

A Comparative Analysis of the CVP Structure of Teaching and Non-Teaching Hospitals

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Abstract

Due to the market turbulence facing the hospital industry, the financial viability of teaching hospitals has been severely threatened. Their missions of education, research, and patient care even strengthen this crisis. Therefore, the objective of this paper is to conduct a comparative analysis of the CVP structure between large non-profit urban teaching hospitals and small for-profit rural/suburban non-teaching hospitals. Two propositions are developed based on a comprehensive review of prior literature regarding teaching hospitals' performance. The primary data source is the Medicare Cost Report. In addition, the CVP technique is used to prove our propositions. Ultimately, we conduct this paper in an attempt to provide useful suggestions to hospital administrators for enhancing their decision effectiveness in selecting the product mix and designing the cost, volume, and profit (CVP) structure as well as financial strategies appropriately.

Key Words: CVP Structure, Teaching Hospitals, Non-teaching Hospitals

I. Introduction

Teaching hospitals are facing a highly uncertain and unpredictable future. The once placid and stable industry that allowed teaching hospitals to practice academic medicine in a financially secure environment has been replaced by an extremely turbulent and competitive marketplace (Ginn 1990 and Shortell et al. 1990). A comprehensive review of prior studies regarding AHCs, AMCs, and teaching hospitals has indicated that changes in public policy, increases in uncompensated care, growth in managed care, increases in input prices, paradox of higher intensity, and drop of operating margins are all key challenges facing these institutions and derive a turbulent and competitive market.

As Langabeer (1998) indicated, although this market turbulence threatens the financial viability of all hospitals, the teaching hospitals are especially affected due to their lack of exposure to a competitive industry and their unusually large and complex organizational and capital infrastructures. Additionally, the existence of several business missions (i.e., education, research, and patient care) rather than the singular profit-maximizing mission of the industrial organization poses even more critical concerns for the financial viability of the teaching hospitals in extremely turbulent markets (Langabeer 1996).

While the private sector has paid significant attention to the links among the environment, strategy, and financial performance for the industrial organization (Buzzell et al. 1987), very little research has focused on the academic teaching hospitals. Consequently, the objective of this paper is to conduct a comparative analysis of the CVP structure between large non-profit urban teaching hospitals and small for-profit rural/suburban non-teaching hospitals. Based on an extensive review of prior literature concerning teaching hospitals' performance, we hence develop the following two propositions: (1) large nonprofit urban teaching hospitals tend to have lower case mix index (CMI) adjusted volume, higher fixed cost, lower variable cost, and lower return on assets (ROA, profit margin x asset turnover) and (2) small for-profit rural/suburban non-teaching hospitals tend to have higher CMI adjusted volume, lower fixed cost, higher variable cost, and higher ROA. By obtaining data primarily from the Medicare Cost Report, we plan to utilize the CVP technique to conduct the analysis. Hopefully, the findings can be used to enhance the decision effectiveness of hospital administrators in selecting their product mix and designing their cost, volume, and profit structure as well as financial strategies appropriately.

The remainder of this paper is organized as follows: section II describes the related literature regarding challenges facing Academic Health Centers (AHCs), Academic Medical Centers (AMCs) and teaching hospitals, and the possible determinants of performance differences between teaching and non-teaching hospitals, section III provides research design, including propositions, sample selection,

data source, and research method, and the final section concludes with a summary of expected conclusion, limitations, and possible future research.

II. Literature Review

Challenges Facing Academic Health Centers (AHCs), Academic Medical Centers (AMCs) and Teaching Hospitals

The Association of Academic Health Centers defines an academic health center as an allopathic or osteopathic medical school with at least one or more other health professional schools and an associated teaching clinical enterprise (Guo 2003). In other words, an AHC refers to a medical teaching institution affiliated with a primary hospital. These institutions have three goals: (1) to provide medical and health education and training, (2) to conduct research and technological innovations, and (3) to provide patient care, especially to populations who are unable to pay.

The environment facing academic health centers has been described as turbulent (Topping et al. 1999), endangered (Blumenthal and Meyer 1996), competitive (Reuter and Gaskin 1997), and opportunistic (Shine 1995). Such a dynamic environment exists due to the following paradoxical view: on one hand, AHCs share distinctive competitive advantage as clinical and research hubs in the healthcare sector although they confront increased scrutiny from federal regulators to ensure that their clinical services and resident practice patterns are in compliance with federal statutes (Reuter and Gaskin 1997); on the other hand, reimbursement systems that reward efficiency have replaced traditional fee-for-service plans and increased penetration by managed care organizations have also reversed the financial incentives that were previously available under the traditional fee-for-service system (Walsh et al. 2002).

AMCs are generally defined to include the medical center, the teaching hospital, and the faculty practice plan. Fox et al. (1993) examined the factors influencing AMCs' financial performance. Their analysis showed that AMCs tend to be more expensive than their community counterparts, that there are differences in the mission and culture of AMCs and managed care organizations, and that AMCs and managed care are incompatible on several levels, including distribution of patient revenues, attitudes toward patients, and the role of primary care physicians. In other words, AMCs need to act like multispecialty group practices, to adopt new methods for controlling service use, and to encourage recognition of the costs of medical education in order to survive in this increasingly turbulent environment.

Due to the emerging dynamic environment, all of AHCs, AMCs, and teaching hospitals need to identify the key challenges facing them so as to position themselves more favorably for future survival or success. Based on an extensive review of prior literature, we thus summarize the possible challenges facing them as follows:

1. Changes in Public Payment Policy

The enactment of the Balanced Budget Act (BBA) of 1997 has reduced both Medicare and Medicaid payments to teaching hospitals. Medicare has been a key source of funding for graduate medical education (GME) which is the training that interns or residents receive following medical school (Rosko 2004). From 1990 to 1997, the U.S. average hospital payment-to-cost ratio for fee-for-service Medicare patients increased from 89.2 to 103.6%. However, following the enactment of the BBA of 1997, Medicare Prospective Payment System (PPS) payments were reduced and the Medicare hospital payment-to-cost ratio fell to 101.1% in 1999 (MedPAC 2001a). In addition to the reduction of Medicare hospital payments, the provisions of the BBA of 1997 also reduced Medicaid hospital payments. Most of the change in Medicaid hospital payments has been attributed to growth in the Medicaid Disproportionate Share Hospital (DSH) program (Liska et al. 1997). This program provides additional funding to hospitals serving a relatively large number of indigent patients. From 1990 to 1998, the Medicaid hospital payment-to-cost ratio for fee-for-service patients increased from 79.7% to a high of 97.9%. However, following the enactment of the BBA of 1997, the Medicaid hospital payment-to-cost ratio fell to 96.7% in 1999 (MedPAC 2001a).

What are the impacts on AHCs of these reductions in funding? Guo (2002) reported that the reductions in Medicare and Medicaid funding decreased AHCs' revenue and increased uncompensated care. Alexander et al. (1997) indicated that reductions in these funding sources adversely affect AHCs' mission of providing care to the poor and uninsured people. The costly care for these patients has contributed to the rising uncompensated care of AHCs. Just as Reuter (1997) reported, AHCs have the highest levels of uncompensated care, accounting for 37 percent of all the uncompensated care in 1994. Reuter (1997) indicated that such funding reductions also affect AHCs' training and education mission. As he stated in his study, programs in GME have more than doubled from 1970 to 1994. Since Medicare is the largest payer of GME, AHCs are especially vulnerable to government legislations that call for reductions in funding to Medicare and Medicaid.

In addition, Linna et al. (2006) utilized the stochastic frontier cost function to estimate the teaching and research costs of Finnish hospitals and demonstrated that (1) the efficiency adjustment had significant impact on the marginal and average cost estimates of the teaching and research output, and (2) the university teaching hospitals were under-funded with respect to both research and teaching output. Their results further suggested that the average rate of teaching and research reimbursement should be approximately 14.6% of the total operating costs in university teaching hospitals. Their findings may provide some important implications to policy makers when there is a need to initiate some policy changes in the future.

2. Increases in Uncompensated Care

Many hospitals provide health services to the uninsured for free or substantially reduced fees, which is called 'uncompensated care'. The increases in uncompensated care are associated with the growth in the number of Americans without health insurance. The number of uninsured increased from 35.6 million in 1990 to 42.6 million in 1999 (GAO 2001, Mills 2000). Due to the competitive forces in health care market, it's getting more difficult for hospitals to shift the costs of caring for poor and uninsured patients onto paying patients. As Bellandi (2000) reported, the uncompensated care represented about 6% of hospital expenses in 1998. When uncompensated care reaches a substantial portion of a hospital's business, it could become a financial burden (Weissman 1996). Consequently, hospitals that serve large numbers of indigent patients need to be subsidized either with public funds or private charities in order to survive in competitive markets (Weissman et al. 2003). Federal and state governments currently are considering revisions in payment policies to support hospitals that disproportionately serve poor uninsured patients (Coughlin et al. 2000, MedPAC 2001b).

The degrees to access the above described subsidies could be various depending upon the types of hospitals. For example, public hospitals and teaching hospitals may be particularly affected by changes in these payment policies because many of them are located in urban centers and serve large numbers of low-income patients (Moy et al. 1996). Especially teaching hospitals, they must balance their patient care activities with their research and education missions in order to position themselves favorably in the market for survival. Moreover, the care of uninsured patients in teaching hospitals may even be affected by growth of managed care during the 1990s. Weissman et al. (2003) examined the relation of teaching status and managed care to changes in market share and market concentration and found that (1) the market share of uninsured patients during the 1990s grew at AMC hospitals relative to other hospitals in their service areas, and these increases occurred primarily in areas with high levels of managed care, and (2) in urban areas, the care of uninsured patients was twice as concentrated as that of all patients, and the ratio of concentration (uninsured patients vs. all patients) was greater in areas with high managed care levels than in areas with low managed care levels.

3. Growth in Managed Care

Managed care here is defined as a system that either pays hospitals on a capitated basis (a per member per month basis) or pays the hospitals based on a discounted price. This managed care system includes two types of agreements: one between hospitals and health maintenance organizations (HMOs) and the other between hospitals and preferred provider organizations (PPOs). As Fox (2001) documented, 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. Although managed care may be credited with reducing hospital and health care cost inflation, such financial constraints are also complained of

jeopardizing other important hospital objectives, especially teaching hospitals' primary missions in providing direct patient care, training the US medical work force, and engaging in medical research.

Several studies dealing with AHCs or teaching hospitals have pointed out the negative impacts of the proliferation of managed care. For example, Levey et al. (1999) indicated that managed care, while affecting significant cost savings, has at no small cost to America's major teaching hospitals and their social missions of teaching, research, and patient care. Also, even more and more consumers enroll in managed care plans, they cannot live by primary care alone; in other words, they will, at one time or another, need the kinds of specialized care that only major teaching hospitals and the specialist physicians trained in such institutions can provide. Guo (2003) reported that the growth of managed care has affected AHCs in several ways. First, managed care has initiated cost containment strategies by seeking to contract with health care organizations that offer lower fees. As they are more likely to contract with non-teaching hospitals that charge less for patient care than AHCs, AHCs are currently facing increasing price competition. More specifically, while AHCs have always charged 30-40 percent more than non-teaching hospitals to offset their mission of caring for the poor and uninsured (Gottlieb 1997), they cannot afford to do so any more under managed care. Second, more for-profit health care organizations entering the market and integrating also threaten AHCs' survival.

Putting differently, the growth of managed care has brought drastic competition, thus leading to higher AHC costs and lower revenues. Higher costs result from the fact that AHCs must serve patients with sicker and more complex needs which non-teaching hospitals are not able to accept. Lower revenues result from AHCs' inability to compete with non-teaching hospitals to secure managed care contracts.

4. Increases in Input Prices

Shortages of hospital workers, such as nurses, radiology technicians, and pharmacists, have led to upward pressures on hospital wages (Rodgers et al. 2003). This pressure can be even more severe for a labor-intensive industry such as hospitals. As Id.? indicated, an estimated 38.8% of the increase in hospital care spending between 1997 and 2001 has been attributed to labor costs.

5. Paradox of Higher Intensity

Fisher et al. (2004), focusing on patients whose initial hospitalization was at one of the 299 hospitals that are members of the Council of Teaching Hospitals (COTH), examined the content, quality, and outcomes of care across AMCs that differ by up to 60 percent in the overall intensity of medical services delivered to patients with serious chronic illnesses. Their findings indicated that (1) although major U.S. AMCs differ dramatically in the overall intensity of services they provide to

similar patients, the increased intensity doesn't appear to be associated with higher quality of care or to result in better survival, and (2) characteristics of the institutions themselves (or the physicians practicing in them) provide the major alternative explanation for the differences in intensity. With respect to the second finding, one factor could be the size of the teaching programs, which is consistent with the findings of prior studies which have shown that as the size of the teaching programs increases, so does the cost of care.

Despite the widely held perception that AMCs' important mission and perceived quality advantages have been used to justify their higher costs and ensure their inclusion in preferred networks of providers, Fisher et al.' (2004) study suggest that (1) the challenge facing AMCs is to learn how to improve both the quality and efficiency of care, and (2) academic institutions that demonstrate both high quality and lower long-term costs will be more likely to compete successfully in a health care marketplace that is increasingly concerned about longitudinal efficiency.

6. Operating Margins Drop

According to a study commissioned by the New York City-based Commonwealth Fund for the financial performance of AHC hospitals, 1994-2000, the main challenges facing AHCs are the declining operating margins. This report documents a drop of the operating margins of 1.4 percent and 2.6 percent in 2000 for AHCs and major teaching hospitals, respectively. Additionally, among the several factors contributing to the declining financial performance of AHC hospitals, the primary two are (1) the decrease in private payer payment-to-cost ratio, and (2) the amount of resources that AHC hospitals spent in caring for the poor. According to this report, since private payers have been less willing than in the past to support the high costs of AHC hospitals, the private payer payments as a percentage of costs have declined from 128.4 percent in 1996 to 112.5 percent in 2000 (Anonymous 2002). Also, although public AHC hospitals depend more on Medicaid as a payment source, which is different from private AHC hospitals who depend more on Medicare and private payers, high levels of uncompensated care have reduced their financial strength (Anonymous 2002).

Moreover, the Association of American Medical Colleges (AAMC) predicted on its Web site in 2000 that nearly 50% of all AMCs that are major teaching hospitals would have negative margins by 2002, compared to only about 25% of non-teaching and other teaching institutions. According to the AAMC data, negative margins for major teaching hospitals would double between 1996 and 2002 due to the provision of BBA. Besides, while no absolute standard exists, total margins below 4% are thought of as insufficient to sustain teaching hospitals. In sum, since the enactment of the BBA of 1997 has added to an already difficult financial environment considerable financial pressure that may threaten the teaching, research and indigent care missions of teaching hospitals, appropriate policy modifications may be necessary to ensure teaching hospitals fulfilling their special missions with

sufficient financial resources.

Possible Determinants of Performance Differences between Teaching and Non-teaching Hospitals

Due to both public policy changes and market reforms, the US health care industry is facing a number of critical changes. While all hospitals are seeing less income after expenses given these changes, the above noted challenges have made major teaching hospitals experiencing a particularly tight financial squeeze.

As the Medicare Payment Advisory Commission (MedPAC) reported in 2000, the total margin for major teaching hospitals declined by 2.8 percentage points in 1998 to 2.3 percent, about half the margin of non-teaching hospitals. Dick Knapp, executive vice president of the Association of American Medical Colleges (AAMC), evaluated this situation and commented that the negative margins reported by a number of major teaching hospitals may be partly attributed to the increases in the cost of new drugs, medical devices, information technology, and labor as well as the declining revenues from managed care, Medicare, and Medicaid, due in part to the 1997 BBA (Anonymous 2000).

In order to gain a better understanding of the factors driving such margin differences and to achieve my research objective, we conduct a comprehensive review of prior studies regarding teaching hospitals' performance analysis and categorize our observations of the possible factors driving differences into the following eight groups:

1. Cost Differences between Teaching and Non-teaching Hospitals

Teaching hospital costs are substantially higher than non-teaching hospital costs (Vancil et al. 1998). For example, Foster (1987) examined the estimation of the costs of the products of teaching hospitals through a review of the literature and found that the following factors have the potential to explain why the costs of the products of teaching hospitals are greater than those of non-teaching hospitals: (1) complexity of case mix, (2) severity of illness, (3) research activity, (4) use of innovative modes of treatment, and (5) teaching of students. In addition, his study suggested the importance of designing a framework that could determine reliable, standard costs for diagnostic case types. Rosko et al. (1994) and Thorpe (1988b), after controlling for a number of characteristics such as location, patient mix, and size, reported that major teaching hospitals may be 30 to 42% more expensive than non-teaching hospitals.

Koenig et al. (2003) estimated the mission-related costs of teaching hospitals and found that AHCs and other teaching hospitals face higher patient care costs than non-teaching hospitals face,

because of their missions of graduate medical education (GME), biomedical research, and the maintenance of standby capacity for medically complex patients. More specifically, it's estimated that total mission-related costs were \$27 billion in 2002 for all teaching hospitals, with GME (including indirect and direct GME) and standby capacity accounting for roughly 60% and 35% of these costs, respectively.

Moreover, Rosko (2004) indicated that teaching hospitals, especially those with substantial GME programs, provide larger volumes of uncompensated care than non-teaching hospitals and thus incur higher costs. He proposed that the possible explanations for this phenomenon may include (1) large size of teaching hospitals, (2) educational value of attracting patients with a wide variety of diagnoses (Banks et al. 1997), and (3) generous indirect medical education payments from Medicare as a subsidy.

2. Cost Differences between Urban and Rural Hospitals

An analysis of the 1981 Medicare cost report data showed that average costs per case in rural hospitals were about 40 percent lower than that in urban hospitals. Even after accounting for differences in case mix, labor costs, and indirect teaching costs, a difference of more than 20 percent still remained. Although the urban-rural cost differential has often been attributed to systematic differences in patient severity of illness across hospital groups that are not accounted for by the current DRG system, the results of O Dougherty et al. (1992) suggested that most of the cost difference between urban and rural hospitals is not attributable to within-DRG differences in average patient severity.

Moreover, Thorpe (1988a) investigated the cost differences between inner city hospitals and suburban and rural hospitals and found that they key sources of cost variation include (1) the higher costs of treating low-income patients, (2) the difference in teaching commitment, (3) market competition, (4) higher numbers of emergency room patients, (5) the ratio of forecasted to actual admissions, and (6) wages. More specifically, the most expensive urban hospitals have costs over 5.3% higher than average and nearly one-half of this higher cost can be attributed to large teaching programs. In addition, case mix accounts for about 20% of the higher-than-average costs, higher salaries and cost-increasing competition for physicians explain 25% of the higher costs, and over 7% of these costs can be traced to emergency admissions, usually involving poor patients.

In October 1983, Medicare changed the payment method for inpatient hospital services from retrospective, cost-based reimbursement to a PPS under which, Medicare pays a fixed basic rate for each inpatient stay. Initially, separate standard rates were established for urban and rural hospitals due to the existence of the above described cost differential; however, the Omnibus Budget Reconciliation Act of 1990 (OBRA 1990) phased out the separate standard rates for urban and rural hospitals between

fiscal year (FY) 1991 and FY 1995.

O'Dougherty et al. (1992) assessed the need for payment adjustments in a PPS without separate urban and rural rates and found that under a single standardized payment and current-law adjustments, there was a need to redistribute payments from rural to urban hospitals. They further suggested that although refinements for case mix, outliers, and the wage index can make a significant contribution to avoiding payment disparities in a single-rate system, changes in the adjustments for teaching and disproportionate-share (DSH) hospitals are also needed due to the originally relative high payments of both.

3. Productivity (Efficiency) Differences between Teaching and Non-teaching Hospitals

If the productivity of medical labor is lower in teaching hospitals, it may be concluded that teaching hospitals are less efficient and thus more costly than their non-teaching counterparts. The evidence can be obtained from the following examples. First, Lehrer et al. (1995) found that attending physicians' productivity is lower in teaching hospitals than that in non-teaching hospitals. Second, Kralewski et al. (1997) corroborated Lehrer et al.' (1995) findings by indicating that productivity of clinical practitioners is lower in teaching hospitals than that in non-teaching clinics.

4. Competitive Effects (Effects of Growth of Managed Care) on Teaching Hospitals

The penetration of managed care could drive increasing price competition for teaching hospitals. How does this market competition affect teaching hospitals' performance? Will such market pressure hinder hospitals' performance or will it result in more efficient hospitals providing the social good of medical education?

According to a study by Pardes (1997), teaching hospitals should become as efficient as possible via decreasing costs, reducing the number of medical residents, and providing more primary care to respond to the growth of managed care. Additionally, Grosskopf et al. (2004) assessed the performance of US teaching hospitals operating in 1995 and found that competition (as measured by the number of managed care contracts per hospital and the number of patients covered by these contracts per hospital) has positive effects on the teaching hospitals; in other words, as competition increases so does the teaching hospital's relative efficiency. Moreover, increased competition leads to higher efficiency without compromising teaching intensity.

Rosko (2004) conducted a panel analysis of cost inefficiency on performance of US teaching hospitals and found that (1) decreases in inefficiency are associated with the HMO penetration rate and time, and (2) increases in inefficiency are associated with for-profit ownership status and Medicare

share of admissions.

5. The Impacts of Organizational Features on Teaching Hospitals

Teaching hospitals vary among themselves in terms of standards and the severity of patients' case mix. Do such differences in organizational features matter in accounting for teaching hospitals' performance? Grosskopf et al. (2004) used two proxy variables for standards and case mix - whether the hospital is a member of the Council of Teaching Hospitals (COTH) and whether the hospital has a medical school affiliation (MDSCH) - to examine this issue. Their findings indicated that COTH members and hospitals with medical school affiliation are relatively less efficient than the hospitals without such memberships, and they maintain higher levels of teaching dedication (the number of residents per physician) and intensity (the number of residents per bed).

6. Does Ownership Form Matter

The difference between for-profit and non-profit hospitals lies in that – a non-profit hospital is not required to pay taxes and is not allowed to distribute earnings. Such non-distribution constraint hence creates a different competitive environment compared to for-profit hospitals. As Property Rights Theory suggests, the variable of ownership form (FP) should be negatively associated with costs and inefficiency. Further, since teaching hospitals have a much different cost structure, regulatory environment, and mission that is linked closely to research and teaching rather than just providing care (Yafchak 2000), the separation of non-profit versus for-profit in addition to teaching versus non-teaching hospitals is thus important and necessary for my analysis.

7. The Significance of Size on Teaching Hospitals' Performance

Despite the general belief that the increased size of health care organizations may reduce costs through economies of scale and scope, a review of prior literature shows mixed results regarding the existence of substantial scale economies in hospitals (Rosko 1996). For example, Carr et al. (1967) analyzed data on 3,147 U.S. hospitals using the average daily patient census and a quadratic cost function and concluded that scale economies existed and the long-run average cost function reached a minimum at approximately 190 patients. Lave et al. (1970) used an elaborate two-stage model to estimate a Cobb-Douglas hospital cost function and found that size (defined by number of operating beds) was negative in sign (economies of scale) but insignificant. In other words, if economies of scale exist in the hospital industry, they are not very strong. Bays (1979) used a quadratic cost function specification for the number of beds, case mix, and case flow rate for teaching and non-teaching hospitals in California. His findings showed that case mix and case flow rate are significant and demonstrate economies of scale but that the size of the hospital (beds) is not significant. However, the

coefficients of the linear and quadratic terms on size are of the right sign to indicate economies of scale.

Yafchak (2000) utilized the Cobb-Douglas production function to empirically estimate whether or not larger hospitals have lower long-run average costs per bed than smaller hospitals. His results indicated that although economies of scale have evolved recently for non-teaching and teaching hospitals, the primary market forces that may be creating economies of scale in the hospital industry are decreasing revenues due to lower reimbursement and lower occupancy rates. As reimbursement and occupancy continue to trend down in the future, he further suggested that hospitals may seek additional economies to survive in an increasingly competitive and shrinking industry. Moreover, Rosko (2004), in his panel analysis of major teaching hospitals' performance, found that major teaching hospitals increased their participation in systems, hoping to reap the benefits of firm-level economies of scale and scope and increased bargaining power. Compared to that in private major teaching hospitals where the rate increased from 46 percent to 73 percent, this trend was especially apparent in public major teaching hospitals that had a 9 percent system participation rate in 1990 and a 40.3 percent rate in 1999.

Contrary to prior studies, Friedman et al. (1981) found that hospitals' average costs increase slightly with an increase in hospital size. Dranove (1995) studied whether or not system affiliation results in economies of scale and found that systems do not appear to have lower costs due to affiliation. Further, Connor et al. (1998) reported that hospital mergers have had a greater effect on bargaining power than on costs.

8. Margin Differences between Teaching and Non-teaching Hospitals

Rosko (2004) employed a panel design to analyze changes in performance variables related to profitability, volume, and efficiency in a national sample of major teaching hospitals from 1990 to 1999. His findings demonstrated that (1) average operating margin was negative throughout the 1990s, which was in contrast with the positive mean operating margin for non-teaching hospitals in six years of the last decade (Rosko 2002), and (2) major teaching hospitals responded to financial pressures by downsizing inpatient capacity, expanding outpatient activity, reducing length of stay, and increasing labor productivity. As he suggested, the difference in operating margins between major teaching hospitals and non-teaching hospitals probably reflects the higher cost structures and greater uncompensated care burdens of major teaching hospitals.

How do teaching hospitals deal with the pressure caused by the higher cost structures and greater uncompensated care burden described above? Langabeer (1998) examined the financial and operating data for 100 major U.S. teaching hospitals to determine relationships among competitive strategy, market environment, and financial return on invested capital. His findings indicated that the single

most significant competitive strategy for improving financial performance was pricing strategy. As he stated, organizations usually have two options to increase their margins due to the only two components of pricing strategy at a macro level – price and cost. The first option is to charge the same price as their competitors as long as they have a substantially lower cost advantage. The second option is by charging higher prices than competitors, which only the high-performing hospitals are able to do. Due to the evolution of managed care reform efforts by commercial insurers and HMOs, teaching hospitals will not be allowed to exert much control over prices in the future. Since they are facing increasingly stricter price competition, their ability to charge higher prices, even for higher quality and better positioned services, could become much more difficult. Therefore, he further suggested that strategic management of teaching hospitals requires improvement of pricing strategies by focusing on both sides of the price-cost equation; that is, to reduce cost or improve internal efficiency while maintaining or increasing prices for services where possible.

Summary

To summarize the above discussion, the possible factors driving performance differences between large non-profit urban teaching hospitals and small for-profit rural/suburban non-teaching hospitals may include (1) cost differences resulting from complexity of case mix, severity of illness, use of innovative modes of treatment, missions of GME, biomedical research and patient care, provision of uncompensated care, size, market competition, teaching commitments, numbers of emergency room patients, the ratio of forecasted to actual admissions, and wages, (2) productivity differences, (3) competitive effects of growth of managed care, (4) organizational characteristics such as whether the hospital is a member of the Council of Teaching Hospitals (COTH) and whether the hospital has a medical school affiliation (MDSCH), and (5) ownership form.

To elaborate further, large non-profit urban teaching hospitals, due to their higher complexity of case mix, greater severity of patients' illness, greater use of innovative technology for treatment, missions of education, research, and patient care, provision of larger volumes of uncompensated care, larger size, higher level of teaching commitments, higher labor cost, lower efficiency, increasing price competition resulting from growth of managed care, organizational characteristics (teaching status/affiliation), and non-profit ownership form, tend to incur higher fixed cost and lower variable cost, have lower CMI adjusted volume, and thus create lower ROA, which can be decomposed into two elements: profit margin and asset turnover.

On the contrary, small for-profit rural/suburban non-teaching hospitals, due to their lower complexity of case mix, less severity of patients' illness, less use of innovative technology for treatment, provision of smaller volumes of uncompensated care, smaller size, lower level of teaching

commitments, lower wages, higher efficiency, lower penetration of managed care in their located areas, organizational characteristics (non-teaching status/affiliation), and for-profit ownership form, are prone to incur lower fixed cost and higher variable cost, have higher CMI adjusted volume, and thus create higher ROA.

The above elaboration is consistent with Langabeer's (1998) findings in product market and capital investment strategy. As Langabeer (1998) stated, product market strategy in hospitals equates to a selection of the optimal patient mix. His analysis confirmed that the product market strategy is one of the most fundamental elements that hospital administrators should consider when formulating a strategic plan. Selecting the appropriate product market strategy will not only enhance pricing strategy but also boost return on invested capital. More specifically, as hospitals select more complex and specialized procedures, as indicated by the adjusted case-mix index, the expected financial performance decreases, the other way round is also true.

Additionally, as teaching hospitals' portfolios of services and programs increase, it becomes strategically necessary to manage the allocation of resources or investments into the fixed capital (i.e., property, plant, and equipment) that supports the business. His findings confirmed that capital intensity (the overall level of resources invested into the assets of an organization and the average age of the capital infrastructure) is significantly negatively related to performance; that is, the more diversified product mix teaching hospitals select, the more capital they will invest into fixed assets, and thus the lower expected return they will get eventually.

Based on the above elaboration, two propositions are thus developed in the following section and will be proved using the CVP analysis.

III. Research Design

Propositions

Based on the foregoing discussion, we therefore develop two propositions as follows:

Proposition 1: Large nonprofit urban teaching hospitals tend to have lower CMI adjusted volume, higher fixed cost, lower variable cost, and lower ROA (profit margin x asset turnover).

Proposition 2: Small for-profit rural/suburban non-teaching hospitals tend to have higher CMI adjusted volume, lower fixed cost, higher variable cost, and higher ROA (profit margin x asset turnover).

Where

Volume = total revenue, adjusted by case mix index (CMI)

Cost = total operating costs (including depreciation and interest costs), adjusted by case mix index (CMI), subdivided into two components: fixed cost and variable cost

ROA = return on assets, measured as profit (total revenue – total operating costs) divided by total assets, subdivided into two components: profit margin and asset turnover

Sample Selection

The unit of analysis is large teaching hospitals, with a non-profit status and situated in an urban area. To achieve the research objective, a matching control sample of small non-teaching hospitals, with a for-profit status and situated in a rural or suburban area, is also chosen. Hospitals with 500 beds or above are considered as large; otherwise, as small. Both sample sets are selected from the Medicare Cost Report for the single year 2000 due to the restricted nature of the CVP analysis.

Data Sources

The study data is obtained from the Medicare Cost Report. It is not only one of the most comprehensive data sets available for every hospital in the U.S. that services Medicare patients and receives federal reimbursement, it also captures a variety of hospital income statement, balance sheet, and operational statistics for the entire hospital and is not limited to Medicare. Due to this, it can be deemed as one of the best sources available for national financial data on hospitals and thus be chosen as our primary data source.

Research Method

Due to our objective to compare the CVP structure of large non-profit urban teaching hospitals and small for-profit rural/suburban non-teaching hospitals, the Cost Volume Profit (CVP) analysis is conducted to prove our propositions. CVP analysis can be seen as one of the most powerful and simplest analytical tools in management accounting. Although CVP analysis is often criticized to have some shortcomings, it is pliable enough to overcome all of them, if necessary and desirable, since most of these shortcomings are related to its basic underlying assumptions. Moreover, its restricted scope can be broadened with an extended version of the basic model designed to mitigate certain shortcomings (Guidry et al. 1998). As a consequence, it is believed to be a very useful initial analysis of strategic decisions (Horngren et al. 1994).

In addition to its merit of simplicity, through the provision of a sweeping financial overview of the planning process (Horngren et al. 1994), it allows managers to examine the possible effects of a wide array of strategic decisions, including pricing policies, product mixes, market expansions or contractions, outsourcing contracts, idle plant usage, discretionary expense planning, and a variety of other important considerations in the planning process.

The key in CVP analysis would be target income, which is defined as the minimum net income acceptable for a particular decision. This minimum income level is formulated as follows:

$$NT^T = k_o \times \Delta TA$$

Where:

$$NT^T = \text{target net income;}$$

$$k_o = \text{cost of capital;}$$

$$\Delta TA = \text{total assets required for a decision.}$$

Given the above definition of target income, a unit cost approach to CVP analysis could thus be formulated as follows:

$$pQ = vQ + FC + (k_o \times \Delta TA)$$

Where:

$$p = \text{selling price per unit;}$$

$$v = \text{variable cost per unit;}$$

$$Q = \text{total quantity of units produced or sold;}$$

$$FC = \text{total fixed costs.}$$

By using CVP analysis, a hospital would be able to determine if a particular pricing policy and cost structure strategy might yield at least a minimum target income level that would meet the hospital's cost of capital.

IV. Conclusion

Expected Conclusion

Although the results cannot be exhibited until the CVP analysis has been conducted, we believe that the analysis would prove our propositions. In other words, large nonprofit urban teaching hospitals tend to have lower CMI adjusted volume, higher fixed cost, lower variable cost, and lower profit in terms of ROA; while small for-profit rural/suburban non-teaching hospitals are prone to have higher CMI adjusted volume, lower fixed cost, higher variable cost, higher ROA, and especially, higher turnover due to their different size, ownership form, location, teaching status and other relevant factors. Hopefully, the findings can be used to enhance the decision effectiveness of hospital administrators in selecting their product mix and designing their cost, volume, and profit structure as well as financial strategies appropriately.

Limitations

This study doesn't come without limitations. First, this study only compares the CVP structure between teaching and non-teaching hospitals, without looking at other performance measures such as cash flow ratio, bond rating, investment of technology, and quality of care. Second, this study focuses on the analysis of teaching hospitals, without looking at AHCs and AMCs. Third, the use of CVP technique to conduct analysis is subject to the following additional limitations: (1) the CVP analysis assumes that changes in volume have no effect on elasticity of demand or on the efficiency of production factors; that is, it ignores the curvilinear nature of total revenue and total cost schedules (Guidry et al. 1998), (2) since CVP analysis is typically restricted to one time period in each case, this study only spans the single year 2000, (3) the CVP analysis has somewhat narrow scope on only sales revenue and operating expenses, which could leave some critical aspects of strategic decisions overlooked, (4) the CVP analysis doesn't measure the impact of the decision on the hospital's wealth (Magee 1975), (5) the CVP analysis does not incorporate the effect of asset structure changes required by the decision (Cheung et al. 1990) and (6) the CVP analysis does not acknowledge the risk created by the decision (Chan et al. 1990). Fourth, this study does not incorporate the shift of services from inpatient to outpatient. Finally, since corporate overhead costs of system-affiliated hospitals are not included in the total cost reported in the Medicare Cost Report data (Yafchak 2000), the focus of this study is purely on the individual hospital and not system-affiliated hospitals. As a result, whether system-affiliated hospitals perform better than their counterparts will not be evaluated in this paper.

Possible Future Research

There are some fruitful areas for future research to pursue. First, future research can examine the performance differences between teaching and non-teaching hospitals in terms of other measures such as cash flow ratio, bond rating, investment in technology, and quality of care. Second, future research can extend the analysis to include both AHCs and AMCs. Third, future research can widen the scope of the CVP analysis to include the impact of managerial compensation schemes on target profit levels (Schneider 1992, 1994). Fourth, due to the one-year nature of CVP analysis, future research can employ research techniques other than CVP to explore the long-term performance differences. Fifth, future research can extend the basic model of CVP by entering some additional variables such as the dichotomy of variable and fixed assets, cost of capital, the degree of operating leverage or an accounting beta risk measure to incorporate the wealth effects and the risk level imposed by a decision (Guidry et al. 1998). Finally, with available data, future research can conduct a comparative analysis of the CVP structure between system-affiliated and nonsystem-affiliated hospitals.

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