AN ANALYSIS OF ORGANIZATIONAL STRUCTURES WITHIN RURAL MULTI-HOSPITAL SYSTEMS

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ABSTRACT

This study examines rural southern hospitals that are part of a multi-hospital system. Using AHA data, three financial variables: cash-on-hand, operating margin, and return on equity serve as dependent variables in the analysis of covariance models. The treatment variable is the profit/non-profit status of the hospital and the covariate is the size of the hospital, as measured by the number of hospital beds. Results indicate that for-profit hospitals, on average, keep 27.26 fewer days of cash on hand than non-profit hospitals. Operating margins and return on equity are larger for profit than for non-profit hospitals, an average difference of 5.6% and 8.36% respectively.

INTRODUCTION

Considering the increasing challenge to provide access to affordable healthcare in the United States and its effect on the economy, it is critical for patients, healthcare organizations, financial institutions, and federal and state agencies to understand the impact of different organizational structures of affiliated hospitals. The primary objective of this study is to investigate the relationship of different organizational structures within rural multi-hospital systems (MHS) to the hospitals' financial performance.

Currently, healthcare represents nearly 18% of the entire U. S. economy and is one of the few bright spots in terms of job growth. Hospitals are an integral part of our healthcare system. In 2010, there were 5,724 registered hospitals in the United States, 4,972 (86%) of which were community hospitals, 3007 (60%) belonged to a system and 1,535 (30%) were part of a network [2]. In 2010, 1,987 hospitals in the United States (34.5% of total) were classified as rural hospitals, serving primarily rural populations [2]. One of the largest issues with many hospitals, especially ones located in rural areas, has been the financial viability of their business model.

LITERATURE REVIEW

The Hill-Burton Act, helped rural hospitals utilize over $4.6 billion in grants and $1.5 billion in loans and grants which helped the construction of about 6,800 healthcare facilities in more than 4000 communities [16]. The federal government attached provisions to any funds that states received. These included: facilities or a soon-to-be updated portion of a facility must be made available to all persons residing within the territorial areas of the application, and a portion of

facilities being built or modernized had to be made available to members of the community who cannot pay for medical treatment [16][23].

A 2004 study found that over half of the converted Critical Access Hospitals (CAHs) were losing money prior to their affiliations and new payment structure allotted as a result of being categorized as a Critical Access Hospital [6][13]. A 2009 study found that rural hospitals that converted to a CAH were able to increase their operating revenue, expenses, and margins significantly [13]. After the conversion, these hospitals increased their profit margin by 2 to 4% [22]. In 2001, one in every nine hospitals was a CAH. A year later, one in every seven hospitals and one in every three non-metropolitan area hospitals were classified as CAH.

Several studies have addressed the issue of organizational structure and its effect on financial performance. For instance, Mullner and colleagues took a look at the closures of 161 CAHs from 1980 to 1987. These hospitals were then match-controlled with 482 rural hospitals that had remained open during this same period of time. This study determined that system affiliation significantly decreased the risk of rural hospitals closing [19]. Cleverly conducted a larger study that explored 5,722 hospitals with complete Medicare Cost Report data for the three year time period of 1986 through 1989.This study utilized a matching function with a comparison linkage to independent hospitals and/or independent hospital systems. This research concluded that system hospitals had a higher return on equity and higher costs per care mix-adjusted discharge, higher profits through more aggressive pricing strategies, and greater capital investments when compared to independent hospitals. [8]

Joining a multi-hospital system can be viewed as a strategic financial decision to assist rural hospitals in mitigating their financial risk. The American Hospital Association (AHA) defines MHS as nonfederal and non-state hospitals that are leased, under contract management, legally incorporated, and/or under the direction of a board of directors, that determine the central direction of two or more hospitals. These hospitals are assigned system identifiers in a given year that retain the same identifier as another hospital [9][15]. The current multi-unit hospital structures are the byproducts of the mergers and affiliations that started in the late 1960s. [14]

Multi-hospital systems can differ on many different dimensions; one main difference is the type of hospital's organizational financial structure. The term "profitability" has taken on different meanings. Some researchers define profitability by its strict accounting definition, while others address it with respect to cash flow. [17] For this study, profitability status defined as either "for-profit" or "not-for-profit" will be based on its true accounting origins.

The two main profit structures are for-profit and not-for-profit. For-profit organizations are ones run by stakeholders and issue stock in these companies. They include investor-owned and private hospitals. Not-for-profit organizations are organizations that do not earn a profit, but are able to hold portions of their earnings in reserve for future expenses. Financial ratios are also an important area within organizations as they provide adjusted benchmarks with respect to how an organization is positioned compared to its peers. These measures include: days cash-on-hand, total operating margin, and return on equity. Days' cash-on-hand is a commonly used liquidity measure that indicates the amount of cash that is readily available for an organization's day-to-day monetary requirements. Total operating margin is the most commonly used ratio to measure

a hospital's financial performance. If total operating revenue is less than total operating expenses, the organization is operating at a loss and will have a negative operating margin. [18] Return on equity provides an indication of how much profit a company earned in comparison to the total amount of shareholder equity outstanding.

A 2003 study found higher cash flow margins in for-profit hospitals compared to not-for-profit hospitals. This stems from better internal factors, most notably lower overhead staffing and benefit expenses. [5] Cash flow is seen as the optimal element within hospitals to indicate financial performance. It is less subjective to variations in accounting practices. In many cases, organizations can utilize different aspects of generally accepted accounting practice to manipulate financial elements of profitability. Additionally, cash is used by organizations to pay expenses and is one of the true benchmarks because it has very little variation between organizations.

Days' cash- on- hand is viewed as an important variable by many financial scholars and represents a measure that helps to predict a company's financial stability. Ultimately the higher the number of days' cash-on-hand, the more funds that an organization has to pay both long and short term liabilities. This financial element especially is important for healthcare organizations, as it helps to predict current and future availability of sustainable funding for all operations. An analysis of current research found no studies that explored the relationship between cash-on-hand and the organizational structure of rural hospitals. [18]

A positive operating margin indicates that the hospital is obtaining patient related income that is above the cost of patient services. In contrast, a negative operating margin would provide information that a hospital is obtaining income from patient care that is below the costs of patient services [3]. Several investors view return on equity (ROE) as a benchmark that indicates how well a company is able to utilize the equity stakes within their organization. Return on equity has been seen by many, especially within the insurance and other financial related industries, as one of the major indicators of the overall financial health of a company [10]

Theoretical Framing

Burns and Stalker originated the elements of contingency theory when they conducted research on internal management practices and environmental factors. [4] Ultimately their research concluded that there were two main structural types: mechanical and organic. The type of structure that an organization initiates should be heavily based on the environment in which they conduct business. In more rigid, stable, and/or predictable environments, a company would choose a more mechanical organizational structure. However, in a more fluid, changing, or unreliable environment, a company should choose an organic organizational configuration. [4] This theory was examined further in a 1962 study by Chandler, which concluded that environmental changes in population, income, and technology are major organizational drivers of change and can cause new methods of conducting business for an organization. [7]

Profitability as a financial term can be somewhat vague and misleading especially as applied to the hospital sector. A hospital that is referred to as "not-for-profit" does not indicate that the hospital does not make a profit; rather, according to the American Hospital Association, it indicates that "not-for-profit" hospitals have been making profits and are for the most part

financially viable hospitals. The profit structure of a hospital, either for-profit or not-for-profit, is a legal distinction that imposes limitations on how the hospital can distribute profits, as well as the hospital's ability to receive tax-deductible donations along with tax-exempt status. Clearly, hospitals are required to maintain profits in order to maintain and/or expand their facilities. [21]

DATA

The data for this study are obtained directly from the 2011 American Hospital Association (AHA) Annual Survey and the American Hospital Directory (AHD) 2012 dataset. Both datasets were secondary data. The researcher had no direction interaction with any hospital. The AHA 2011 Annual Survey dataset was obtained via download directly from HealthDirect. Throughout the year, the data is updated because information may be missing, changed or incorrect. The dataset obtained from the AHD utilized 2012 data. This dataset is the most recent annual dataset available and was based on data obtained from the 2012 CMS Medicare Compare National Dataset. The final dataset was constructed based on the researchers' specifications.

The AHA is a single dataset that includes the most reliable information about hospitals within the United Sates and associated areas. The survey generates estimates from the previous year's responses and from comparisons to hospitals of similar size and orientation. If there are any unusual variations in reported characteristics from one year to the next, the data administrators will contact the hospital for clarification. The data are a primary source of hospital-level data for government agencies, including the Center for Disease Control and Prevention, Centers for Medicare and Medicaid Services and a number of industry-related companies. These data are viewed as the industry benchmark as they contain valuable insights into our nation's current hospitals. [2]

Currently the AHA dataset tracks hospital demographics and characteristics. This includes information pertaining to hospital leadership, strategic planning, service-line offering, beds, utilization, finance human resource management, information management, process management, patient-centered focus satisfaction, and staffing. An added level of analysis is implemented to ensure the highest data quality. Hospital data are compared to information obtained in previous years with regard to hospital type, size, and geographic location. The data is updated monthly from information obtained directly from Medicare. The preliminary data on hospitals are updated monthly from April to September, with finalized data available in October. [1]

The American Hospital Directory provides online data for over 6,000 hospitals and is a privately owned Subchapter S Corporation incorporated in the State of Kentucky. The company has no third-party relationships that could influence the services provided. The main sources of revenue are subscriptions to the company's website, ahd.com, and the sale of custom data services. Most of the data used on the website or in their custom data services is obtained from Medicare claims data (MedPar and OPPS), hospital cost reports, and other files obtained from the Centers for Medicare and Medicaid Services (CMS). It is important to note that the AHD is not affiliated with the American Hospital Association (AHA) and is not a direct source for AHA data.

This research is exploring rural southern hospitals as most of the current research on this topic explores either only urban multi-hospital systems, all hospitals nationally or select individual hospitals. It attempts to fill a void with respect to the current literature by providing valuable information with respect to a somewhat overlooked, but very valuable part of our nation's healthcare delivery system. Southern states were chosen for two primary reasons: they have shown a large amount of growth over the last ten years, and an overwhelming majority of rural multi-hospitals are located within southern states.

According to the U. S. Census [24], states classified as "South" include Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, West Virginia, Delaware, Alabama, Kentucky, Mississippi, Tennessee, Arkansas, Louisiana, Oklahoma and Texas. It should be noted that this dataset does not include any observations from Delaware. Approximately 49% of the southern states in the study were from the southern Atlantic region, while the other 51% were from the east and west south central states.

These hospitals were classified as located in a rural area; there were no hospitals located in an urban area. Rural hospitals were further classified as centralized, decentralized, or semi-centralized; however information on their profit/non-profit status was missing. Therefore, data on the profit status of hospitals was obtained from a nationally recognized website, HospitalsCenter.com. [11] As previously noted in the 2000 article by Rickett and Heaphy, over half of rural hospitals are non-profit or government owned hospitals [20]. The final sample consists of 123 rural Southern hospitals that are part of a multi-hospital system, of which 77 (62.6%) are non-profit and 46 (37.3%) are for-profit institutions. All but four of the hospitals were not critical access. The final sample size was reduced compared to the size of the original data set due to missing values.

Within the sample, agency characteristics of hospitals included not only the actual profit status of a hospital (profit/non-profit), but the size of the hospital based on the number of beds, and if the hospital was critical access (CAH) or not. These traits are known to be important as they help clarify the dynamics of each hospital as it relates to the hospital's main financial indicators of days cash-on-hand, operating margin, and return on equity.

METHODOLOGY

An initial examination for possible correlation between the financial variables days' cash-on-hand, operating margin, and return on equity reveals virtually no multivariate correlation as measured by variance inflation factors of approximately 1. Therefore, although the use of multiple dependent variables would usually suggest the use of a MANCOVA model, the lack of a sufficient degree of correlation (r values considered to be between .3 and .9, or comparable VIFs between 1.43 and 10), necessitates the use of three separate analyses of covariance (ANCOVA) models instead. These models are run utilizing a GLM modeling procedure.

An analysis of covariance procedure evaluates whether population means of a dependent variable are the same for all levels of a categorical dependent variable, while controlling for the effects of a quantitatively measured covariate(s). The means of the dependent variable are adjusted to what they would be if the treatment groups were equal for all covariates. [12] The treatment

effect variable in the model is the organizational status of the hospital, ie whether the hospital is a for-profit or non-profit institution. The covariate, hospital beds (hospbeds), is a measure of the size of the hospital. Since all but four of the hospitals are not critical access entities, this variable was not included in the model due to a lack of variability.

RESULTS

The results are shown in the three tables on the following page. Overall, all three models were significant with p values of .0012, .0016, and .0137 respectively. Table 1 shows the results of the ANCOVA model for days' cash-on-hand. The treatment variable, profit/non-profit status is significant at a p value (pr>F) of .0004. The covariate hospital beds is insignificant (pr>F=.2433). Least square means are then computed for the profit (i=1) and non-profit (j=2) groups. The use of a Bonferoni multiple comparisons test reveals that for-profit hospitals keep 6.084 days of cash-on-hand compared to non-profit hospitals, which keep 33.351 days of cash on hand, a significant difference of -27.26.

Table 2 shows the results of the ANCOVA model with operating margin as the dependent variable. It also shows the profit/non-profit status effect as significant (pr>F=.0021). The covariate hospital beds are significant at a p value of .0404. The LS means show an average operating margin of 5.335% for profit hospitals and -.268% for non-profit ones, a significant difference of 5.6%. Over half of the non-profit hospitals in the sample had negative operating margins.

Table 3 results confirm a significant difference between return on equity of profit and non-profit hospitals at a pr>F value of .0038. As with the days cash-on-hand model, hospital beds are insignificant in this equation. The least squares means for profit and non-profit hospitals for ROE are 13.47% and 5.11% respectively, revealing a significant difference of 8.36%.

The assumptions underlying the models were tested. The homogeneity of variances is confirmed, as is the independence of the effect (profit/non-profit) and covariate variables. The former is verified by plotting the residuals of the model against the predicted values. To check for independence of the effect and covariate variables, an interaction term between the two was included in the models. Since the interaction term was insignificant in all three models, it was removed and proof of independence was established. The only assumption that is violated concerns the multivariate normality assumption. Tests of normality reveal p values of <.01, .0694, and .0383 for models 1-3 respectively. All outliers were removed from the original data, so the non-normality in models 1 and 3 is caused by skewness in the data. Since the number of observations in each treatment group exceeds 30 and non-normality is not severe, except for the days' cash-on-hand model, the results should be fairly robust. Caution, however, should be utilized when interpreting the results of the days' cash-on-hand model.

Table 1
ANCOVA for Days Cash- on- Hand (n=119)

Source	df	TYPE III SS	Mean Square	F value	PR>F
Profit	1	20775.72627	20775.72627	13.11	.0004
Hospbeds	1	2178.93406	2178.93406	1.38	.2433

Least Squares Means

Profit Status	Cash LS Mean	Ho:LSmean1-LSmean2=0: pr>T
1 (Profit)	6.084606	.0004
2(Non-Profit)	33.351779	

Least squares means for effect Profit

i	j	Difference between means	Simultaneous 95% confidence limits for differences	
1	2	-27.267173	-42.180038	-12.354309

Table 2
ANCOVA for Operating Margin (n=121)

Source	df	TYPE III SS	Mean Square	F value	PR>F
Profit	1	877.1058124	877.1058124	9.92	.0021
Hospbeds	1	379.6014237	379.6014237	4.29	.0404

Least Squares Means

Profit Status	Opmargin LS Mean	Ho:LSmean1-LSmean2=0: pr>T
1 (Profit)	5.335302	.0021
2(Non-Profit)	-.268366	

Least squares means for effect Profit

i	j	Difference between means	Simultaneous 95% confidence limits for differences	
1	2	5.603668	2.080450	9.126887

Table 3
ANCOVA for Return on Equity (n=117)

Source	df	TYPE III SS	Mean Square	F value	PR>F
Profit	1	1898.715276	1898.715276	8.75	.0038
Hospbeds	1	15.296925	15.296925	.07	.7910

Least Square Means

Profit Status	Roe LS Mean	Ho:LSmean1-LSmean2=0: pr>T
1 (Profit)	13.479538	.0038
2(Non-Profit)	5.114714	

Least squares means for effect Profit

i	j	Difference between means	Simultaneous 95% confidence limits for differences	
1	2	8.364825	2.764505	13.965144

CONCLUSION

The results obtained in this study will help both community and financial stakeholders' understanding of financial viability within rural southern hospitals. The number of community hospitals in rural areas decreased by 11.8% between 1980 and 1998, largely due to hospital closures, mergers, and conversions [20]. Ensuring the hospitals within rural communities not only are financially viable, but also are able to be stable within their community is critical to the sustained success of the rural south. This study is helpful in providing the basis for which future researchers can explore other financial and organizational structure elements, as well as their possible interactions. Future research could expand this study to look at all national rural multi-system hospitals, hospital affiliation and/or a combination of other organizational elements with respect to both rural and urban hospitals.

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