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The Efficiency Frontier of For-Profit Hospitals

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Abstract

This study evaluates the efficiency of small and large for-profit hospitals using Data Envelopment Analysis (DEA). For this study, small for-profit hospitals are 35 beds or less which is consistent with the Federal designation of critical access hospitals (CAH). Large for-profit hospitals are 36 beds and greater. Results indicate overall efficiency in small for-profit hospitals was 60% in 2013. In contrast, the overall efficiency in large for-profit hospitals was 71% in 2013. The number of small for-profit hospitals operating on the efficiency frontier was 18 which represent 12%. Similarly, the number of large for-profit hospitals operating on the efficiency frontier was 49 which represent 8%. This clearly documents for-profit hospitals' overall efficiency increases with greater size. Hospital executives, healthcare policymakers, taxpayers and other stakeholders benefit from studies that improve hospital efficiency. From a policy perspective, this study demonstrates a positive association between increased hospital size and increased efficiency within the for-profit hospital industry.

Key words: Hospital efficiency, for-profit hospital efficiency, data envelopment analysis, DEA.

INTRODUCTION

Health expenditures in 2013 increased 3.6 percent to reach $9.2 trillion or $9,255 per person. Additionally, healthcare spending in 2013 remained at 17.4 percent of Gross Domestic Product (GDP). Healthcare spending as a percent of GDP has remained consistent since 2010 because the economy and healthcare have grown at similar rates. The largest component of healthcare spending is hospitals which increased 4.3 percent to $936.9 billion in 2013 (CMS 2013).

For-profit hospitals provide a wide range of clinical services and are a significant resource in their local communities. As discussed by Harrison & Sexton (2004), acute care hospitals provide a wide range of services geared to improving the health status of their community. Unfortunately, for-profit hospitals face organizational and environmental challenges which include changing patient demographics, advancements in technology, increasing cost of capital and the need to operate more efficiently.

As state and federal governments face increasing financial pressures, for-profit hospitals are facing reduced reimbursement rates as well as increased competition. For example, lower federal reimbursement through value-based purchasing as well as reduced commercial rates are having a negative impact on hospital revenues. As a result, for-profit hospitals are being challenged to increase efficiency in order to gain greater access to capital and remain competitive in the changing healthcare market (Harrison & Sexton, 2004). According to Harrison, McCue, Wang & Wolfe (2003), as industry pressures mount many hospitals are being acquired, merging or closing. Recognizing this trend, the for-profit industry has been acquiring not-for-profit hospitals. This helps the acquired hospital to improve its ability to respond to environmental challenges and return the hospital to profitability. Those for-profit hospitals that approach the efficiency frontier have the best opportunity for profitability and long-term survival. As discussed by Cooper, Seiford & Tone (2003), the efficiency frontier is where inputs and outputs are maximized. This efficiency frontier becomes the optimal solution as for-profit hospitals search for the best practice solution.

For-Profit Status

For-profit hospitals are owned by equity based investors and have a well-defined organizational goal of profit maximization (Lee, Yang & Choi, 2008). As a result, the management team of for-profit hospitals answers to the shareholders of the company. These shareholders are interested in seeing a return on their investment; therefore, the hospital must be able to consistently generate a profit. Although for-profit hospitals' mission is to make a profit, they do provide uncompensated care to the most vulnerable members of their community and thereby improve the health status of the local community.

For-profit hospitals are a major provider of healthcare in the United States, providing care to millions of Americans. They provide care to all segments of the population with an eye to improving the health status of the community in which they are located. Additionally, for-profit hospitals make significant investments in their community by investing capital, employing their personnel, and maintaining their facilities with up-to-date medical technologies to provide the best care possible to their patients.

For-profit hospitals are generally smaller in size than their not-for-profit counterparts and as a rule offer fewer services. Farsi & Filippini (2008) suggested that hospitals with wider ranges of specialization are more costly to operate than those that specialize in fewer categories of medical services. By offering less specialization in their hospitals, for-profit hospitals keep their cost structure under control and maximize the quality of care they provide while maintaining a return on investment for their shareholders.

Literature Review

As the population continues to age and the Affordable Care Act (ACA) expands the population of insured Americans, for-profit hospitals face a changing environment with growing financial pressure. According to the Kaiser Foundation, prior to the start of the

ACA there were 41 million uninsured in 2013. At that time, 61% of uninsured adults said the main reason they were uninsured was because the cost was too high or they had lost their job. Additionally, in 2013 nearly 40% of uninsured adults had outstanding medical bills and 20% said these medical bills caused serious financial impact. The health insurance component of ACA went into effect in 2014 and expanded coverage to adults through a health insurance marketplace (Kaiser Health Foundation, 2014). Thus far in 2015, family enrollment in the health insurance marketplace through ACA has exceeded 9.5 million enrollees (Robert Wood Johnson Foundation, 2015). These trends further heighten the case for improving organizational efficiency and developing long-term survival strategies.

Faced with extreme environmental and competitive pressures, many not-for-profit hospitals have been purchased by for-profit healthcare systems (Harrison, McCue, Wang & Wolfe, 2003). Therefore, many previously not-for-profit hospital entities have departed from their charitable mission and are becoming part of the for-profit hospital industry. This expansion of the for-profit hospital industry is being caused by the intense competitive pressures, reduced reimbursement from governmental payers and declining charitable contributions to not-for-profit hospitals.

A historically stable healthcare industry that allowed hospitals to practice medicine in a financially secure environment has been replaced by an extremely turbulent and competitive marketplace (Liu, Forgione & Younis, 2012). Over the past decade, approximately one in three hospitals lost money on the provision of patient care (Singh & Song, 2013). According to Liu, Forgione & Younis (2012) changes in public policy, increases in uncompensated care, growth in managed care, and increases in supply prices have created a paradox of declining operating margins which are forcing healthcare institutions to be more competitive. This is of greatest importance to for-profit hospitals because they must generate a positive profit margin to provide a return to investors and insure long-term survival (Singh & Song, 2013).

According to Capps, Dranove & Lindrooth (2010), an average of 30 percent of hospitals' revenue is from the Federal Medicare program which along with traditional Medicaid hospital reimbursement is set by government regulation rather than by the market. As a result, much of a hospital's reimbursement for care does not adjust to supply and demand conditions. Medicaid payments normally meet the variable cost of care, but frequently do not cover the total average cost of care (Capps, Dranove, & Lindrooth, 2010). Given the threat of reduced reimbursement from Federal programs, efficiency is of paramount importance so for-profit hospitals can create returns for their investors.

Society is struggling with the challenge of cost containment in healthcare. Costs are expected to grow considerably, mainly due to the population aging and the introduction of new technology (Lent, Beer & Harten, 2010). As people become unemployed, underemployed or leave the work force, they are unable to pay for medical care and become recipients of charity care thus making it harder for hospitals to cost shift. Many patients that used to have private insurance or pay out of pocket have become charity care cases. In 1998, uncompensated care accounted for 6 percent of hospitals' expenses (Liu, Forgione & Younis, 2012).

Faced with extreme environmental and competitive pressures, many not-for-profit hospitals have been purchased by for-profit healthcare systems (Harrison, McCue, Wang & Wolfe, 2003). Therefore, many previously not-for-profit hospital entities have departed from their charitable mission and are becoming part of the for-profit hospital industry. In a study conducted by Tiemann & Schreyogg (2012), the results showed that hospitals that were converted to for-profit status realized between 2.9 and 4.9 percent efficiency gain by reducing labor costs and using shared purchasing to reduce the expenditure on supplies. The growing intensity of competitive pressures and reduced government support will lead to continuing growth in the for-profit hospital industry.

In regulated markets, such as healthcare, cost efficiency does not necessarily lead to sustained profit (Herr, Schmitz & Augurzky, 2011). For example, Lee et al. believe for-profit hospitals overemphasize the control of medical cost, which may lower the quality of care they provide thereby reducing their overall market share (Lee, Yang & Choi, 2008). However, Valdmanis, Rosko & Mutter (2008) point out that too much labor and capital inputs may lead to inefficiency and do not ensure higher quality. A case can be made that slack resources and excess capacity can be counter-productive and lead to higher inefficiency without enhancing quality. Reducing slack resources can increase efficiency and decrease cost. Research shows improved quality as well as lower cost can lead to higher revenue for hospitals (Velez-Gonzalez, Pradhan & Weech-Maldonado, 2011).

The increase in Accountable Care Organizations (ACO) has been putting pressure on the healthcare system as a whole but hospitals in particular. ACOs and other managed care programs often pay hospitals on a capitated (per person per month basis) or pays the hospital based on a discounted price (Liu, Forgione & Younis, 2012). There are several models of managed care which include Health Maintenance Organizations (HMOs) and Preferred Provider Organizations (PPOs). About 30 percent of the population is enrolled in HMOs and 34 percent in PPOs with only 14 percent remaining in traditional fee-for-service plans (Liu, Forgione & Younis, 2012). The introduction of ACOs combined with other managed care programs has helped reduce the rate of medical inflation. However, they have also reduced a hospital's ability to generate profit and cost shift to cover charity care.

Research Questions

The study will analyze 2013 American Hospital Association (AHA) data on for-profit hospitals to evaluate hospital efficiency. The primary research question was: What are the characteristics of for-profit hospitals that operate on the efficiency frontier? The following underlying research questions are provided:

- To identify those small and large for-profit hospitals on the efficiency frontier and calculate the level of inefficiency in those organizations not on the efficiency frontier.
- Is the level of efficiency greater for small or large for-profit hospitals in 2013?
- Are for-profit hospitals as an industry efficiently managing their key input resources during the hospital production process?
- How can for-profit hospitals improve overall efficiency?

Measuring Efficiency

As discussed by Cooper, Seiford & Tone (2003), technical efficiency refers to the sources of waste that can be eliminated without worsening any other input or output. This study utilizes technical efficiency analysis by measuring the inputs used to create outputs. Optimization is achieved when no other use of resources can improve efficiency.

Technical efficiency studies treat labor, capital, and technology as resource inputs used to create outputs of healthcare services. Measuring the level of technical efficiency involves comparing for-profit hospitals to identify the most efficient organizations. This efficiency frontier, reflected by a score of 1.0, represents production at optimal levels (Grosskopf, 1986).

Utilizing a recognized and valid measure of analysis is critical for hospital executives seeking to increase the effectiveness of their organizations. The most common measure of efficiency is the use of descriptive statistics (White & Ozcan, 1996). Since Descriptive Statistics are a parametric statistical test, they require the data be normally distributed. Therefore, it is important that the restrictions for parametric data be met and that the distribution of the data not be skewed. For example, the mean can be adversely influenced by extreme scores within the data (Neutens & Rubinson, 2002). By comparing the current number of nurses employed, beds, inpatient days, and operating expenses from previous years to a more recent year, the researcher can determine if the rate of growth in inpatient days has exceeded that of resources. Unfortunately, descriptive statistics often provide a limited perspective on the performance of the organization and can easily exclude other factors that may be impacting efficiency.

According to Coppola (2003) much of the research investigating single input or output variables has employed ratio analysis, regression analysis, or Stochastic Frontier Analysis (SFA). Ratio analysis measures relationships between inputs and outputs through simple comparisons but produces limited information about trends. Since regression analysis and SFA techniques compare against an average, they do not identify the most efficient organizations. More importantly, organizations with the greatest efficiency may be treated as outliers in these analyses. The challenges with these research techniques have led to the use of data envelopment analysis (DEA) for many studies analyzing efficiency (Ozcan et al., 2000; Harrison & Kirkpatrick, 2011).

Data Envelopment Analysis

Data Envelopment Analysis (DEA) was first introduced into the literature by Charnes, Cooper & Rhodes (1978) as an analytic tool that redirects emphasis from financial assessment toward optimizing performance and decision-making. As a result, DEA is a decision-making tool that allows for measuring the efficiency of each organization relative to similar organizations.

DEA has two analytical frameworks, the constant returns to scale (CRS) model and the variable returns to scale (VRS) model to evaluate performance. The CRS model was developed by Charnes, Cooper & Rhodes (1978) and is considered the classical DEA model of Efficiency = Output/Input. The CRS model generalized the single output/input ratio measure of efficiency for an organization in terms of a fractional linear programming formulation transforming the multiple output/inputs of each organization to that of a single virtual output and virtual input. The CRS model focuses on *technical efficiency*. In this manner, the producers are able to linearly scale the inputs and outputs without increasing or decreasing efficiency.

A unit operates under constant returns to scale if an increase in inputs results in a proportionate increase in outputs. Technical efficiency refers to the extent to which an organization fails to produce maximum outputs from a chosen combination of factor inputs. With constant returns to scale, producers are able to linearly scale inputs and outputs without increasing or decreasing efficiency. The model also identifies sources and estimated levels of inefficiency present (Thanassoulis, 2001; Cooper, Seiford & Tone, 2003).

The second type of DEA model is Variable Returns to Scale (VRS). Banker, Charnes & Cooper introduced the VRS into the literature in 1984. The BCC model measures mixed efficiency. Mixed inefficiency occurs when a percentage of outputs or inputs exhibit inefficient behavior (Cooper, Seiford & Tone, 2003). The subsequent elimination of these identified inputs or outputs will alter the proportions in which inputs are utilized or outputs produced.

An organization uses VRS if an increase in their inputs does not produce a proportional change in its outputs. Therefore, as the organization changes its scale of operations, its efficiency will either increase or decrease. This model also measures technical efficiency as the convexity constraint that the composite unit is of similar scale size as the unit being measured (Banker, Charnes & Cooper, 1984). The resulting efficiency is always at least equal to the one given by the CRS model, and those organizations with the lowest input or highest output levels are rated as most efficient and on the "efficiency frontier." The VRS model is different from the CRS model in the sense that it allows for varying returns to scale and pure model efficiency (Thanassoulis, 2001; Cooper, Seiford & Tone, 2003). Due to the dynamic nature of the healthcare industry, this study uses the VRS model of DEA for its analysis.

Technical efficiency deals with the usage of labor, capital and technology as inputs to produce outputs relative to best practice among a group of homogeneous organizations. For example, given the same inputs for all for-profit hospitals, there is no wastage of inputs at all in producing the given quantity of output. A for-profit hospital is judged to be technically efficient if it operates at optimal levels in comparison to its peer in the sample with the same resources (Grosskopf, 1986; Fare, Grosskopf & Lovell, 1985). If the organization operates below optimal best practice levels within the population, then the organization's technical efficiency is expressed as a percentage of the total best practice within the population.

In DEA, *Inputs* are any factor used as a resource to produce something of value. Inputs may also include any environmental factor that has a strong impact on how resources are consumed. *Outputs* are the amount of goods or services produced as a result of the processing of resources.

As discussed by Harrison & Coppola (2007), regression analysis and other parametric techniques can be used as part of a two-stage analysis where DEA is utilized in conjunction with the other technique to analyze the operation of hospitals while identifying the efficiency frontier. This allows DEA to be more effective in evaluating multiple inputs and outputs. For these reasons, DEA has been used extensively in health services research to measure efficiency and provide benchmarks (Rollins et al., 2001; Ozcan et al., 2000; Harrison & Coppola, 2007).

From an efficiency perspective, DEA evaluates inputs (beds, labor, and operating expenses) in relation to outputs (inpatient days, outpatient visits and surgical procedures). Performance is indicated by a DEA Theta (θ) score between zero (lowest possible score) and one (highest possible score). A theta value less than one ($\theta < 1$) indicates inefficiency while a $\theta = 0.5$ indicates that the organizations should be able to reduce resource input by 50 percent to be efficient.

As discussed by Harrison & Kirkpatrick (2011), an important feature of DEA is the ability to identify slack within hospitals. This allows us to determine which inputs and/or outputs appear to be inefficiently used or produced by hospitals. This, in turn, offers practical applications for policy-makers, managers, and researchers. Inefficiently used inputs or inefficiently produced outputs generate slack. This slack reflects either surpluses (inputs) or shortages (outputs) in production. Slack can be analyzed to determine which inputs or outputs contribute most to an inefficient hospital's efficiency scores.

As discussed by Nyhan & Cruise (2000), DEA has some advantages over previous statistical applications. These advantages include the ability to measure multiple input and output variables and provide a single measure of performance as well as provide a scalar ranking of organizations within the sample. Additionally, outstanding organizations in the sample are not viewed as outliers and efficient organizations can be used as benchmarks to identify slack in the production process. Finally, DEA can be used as a benchmarking tool to improve individual hospital performance.

Organizational Theory

In 1978 Pfeffer and Salancik published *The External Control of Organizations: a Resource Dependence Perspective;* in the ensuing years resource dependency theory (RDT) has become one of the most influential theories in organizational theory and strategic management (Hillman, Withers & Collins, 2009). *The External Control of Organizations* integrated many preexisting ideas about the management of interorganizational interdependencies (Drees & Heugens, 2013).

Resource dependence theory focuses on why organizations are subject to external forces, and how companies behave in reaction to limited resources (Alexander & Wells, 2008). For example, healthcare organizations are subject to external actors such as the capital markets because of their reliance on resources that they do not control. The foundation of RDT is the idea that all organizations are critically dependent on other organizations to provide them with vital resources they need for survival and future success. Interestingly, the dependency relationship is not exclusively one way but often reciprocal (Drees & Heugens, 2013). The resources that external actors control include: labor, information, social support and political support (Verbruggen, Christiaens & Mills, 2011).

From a RDT perspective, leadership’s primary purpose is to enhance a healthcare organization’s ability to deal with environmental constraints which often have a negative impact on an organization’s performance (Kash, Spaulding, Johnson & Gamm (2014), Mick & Wyttenbach, 2003). RDT recognizes the power exerted on an organization by those who control critical scarce resources (Verbruggen, Christiaens & Mills, 2011). Healthcare organizations frequently attempt to reduce the power external organizations have over them by grouping together in health systems (Hillman, Withers & Collins, 2009).

Healthcare organizations undertake a number of actions to mitigate the power that others have over them. These actions can be categorized as merger and acquisitions, joint ventures and interorganizational affiliations. The area of greatest growth in the hospital industry is the growth of health systems designed to create a critical mass of hospitals. This strategy is leading to significant growth in the for-profit hospital industry. Some of the benefits of for-profit hospital systems membership include: (1) access to technical information, (2) data about environmental threats, (3) preferential access to capital market, and (4) legitimacy. In healthcare, mergers and acquisitions can be horizontal integration where a for-profit hospital system purchases other hospitals in order to increase size. Conversely, vertical integration is the creation of integrated delivery systems designed to gain access to scarce resources by acquiring an organization that controls the resources across the continuum of care. Joint ventures like mergers and acquisitions aim to increase access to resources, but unlike mergers and acquisitions, joint ventures and other interorganizational affiliations only provide limited access to additional resources (Hillman, Withers & Collins, 2009).

Methodology

This study evaluates the efficiency of small and large for-profit hospitals using a variable returns to scale (VRS) input oriented Data Envelopment Analysis (DEA) model. For this study, small for-profit hospitals are 35 beds and less which is consistent with Federal designation of critical access hospitals (CAH). The second group, large for-profit hospitals are 36 beds and greater. Data for this research was obtained from the American Hospital Association's (AHA) 2013 annual survey. Included in the study were a total of 141 small for-profit hospitals and 608 large for-profit hospitals. The variables selected for this study are commonly used input and output variables affecting hospital efficiency (Harrison & Kirkpatrick, 2011).

Inputs:

<u>Operating Expenses</u> – Payroll expenses are not included because the number of full time employees (FTEs) is used as a separate measure of labor input.

<u>Hospital Beds</u> – The number of hospital beds is an accepted indicator of capital investment (Harrison & Meyer, 2014).

<u>Full Time Employees (FTEs)</u> – Labor is an important facet of an organization's resource consumption.

Outputs:

Inpatient Days – Inpatient Days is a common measure of hospital productivity and is a widely accepted measure of inpatient workload (Harrison & Kirkpatrick, 2011).

Outpatient Visits –Outpatient workload is a widely accepted measure of hospital output (Harrison & Kirkpatrick, 2011).

Surgical Procedures - Surgical procedures is a widely accepted measure of hospital output (Harrison & Meyer, 2014).

RESULTS

Descriptive statistics for small and large for-profit hospitals in 2013 are shown in Table 1. Table 1 shows that the average operating expenses of small for-profit hospitals were $12,375,877. The average number of hospital beds in small for-profit hospitals was 22. The average number of FTEs in small for-profit hospitals was 104. From an output perspective, the average inpatient days in small for-profit hospitals was 2,693 and the average number of outpatient visits was 19,259. The average number of surgical procedures for small for-profit hospitals was 1,809.

Similarly, Table 1 shows that the average operating expenses of large for-profit hospitals were $70,342,042. The average number of hospital beds in large for-profit hospitals was 177. The average number of FTEs in large for-profit hospitals was 615. From an output perspective, the average inpatient days in large for-profit hospitals was 35,992 and the average number of outpatient visits was 79,401. The average number of surgical procedures for large for-profit hospitals was 5,839.

A review of the descriptive statistics clearly documents that productivity in large for-profit hospitals was greater. Nonetheless, as discussed previously, using descriptive statistics to analyze overall efficiency is cumbersome and lacks precision.

Table 1: Descriptive Statistics for small and large for-profit hospitals 2013

Variable **N=**	**Small Mean*** **(std. Dev.)** **141**	**Large Mean**** **(std. dev.)** **608**
Operating Expenses ($)	12,375,877 (10,525,319)	70,342,042 (71,965,545)
FTEs	104 (65)	615 (525)
Beds	22 (7)	177 (146)
Inpatient Days	2,693 (2,061)	35,992 (34,069)
Outpatient Visits	19,259 (24,117)	79,401 (66,166)
Surgical Procedures	1,809 (2,432)	5,839 (5,692)

Data Source: 2013 American Hospital Association Survey

* Small for-profit hospital, 0-35 beds

** Large for-profit hospital, 36 beds and greater

The results of the data envelopment analysis (DEA) for small and large for-profit hospitals are presented in Table 2. DEA provides a clear yet sophisticated determination of efficiency and shows the average efficiency score of small for-profit hospitals was 60 percent in 2013. The number of small for-profit hospitals on the efficiency frontier with a Theta score of 1 was 18 for 12 percent of small hospitals.

The results of the data envelopment analysis (DEA) for large for-profit hospitals show the average efficiency score of large for-profit hospitals was 71 percent in 2013. The number of large for-profit hospitals on the efficiency frontier with a Theta score of 1 was 49 for 8 percent of large hospitals.

Those hospitals located on the efficiency frontier represent the optimal application of inputs to create outputs within for-profit hospitals. Those for-profit hospitals on the efficiency frontier serve as benchmarks for less efficient peer organizations. This evidence of improved efficiency among large for-profit hospitals and less slack is a clear indication of increased organizational efficiency.

Table 2: Summary of DEA Measures for small and large for-profit hospitals

	Small *	**Large****
N =	141	608
Average Efficiency Score	0.60 or 60%	0.71 or 71%
Minimum Score	0.28	0.34
Maximum Score	1.00	1.00
Standard Deviation	0.15	0.16
Number of Efficient Hospitals	18 or 12%	49 or 8%
Number of Inefficient Hospitals	123	559

Data Source: 2013 American Hospital Association Survey

* Small for-profit hospital, 0-35 beds

** Large for-profit hospital, 36 beds and greater

Data for Table 3 was calculated using DEA solver software and shows the average amount of slack among small and large inefficient for-profit hospitals, compared to those for-profit hospitals on the efficiency frontier (DEA score of 1). These results represent the combined scores of slack for the respective groups of inefficient for-profit hospitals. The combined scores were then divided by the number of inefficient hospitals to calculate the average level of slack within each group of for-profit hospitals. This average level of slack provides a measure of overall inefficiency.

From an input perspective, the results show that based upon the level of output, the average slack in beds for small for-profit hospitals was 0.1. The average slack in operating expenses for small for-profit hospitals was $1,228,962. The average slack in FTEs for small for-profit hospitals was 6. DEA also measures the level of inefficiency in output. DEA showed the level of output in inpatient days in small for-profit hospitals was underutilized by 136. Similarly, outpatient visits in small for-profit hospitals were underutilized by 1,817. The slack in surgical procedures in small for-profit hospitals was 203.

From an input perspective, the results show that based upon the level of output, the average slack in beds for large for-profit hospitals was .67. The average slack in operating expenses for large for-profit hospitals was $8,544,611. The average slack in FTEs for large for-profit hospitals was 12. DEA also measures the level of inefficiency in output. DEA showed the level of output in inpatient days in large for-profit hospitals was underutilized by 60. Similarly, outpatient visits in large for-profit hospitals were underutilized by 10,425. The slack in surgical procedures in large for-profit hospitals was 373. From a global perspective, this study clearly documents a higher efficiency in large for-profit hospitals than in small for-profit hospitals in 2013.

Table 3: Analysis of inefficiency or slack for small and large for-profit hospitals

	Small* N = 141	**Large**** N = 608
Input Inefficiency per Hospital		
Excess Beds	.1	.6
Excess Operating Expenses ($)	1,228,962	8,544,611
Excess FTEs	6	12
Output Inefficiency		
Shortage – Inpatient Days	136	60
Shortage – Outpatient Visits	1,817	10,425
Shortage – Surgical Procedures	203	373

Data Source: 2013 American Hospital Association Survey

* Small for-profit hospital, 0-35 beds

** Large for-profit hospital, 36 beds and greater

Table 4 is a case study for a large for-profit hospital operating below the average efficiency of similar hospitals in 2013. As stated previously, healthcare leaders of inefficient for-profit hospitals can improve efficiency by analyzing DEA results. For example, the DEA score of 0.58 or 58 percent is not on the efficiency frontier and is well below the average efficiency score of 0.71 or 71 percent in 2013. According to the analysis, in order to become efficient the case study for-profit hospital should reduce operating expenses by $1,144,353 and reduce FTEs by 37. It is interesting to note the case study hospital has no excess beds based on comparison to those large for-profit hospitals which operate on the efficiency frontier. From an output perspective, the case study hospital does not need to improve its output. If all the adjustments discussed previously are implemented, DEA suggests that this case study for-profit hospital could approach the efficiency frontier.

Table 4: Case Study of an Inefficient For-Profit (FP) Hospital in 2013

Level of Efficiency	**.58 or 58%**
Input Inefficiency of FP	
Excess Beds	0
Excess Operating Expenses	$1,144,353
Excess FTEs	37
Output Inefficiency of FP	
Shortage – Inpatient Days	0
Shortage – Outpatient Visits	0
Shortage – Surgical Procedures	0

DISCUSSION

Our study shows for-profit hospitals are working to improve operating efficiency with greater success among large for-profit hospitals. This study clearly documents that the number of excess hospital beds is not a cause of for-profit hospital inefficiency. The volume of outpatient visits in large for-profit hospitals is significant. This is consistent with changes in the healthcare industry to focus on shorter lengths of stays and increased ambulatory care. This study shows the average excess operating expense per hospital is reasonable, but there are opportunities for improvement.

The data show that for-profit hospitals could reduce staffing. For example, small for-profit hospitals could reduce slack in FTEs by 6 positions. At $64,647 per FTE this represents a potential average savings in staff at small for-profit hospitals of $387,882 per hospital.

Large for-profit hospitals could reduce slack in FTEs by 12 positions. At $64,647 per FTE this represents an average savings in staff at large for-profit hospitals of $775,764 per hospital.

On a positive note, for-profit hospitals have significant inpatient workload and outpatient visits with limited slack among the input variables. This clearly documents productivity and efficiency.

The study results indicate that the large for-profit hospitals have the highest overall efficiency with an average efficiency score of 71 percent in 2013. The large for-profit hospitals had 49 on the efficiency frontier or 8 percent. However, there remain additional opportunities to increase efficiency among the other for-profit hospitals.

Managerial and Policy Implications

From a management perspective, the results of this study suggest greater efficiency in large for-profit hospitals. From a resource allocation perspective, this study found the continuing opportunity for reducing the level of operating expenses. When reviewing the allocation of manpower, the DEA data showed an average excess of FTEs across the for-profit hospital industry.

Reducing operating expenses and labor will enhance short-term improvements to the hospital's bottom line. Efficiency gains as represented by higher productivity must be realized on a sustainable basis. As discussed by Harrison & Sexton (2004), for-profit hospitals have been successful in increasing occupancy rates by expanding market presence through increased inpatient volume. Such increases in productivity allow for greater economies of scale. Benchmarking against the efficiency frontier will help the organization to further ascertain its competitive position in the market.

As policymakers seek increased efficiency in the healthcare delivery system, they should monitor the provision of charity care as well as access to critical health services in local communities. At the same time it should be recognized that the for-profit hospital industry pays Federal and state income tax which is not paid by not-for-profit hospitals. Additionally, Federal healthcare policy makers and state regulators have legitimate concerns about the social losses from converting not-for-profit hospitals to for-profit ownership. These dangers include the loss of community benefits, abandonment of charity care, and reductions in the range of clinical services available within geographic areas. Unfortunately, financially weak not-for-profit hospitals that need capital to continue to provide care may be unable to raise funds and may be forced into bankruptcy and closure.

In summary, for-profit hospitals must align their for-profit mission with community needs in order to ensure the continuing support of the local community. As a result, for-profit hospitals must continue their focus on quality and efficiency to ensure their long-term survival.

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