distribution. For example, if three points were removed from both sides of a data set for a total of six deletions, six additional values were added to construct the Winsorized sample. If the most extreme values on the left side of the distribution were "a", "b", and "c" with "d" next in line, the Winsorized sample contained the value "d" in place of "a", "b", and "c". That is, "d" remained in the data set and also replaced the three deleted values. The result was that "d" was repeated four times. If "x", "y", and "z" were the most extreme values at the right end of the distribution with "w" next in line for removal if one more point were removed, the Winsorized sample contained "w" repeated four times. In this way, more attention was given to the ends of the data set. The standard deviation of the trimmed sample (i.e., the value that was used in the trimmed t

test) is given by:

$s_T = \{[(n - 1)(s_W^2)]/(h - 1)\}^{1/2}$,

Where, s_W = the Winsorized standard deviation,

n = the original sample size, and

h = the trimmed sample size

(6) The standard error of the trimmed mean was calculated by dividing the square root of the trimmed sample size into the trimmed standard deviation as constructed above. The standard error of the trimmed mean is given by:

$SE_{\bar{X}} = s_T/(h)^{1/2}$,

Where, s_T = the trimmed standard deviation, and

h = the trimmed sample size

(7) The formula for the trimmed t in the one sample case is given by:

$t_T = (\bar{X} - \mu)/SE_{\bar{X}}$

Where, $\bar{X}$ = the trimmed sample mean

μ = the population mean

$SE_{\bar{X}}$ = the standard error of the trimmed mean

Most of the trimmed t tests utilized here were one sample trimmed t's. Samples were composed of differences between values for study hospitals and their matches. The trimmed mean was tested to determine if it differed from zero.

In two cases, Tables 4-1 and 4-2, two sample trimmed t tests were employed. The two sample test based on trimmed means was carried out in a fashion analogous to that described above. Extreme outliers were identified as already described. Data sets for comparison were trimmed by the same percentage. A pooled standard deviation (s_p) was

used in the denominator. In the two sample case, the trimmed t is defined as:

$$t = (\bar{X}_{T1} - \bar{X}_{T2})/\{(s_p)[(1/h_1) + (1/h_2)]^{1/2}\},$$

Where, $s_p = [(h_1 - 1)s_{T1}^2 + (h_2 - 1)s_{T2}^2]/(h_1 + h_2 - 2)$

$\bar{X}_{T1}$ = the trimmed mean of the first data set,

$\bar{X}_{T2}$ = the trimmed mean of the second data set,

h_1 = the trimmed sample size of the first data set,

h_2 = the trimmed sample size of the second data set,

s_{T1} = the trimmed standard deviation of the first data set

s_{T2} = the trimmed standard deviation of the second data set

Development of the trimmed t test is attributed originally to Tukey and McLaughlin (1963). Koopmans (1981) presents a practical application of the original statistical theory. Both sources may be consulted for further information.

Appendix C

TABLE 1-C: Comparison of Average Pre-acquisition Financial Indicator Ranks for Hospitals Acquired by FP and NFP MHSs (Wilcoxon Rank Sum Tests)

	FP		NFP		
Variable	n	mean rank	n	mean rank	z score
LIQUIDITY					
CURRENT	29	21.97	13	20.46	.72
QUICK	29	21.66	13	21.15	-.11
ACID	29	23.48	13	17.08	-1.55
DAYSAR	29	20.55	13	23.62	.73
AVPAY	29	21.69	13	21.08	-.14
DAYCASH	29	22.69	13	18.85	-.93
CAPITAL STRUCTURE					
CASHDEBT	29	21.76	13	20.92	-.19
FBTA	29	21.59	13	21.31	-.05
TDFB	29	21.97	13	20.46	-.35
LTDFB	29	20.45	13	23.85	.81
LTDFA	27	19.31	13	22.96	.91
ACTIVITY					
CATURN	29	20.93	13	22.77	.44
FATURN	27	21.11	13	19.23	-.46
TATURN	29	23.07	13	18.00	-1.22
PROFITABILITY					
MARKUP	29	20.66	13	23.38	.65
NONOPREV	29	22.90	13	18.38	-1.09
ROE	29	21.69	13	21.08	-.14
ROA	29	22.24	13	19.85	-.57
OPMARG	29	21.31	13	21.92	.14
DEDUCT	29	20.10	13	24.62	1.09
AVERAGE AGE OF PLANT					
AGE	28	20.46	13	22.15	.41

TABLE 2-C: Wilcoxon Rank Sum Tests of Differences in Average Performance for Hospitals Acquired by FP and NFP MHSs (During Membership minus Before Membership)

	FP		NFP		
Variable	n	mean rank	n	mean rank	z score
LIQUIDITY					
CURRENT	29	24.31	13	15.23	-2.20**
QUICK	29	24.24	13	15.38	-2.15**
ACID	29	18.31	13	28.62	2.50**
DAYSAR	29	22.41	13	19.46	-.71
AVPAY	29	18.59	13	28.00	2.29**
DAYCASH	29	18.55	13	28.08	2.31**
CAPITAL STRUCTURE					
CASHDEBT	29	24.10	13	15.69	-2.04**
FBTA	29	22.52	13	19.23	-.79
TDFB	29	22.24	13	19.85	-.57
LTDFB	29	22.48	13	19.31	-.76
LTDFA	27	20.33	13	20.85	.12
ACTIVITY					
CATURN	29	20.62	13	23.46	.68
FATURN	27	18.11	13	25.46	1.85*
TATURN	29	19.38	13	26.23	1.66*
PROFITABILITY					
MARKUP	29	23.83	13	16.31	-1.82*
NONOPREV	29	19.48	13	26.00	1.58
ROE	29	23.97	13	16.00	-1.93*
ROA	29	24.24	13	15.38	-2.15**
OPMARG	29	24.97	13	13.77	-2.72***
DEDUCT	29	21.38	13	21.77	.08
AVERAGE AGE OF PLANT					
AGE	28	19.36	13	23.17	.93

* Significant at the .10 level
** Significant at the .05 level
*** Significant at the .01 level or better

TABLE 3-C: Wilcoxon Signed Rank Tests of Differences in Performance Variable Averages Between FP MHS Acquired Hospitals and Independent Matches in the Years before Acquisition (FP MHS Value minus Independent Value)

Variable	n	Signed Rank
LIQUIDITY		
CURRENT	29	-68.5
QUICK	29	-59.5
ACID	29	-86.5*
DAYSAR	29	31.5
AVPAY	29	27.5
DAYCASH	29	-79.5*
CAPITAL STRUCTURE		
CASHDEBT	29	6.5
FBTA	29	-38.5
TDFB	29	40.5
LTDFB	29	-48.5
LTDFA	27	-58.0
ACTIVITY		
CATURN	29	58.5
FATURN	27	125.0***
TATURN	29	142.5***
PROFITABILITY		
MARKUP	29	-26.5
NONOPREV	29	-14.5
ROE	29	-49.5
ROA	29	-10.5
OPMARG	29	-56.5
DEDUCT	29	-8.5
AVERAGE AGE OF PLANT		
AGE	28	15.0

* Significant at the .10 level
** Significant at the .05 level
*** Significant at the .01 level or better

TABLE 4-C: Wilcoxon Signed Rank Tests of Differences in Performance Variable Averages Between NFP MHS Acquired Hospitals and Independent Matches in the Years before Acquisition (NFP MHS Value minus Independent Value)

Variable	n	Signed Rank
LIQUIDITY		
CURRENT	13	-16.5
QUICK	13	-15.5
ACID	13	-23.5
DAYSAR	13	.5
AVPAY	13	9.5
DAYCASH	13	-15.5
CAPITAL STRUCTURE		
CASHDEBT	13	.5
FBTA	13	-9.5
TDFB	13	10.5
LTDFB	13	13.5
LTDFA	13	11.5
ACTIVITY		
CATURN	13	9.5
FATURN	13	12.5
TATURN	13	5.5
PROFITABILITY		
MARKUP	13	-17.5
NONOPREV	13	-14.5
ROE	13	-8.5
ROA	13	-5.5
OPMARG	13	8.5
DEDUCT	13	-24.5*
AVERAGE AGE OF PLANT		
AGE	13	-3.5

* Significant at the .10 level

TABLE 5-C: Wilcoxon Signed Rank Tests of Differences in Performance Variables for FP MHS Hospitals Before and During Membership (During Membership minus Before Membership)

Variable	n	Signed Rank
LIQUIDITY		
CURRENT	29	72.5
QUICK	29	57.5
ACID	29	-172.5***
DAYSAR	29	17.5
AVPAY	29	-39.5
DAYCASH	29	-198.5***
CAPITAL STRUCTURE		
CASHDEBT	29	19.5
FBTA	29	-196.5***
TDFB	29	169.5***
LTDFB	29	151.0***
LTDFA	27	120.5***
ACTIVITY		
CATURN	29	87.5*
FATURN	27	-85.0**
TATURN	29	-25.5
PROFITABILITY		
MARKUP	29	192.5***
NONOPREV	29	-191.5***
ROE	29	91.5**
ROA	29	74.5
OPMARG	29	163.5***
DEDUCT	29	110.5**
AVERAGE AGE OF PLANT		
AGE	28	-182.0***

* Significant at the .10 level
** Significant at the .05 level
*** Significant at the .01 level or better

TABLE 6-C: Wilcoxon Signed Rank Tests of Differences in Performance Variables for NFP MHS Hospitals Before and During Membership (During Membership minus Before Membership)

Variable	n	Signed Rank
LIQUIDITY		
CURRENT	13	-32.5**
QUICK	13	-32.5**
ACID	13	8.0
DAYSAR	13	-10.5
AVPAY	13	23.5
DAYCASH	13	7.0
CAPITAL STRUCTURE		
CASHDEBT	13	-31.5**
FBTA	13	-44.5***
TDFB	13	34.5**
LTDFB	13	33.5**
LTDFA	13	25.5*
ACTIVITY		
CATURN	13	22.5
FATURN	13	12.5
TATURN	13	17.5
PROFITABILITY		
MARKUP	13	17.5
NONOPREV	13	-26.0**
ROE	13	-16.5
ROA	13	-21.5
OPMARG	13	-9.5
DEDUCT	13	33.5**
AVERAGE AGE OF PLANT		
AGE	13	-27.0**

* Significant at the .10 level
** Significant at the .05 level
*** Significant at the .01 level

TABLE 7-C: Wilcoxon Signed Rank Tests of Changes in Performance of FP MHS Hospitals Relative to Matched Independent Hospitals (FP MHS Value minus Independent Value)

Variable	n	Signed Rank
LIQUIDITY		
CURRENT	29	103.5**
QUICK	29	73.5
ACID	29	-70.5
DAYSAR	29	-31.5
AVPAY	29	-66.5
DAYCASH	29	-118.5***
CAPITAL STRUCTURE		
CASHDEBT	29	-23.5
FBTA	29	-194.5***
TDFB	29	172.5***
LTDFB	29	161.5***
LTDFA	27	119.0***
ACTIVITY		
CATURN	29	88.5*
FATURN	27	-128.0***
TATURN	29	-24.5
PROFITABILITY		
MARKUP	29	78.5*
NONOPREV	29	-138.5***
ROE	29	77.5*
ROA	29	33.5
OPMARG	29	111.5**
DEDUCT	29	-71.5
AVERAGE AGE OF PLANT		
AGE	28	-148.0***

* Significant at the .10 level
** Significant at the .05 level
*** Significant at the .01 level

TABLE 8-C: Wilcoxon Signed Rank Tests of Changes in Performance of NFP MHS Hospitals Relative to Matched Independent Hospitals (FP MHS Value minus Independent Value)

Variable	n	Signed Rank
LIQUIDITY		
CURRENT	13	-23.5
QUICK	13	-30.5**
ACID	13	10.5
DAYSAR	13	-29.5**
AVPAY	13	14.5
DAYCASH	13	4.5
CAPITAL STRUCTURE		
CASHDEBT	13	-13.5
FBTA	13	-38.5***
TDFB	13	27.5*
LTDFB	13	32.5**
LTDFA	13	28.5**
ACTIVITY		
CATURN	13	45.59***
FATURN	13	7.5
TATURN	13	15.5
PROFITABILITY		
MARKUP	13	-2.5
NONOPREV	13	-25.5*
ROE	13	-15.5
ROA	13	-14.5
OPMARG	13	-3.5
DEDUCT	13	3.5
AVERAGE AGE OF PLANT		
AGE	13	-33.0***

* Significant at the .10 level
** Significant at the .05 level
*** Significant at the .01 level or better

TABLE 9-C: Multiple Regression Analysis of the Effects of System Membership on Financial Indicators

	Dependent Variables									
	CURRENT		QUICK		ACID		DAYSAR		AVPAY	
Independent Variables	B (SE)	t	B (SE)	t	B (SE)	t	B (SE)	t	B (SE)	t
BORDER+	-.06 (.31)	-.20	-.24 (.26)	-.94	-.05 (.11)	-.45	-36.88 (27.68)	-1.33	-33.93 (23.17)	-1.46
SOUTH+	-.44 (.28)	-1.61	-.50 (.23)	-2.16**	-.05 (.10)	-.45	-25.21 (24.85)	-1.01	-18.58 (21.03)	-.88
METRO@	-.14 (.25)	-.56	-.23 (.21)	-1.07	-.05 (.09)	-.54	-12.28 (22.51)	-.55	.03 (18.97)	.001
BEDS	-.002 (.002)	-.91	-.0003 (.002)	-.19	.00003 (.0007)	.04	-.10 (.16)	-.58	-.14 (.14)	-1.01
NFPMHS#	-1.22 (.43)	-2.87***	-.99 (.36)	-2.79***	-.16 (.16)	-1.03	106.99 (38.36)	2.79***	129.06 (31.92)	4.04***
FPMHS#	.50 (.30)	1.66*	.06 (.25)	.22	-.62 (.11)	-5.54***	-2.66 (27.33)	-0.10	4.06 (22.92)	.18
Intercept	3.59 (.32)	11.05***	3.10 (.27)	11.37***	.74 (.12)	6.14***	116.40 (29.33)	3.97***	85.38 (24.75)	3.45***
F		2.61**		2.17**		5.33***		1.88*		3.45***
R^2		.05		.04		.09		.04		.06

* significant at the .10 level
** significant at the .05 level
*** significant at the .01 level or better

\+ Reference group includes TX, LA, MS, and ALA
@ Reference group is rural
\# Reference group is NFP independent

Table 9-C: Multiple Regression Analysis of the Effects of System Membership on Financial Indicators

	Dependent Variables									
	DAYCASH		CASHDEBT		FBTA		TDFB		LTDFB	
Independent Variables	B (SE)	t	B (SE)	t	B (SE)	t	B (SE)	t	B (SE)	t
BORDER+	.56 (4.72)	.12	.19 (.11)	1.75*	.01 (.05)	.29	-.05 (2.94)	-.02	.22 (2.74)	.08
SOUTH+	-.80 (4.28)	-.19	.25 (.10)	2.58***	.02 (.05)	.40	2.30 (2.65)	.87	2.32 (2.47)	.94
METRO@	-2.81 (3.87)	-.73	-.03 (.09)	-.32	-.14 (.04)	-3.36***	-1.22 (2.39)	-.51	-1.37 (2.23)	-.61
BEDS	.03 (.03)	1.15	.0008 (.0006)	1.28	.0005 (.0003)	1.54	-.0009 (.02)	-.05	.0003 (.02)	.02
NFPMHS#	-4.56 (6.46)	-.71	-.61 (.15)	-4.12***	-.60 (.07)	-8.31***	5.41 (4.09)	1.32	4.26 (3.81)	1.12
FPMHS#	-26.16 (4.65)	-5.63***	.13 (.11)	1.23	-.48 (.05)	-9.42***	18.81 (2.91)	6.47***	17.43 (2.71)	6.42***
Intercept	25.26 (5.04)	5.02***	.11 (.11)	.95	.58 (.06)	10.61***	1.05 (3.12)	.34	.47 (2.91)	.16
F		5.74***		5.51***		26.13***		7.35***		7.26***
R^2		.10		.10		.34		.12		.12

* significant at the .10 level
** significant at the .05 level
*** significant at the .01 level or better

\+ Reference group includes TX, LA, MS, and ALA
@ Reference group is rural
\# Reference group is NFP independent

Table 9-C: Multiple Regression Analysis of the Effects of System Membership on Financial Indicators

	Dependent Variables									
	LTDFA		CATURN		FATURN		TATURN		MARKUP	
Independent Variables	B (SE)	t	B (SE)	t	B (SE)	t	B (SE)	t	B (SE)	t
BORDER+	-.22 (.18)	-1.26	-3.81 (1.79)	-2.13**	-.56 (.52)	-1.09	.54 (.71)	.77	-.36 (1.34)	-.27
SOUTH+	-.14 (.16)	-.85	-2.26 (1.60)	-1.41	-1.18 (.47)	-2.53***	-.57 (.64)	-.90	1.03 (1.20)	.86
METRO@	-.05 (.14)	-.32	-2.01 (1.45)	-1.39	.61 (.42)	1.45	.89 (.57)	1.55	-.91 (1.09)	-.84
BEDS	.0004 (.001)	.39	-.02 (.01)	-1.91*	-.01 (.003)	-3.43***	-.008 (.004)	-1.90*	-.003 (.008)	-.41
NFPMHS#	.64 (.25)	2.60***	14.25 (2.48)	5.75***	2.82 (.71)	3.94***	1.51 (.98)	1.54	.35 (1.87)	.19
FPMHS#	.78 (.17)	4.45***	1.00 (1.76)	.57	.08 (.51)	.16	1.73 (.70)	2.48***	2.78 (1.32)	2.11**
Intercept	.55 (.19)	2.96***	8.27 (1.89)	4.37***	3.90 (.55)	7.13***	1.87 (.75)	2.49***	1.60 (1.41)	1.14
F		4.35***		7.48***		6.16***		2.67**		1.16
R^2		.08		.13		.11		.05		.02

* significant at the .10 level
** significant at the .05 level
*** significant at the .01 level or better

\+ Reference group includes TX, LA, MS, and ALA
@ Reference group is rural
# Reference group is NFP independent

Table 9-C: Multiple Regression Analysis of the Effects of System Membership on Financial Indicators

Independent Variables	Dependent Variables											
	NONOPREV		ROE		ROA		OPMARG		DEDUCT		AGE	
	B (SE)	t	B (SE)	t	B (SE)	t	B (SE)	t	B (SE)	t	B (SE)	t
BORDER+	-.02 (.02)	-1.02	.38 (.20)	1.90*	.09 (.05)	1.66*	.04 (.02)	1.52	-.01 (.02)	-.55	-3.12 (2.06)	-1.51
SOUTH+	-.009 (.01)	-.59	.13 (.18)	.73	.12 (.05)	2.49***	.05 (.02)	2.38**	-.02 (.02)	-1.54	-2.74 (1.86)	-1.47
METRO@	.05 (.01)	3.47***	.31 (.16)	1.93**	-.004 (.04)	-.10	-.05 (.02)	-2.55***	.02 (.01)	1.39	-1.97 (1.67)	-1.18
BEDS	.000 (.000)	2.82***	.002 (.001)	1.48	.0007 (.0003)	2.09**	-.000 (.0001)	-.49	.0005 (.0001)	4.51***	-.02 (.01)	-1.80*
NFPMHS#	-.04 (.02)	-1.93**	-1.12 (.27)	-4.06***	-.39 (.08)	-5.12***	-.01 (.03)	-.39	.03 (.02)	1.13	4.01 (2.95)	1.36
FPMHS#	-.04 (.02)	-2.59***	-.01 (.20)	-.07	.04 (.05)	.75	.10 (.02)	4.17***	-.003 (.02)	-.19	-6.56 (2.02)	-3.25***
Intercept	.005 (.02)	.28	-.42 (.21)	-1.99**	-.12 (.06)	-1.98**	-.02 (.02)	-.83	.13 (.02)	7.28***	14.12 (2.22)	6.37***
F		6.21***		4.33***		7.22***		5.74***		5.24***		3.61***
R^2		.11		.08		.12		.10		.09		.07

* significant at the .10 level
** significant at the .05 level
*** significant at the .01 level or better

\+ Reference group includes TX, LA, MS, and ALA
@ Reference group is rural
\# Reference group is NFP independent

Table 10-C: Year of Acquisition by MHS Ownership Type

MHS Ownership	Year of Acquisition					
	1978	1979	1980	1981	1982	Total
For-Profit	2	2	8	16	1	29
Not-For-Profit			2	5	6	13

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