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Hospitals' Decision to Vertically Integrate Skilled Nursing Units Before and After the Balanced Budget Act

Betty C. Lucente
Virginia Commonwealth University

Hospitals' Decision to Vertically Integrate Skilled Nursing before and after the Balanced Budget Act

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

By

Betty C.Lucente
M.S. Nursing, West Virginia University, 1987
B.S. Nursing Marshall University, 1978

Director: Dr. Robert Hurley Ph.D.
Professor
Department of Health Administration

Virginia Commonwealth University
Richmond, Virginia
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Table of Contents

List of Tables

List of Figures

Abstract

HOSPITAL DECISIONS TO VERTICALLY INTEGRATE SKILLED NURSING UNITS BEFORE AND AFTER THE BALANCED BUDGET ACT

By Betty C. Lucente

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Major Director: Dr. Robert Hurley, Ph.D

The decision to vertically integrate services and deliver care has both management and policy concerns for healthcare in the United States. The change in reimbursement, which was enacted with the Balanced Budget Act of 1997, influenced the availability of post acute services for acute hospital inpatients. Prior to this change, post acute services were reimbursed based on cost similar to the pre DRG era of Medicare reimbursement. The change in payment had the potential to make discharging patients more difficult resulting in a prolonged length of stay without additional payment and at increased costs for hospitals. As a result of this change hospitals made arrangements to provide care for this population. The choices included vertical integration, contracting or hybrid arrangement and simply relying on the spot market. This make or buy decision is a focus of this study. Were hospital decisions different after the BBA, than before this legislation?

This study utilizes Oliver Williamson's transaction cost economics theory as the framework for the study and is a replication of a prior study by Chiu (1995)

hybrid arrangement and simply relying on the spot market. This make or buy decision is a focus of this study. Were hospital decisions different after the BBA, than before this legislation?

This study utilizes Oliver Williamson's transaction cost economics theory as the framework for the study and is a replication of a prior study by Chiu (1995) The Williamsons theory is based on the proposition that three transaction dimensions determine the most efficient method of operation for a firm: uncertainty, frequency, and asset specificity. Depending on the "market", organizations may elect to arrange services through the spot market, contract for services, or vertically integrate the service.

The study uses data from the American Hospital Association survey as well as the Area Resources files to determine if individual hospitals have made contract arrangements, vertically integrated, or relied on the spot market to provide skilled nursing services. Data is collected before and after the BBA and analyzed using multiple regression analysis and then subjected to significance testing. Sixteen hypotheses are tested that focus on the three dimensions of transaction cost theory. Findings support the importance of transaction frequency and asset specificity, while only weak support is offered for transaction uncertainty. The results differ from the Chiu study, which found strong support for uncertainty and weak support for frequency.

This study is unique in that it examines data from two time periods surrounding a major reimbursement change in Medicare. It makes an important contribution to the empirical testing of transaction cost economics and the decision to vertically integrate in health care.

CHAPTER 1: INTRODUCTION

Overview

Hospitals have responded to changes in reimbursement from payers with new strategies designed to capture new revenues. Since the biggest purchaser of hospital care is the government, any change in Medicare reimbursement affects all hospitals that serve Medicare patients. Before 1983 hospitals were reimbursed on a cost basis so that growth was unchecked and consequently spending also escalated. In 1983 payment changed to a perspective payment system, which categorized care into diagnosis related groups or DRGs and reimbursed a lump sum amount, which was not dependent on cost incurred during a specific stay.

This dramatically changed hospital revenue, since a flat amount was reimbursed based on the DRG and was not sensitive to cost. Hospitals began efforts to reduce cost by discharging patients sooner, in order to ensure the fixed payments covered costs of care. For some patients this was not possible, since they were too sick to leave. As a consequence, new discharge options in the form of Post Acute Care Services (PACS) began appearing, such as home care, skilled care, neuro–rehabilitation and long–term care. Reimbursement for this level of care was still reimbursed under a cost based methodology, so if the

hospital owned one or more PACS, they could still capture additional revenue once the DRG was exhausted. If the hospital did not integrate a post discharge option, then they had to rely on community resources to provide it. This can be accomplished through contacting with local providers or trust the availability of services when they are needed. The Balanced Budget Act (BBA) of 1997 responded to rising costs by implementing a prospective payment for Post Acute Services or PACS.

Background

As part of the post acute services that patients are discharged to, skilled nursing units are a very important discharge destination. Following the BBA, home care providers dramatically decreased leaving markets with less choices and so skilled care became a substitute for some. Before 1983 few, hospitals were integrating post acute services. However, following the reimbursement changes of 1983, more hospitals entered into the post-acute business.

In this era of environmental change, hospitals began integrating their delivery systems and providing more than acute care. Skilled nursing care provides both short–term rehabilitation and long–term care for patients who require skilled nursing care and therapy care on an inpatient basis. CMS (2003), reports that there were about 16,500 nursing homes certified to provide Medicare and or Medicaid in the US. Approximately 1.8million beds serve about 3.5 million people a year. Table 1 shows the change in number of beds and services from 1992 to 2004. Then number of skilled facilities is greater than in 1992, but has

declined from 1998. Home care agencies show growth until 1998 and declined

Table 1. Number of Beds and Services from 1992 – 2004

	1992	1994	1996	1998	2000	2002	2004
Skilled Nursing Facilities*	12,303	13,945	14,548	16,079	16,275	15,089	15,784
Home Health Agencies	6,447	8,003	9,808	9,284	7,317	6,888	7,148
Inpatient Rehabilitation	907	1,001	1,031	1,078	1,102	1,181	1,206
Long -Term Care Hospitals	97	146	183	209	240	286	307

Note: *Includes swing bed hospitals.

Source: CMS 2003.

further until 2002 and then increase slightly for 2004. Long–term care and inpatient rehabilitation have shown slow but steady growth.

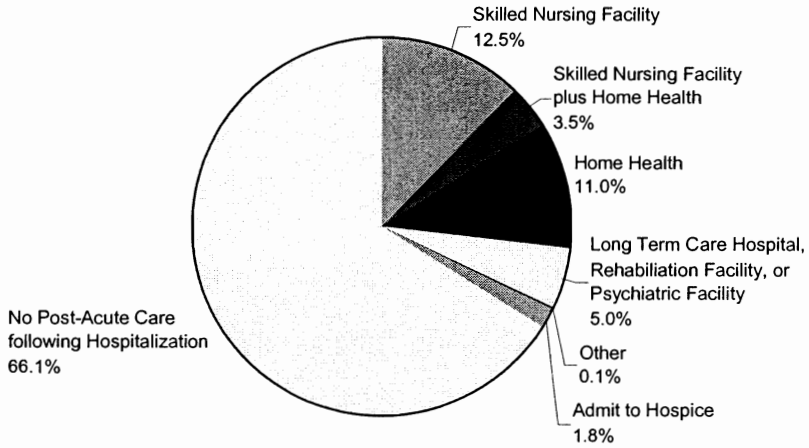
Medicare does not pay for skilled care on a long–term basis, if a beneficiary requires more care once Medicare has run out the patient must pay for services out of pocket. When their resources have "spent down" they become Medicaid eligible. There are approximately 15,000 Medicare certified SNFs. Of these, about 85% are freestanding while the remaining 15% are hospital–based. Three quarters of the freestanding SNFs are operated as for–profit, and the majority of hospital–based units are not–for–profit. Table 2 below is nursing home facilities and beds by type of ownership.

Table 2. Nursing Home Facilities and Beds by Type of Ownership

Type of Ownership	No. of Facilities	Percent	Number of Beds	Percent
For–profit	10,759	65.4%	1,188,643	66.2%
Not–for–profit	4,676	28.4%	485,706	27.1%
Government	1,011	6.1%	120,923	6.7%
Total	16,446	100.0%	1,795,272	100.0%

Source CMS, OSCAR data April 2003

Reliance on the ability to discharge to a post acute facility is reflected in Figure 1, is the utilization of post acute services, which shows the percentage of patients discharged to a post acute service following a hospital stay. The most common destination is skilled care and, though some involve multiple settings.



Note: Long-term hospital, rehabilitation facility, or psychiatric facility includes beneficiaries who used other post acute setting following their stay in these settings. Other includes all other 'mixed' episodes.

Source:: MedPac 2004

Figure 1. Utilization of Post Acute Services

Balanced Budget Act

Responding to rising costs for Post Acute Care Services, (PACS), Congress enacted the Balanced Budget Act of 1997. The major reforms of this act include broad changes, which affect hospital operations as well as a slowdown in inpatient price increases from prior years, which had been about one percent less than inflation. Additionally included were early transfer penalties for ten

DRGs. This means that if a patient is moved earlier than a predetermined length of stay, the payment for that patient will be at a lower transfer rate. Traditionally, a transfer to SNF or HH would capture different dollars under a different reimbursement scheme. Prior to the BBA, these services were cost reimbursed on historic and current costs including some hospital costs. However, the provisions of the BBA changed that to a prospective payment system (PPS). For SNF, this meant a per diem system, which helps contain costs by establishing in advance a unit price for each service. (Liu, et al.,1999).

In other provisions of the BBA, home care was converted to a fixed rate interim payment system (IPS) to capture Medicare savings until PPS was implemented. The IPS modified Medicare's home care payment by reducing the cost limits for each service, and adding a new cost limit criterion. The other elements of the BBA address outpatient payment modification, and teaching hospital disproportionate share cutbacks. The overall effect of these changes has been to reduce hospital revenue and increase the per discharge expense.

The impact and importance of this issue lies in the fact that hospitals have historically relied on their ability to move Medicare patients from acute inpatient services which are under DRG payments, to a less acute setting with a different reimbursement structure. This provides a new payment source after the DRG has ceased to reimburse for added costs of patient care in the acute setting. This change, along with the different rules for submission of billing information as well as demand for more patient level data, has increased the cost of operating a

SNF. The American Hospital Association (AHA)(2001), in a study with Price Waterhouse identified 100 new regulations. These were reviewed and found to consume from thirty minutes to one hour for every hour of care delivered depending on the setting. This regulatory environment adds to the transaction cost of PACS. Regulation as an added transaction cost is the focus of prior research from Cook et al (1983) and Gay et al (1989).

Access to this part of the continuum of care has become uncertain as the cost of delivering this service has increased and PACS facilities have closed. This leaves hospitals with the problem of discharging of complex, high–cost patients, which increase length of stay and costs. According to the Advisory Board (2000), hospitals account for 53.3% of skilled nursing admissions. If access to these services becomes limited, hospitals will be faced with discharge placement barriers, which could further affect their declining revenue and increasing costs of providing care.

The Balanced Budget Act changed the payment for PACS from cost–based to a prospective payment system, which was an all–inclusive rate for certain conditions. With the decline in reimbursement, private providers of PACS, especially skilled nursing and home care, were exiting the market place leaving a possible gap in service for those who were hospitalized but no longer needing expensive acute care. What decisions did hospitals make that had previously relied on PACS for additional sources of revenue and reductions in length of stay? Were the determinants of vertical integration the same after the BBA as

before? No empirical studies have been done to examine determinants of vertical integration of skilled nursing before and after the BBA.

According to CMS (2003), about 28% of nursing homes are not–for–profit, meaning that revenues in excess of cost must be reinvested back into the company. The General Accounting Office (GAO) found that the median total margin for NFP SNFs was 0.6% in 1999 and 0.3% in 2000, compared to for–profit margins of 1.6% in 1999 and 2.2% in 2000. Among the large for–profit facilities, Medicare is typically 10 %– 15% of the patient population and approximately 25% of the revenue. This dropped following the BBA and SNF PPS in 1998. Before this change in reimbursement, Medicare revenues allowed the industry to expand despite losses on other lines of business. Following the implementation of PPS, however, providers were forced to operate more efficiently.

Vertical Integration

Press (2000) contends that every aspect of health care is destabilized in a way that has not occurred previously. In the past changes have occurred somewhat sequentially allowing time to adapt in each segment of the process. This pervasive instability is reflective of a three–dimensional change that is present simultaneously. For instance, change in horizontal alignments such as insurers, hospitals, suppliers, and physicians continue to seek ways to improve pricing advantages and gain market share. Consolidations are concentrating power in fewer participants. Secondly, there is deterioration in vertical

relationships between hospitals and physicians as well as HMOs and, at the same time, there is a drive to find new vertical partners. Pharmaceutical firms are racing to be first to market with new genetically engineered drugs, which has split the industry into layers of processing. Lastly, consumerism is redefining the industry, as a more informed and cost conscious patient becomes the target of marketing. There is a transition to predictive medicine away from the old diagnose and treat model. According to Press, these three dimensions, horizontal alignments, vertical integration, and consumerism have become unstable and have resulted in a lack of trust in past core assumptions about the future organization of healthcare. In an environment of heightened litigation, consumerism, published quality report cards, reduced reimbursement and increased costs it is difficult to rely on historical strategies to produce the same outcomes.

Vertical integration is one strategy that hospitals employ to gain access to timely discharge planning options for patients. Vertical integration according to Porter, (1980), is the combining of distinct distribution parts, such as selling, distribution or other economic processes within a single organization. Additionally, Porter contends that vertical integration is really more than just economic strategy and includes the strategic issues of integration versus the use of market transactions. Vertical integration is when health care organization "offers directly or through arrangement with others a broad range of health services and in a functionally unified manner" (Conrad and Dowling, 1990).

The number of hospital–based SNFs decreased by about one third from 2,173 to 1,463 between 1998 and 2003. From 1992 – 1998; however, freestanding facilities grew 61% and increased 4.6% from 1998-2003, (MEDPAC, 2004). Evidence is that freestanding facilities were substituting for hospital–based skilled units when the hospital units have closed. Hospital–based SNFs are continuing to leave Medicare at the rate of about 9% a year from 2001–2003. According to Med Pac (2004), hospitals were more likely to leave the skilled market if they were new to the market, were for–profit, had a higher proportion of patients with high pharmaceutical costs or were located in urban areas.

As the environment becomes more uncertain in the presence of changing financial schemes, increased demand through an older, sicker population and a need to find alternative discharge destination, hospitals are faced with the need to implement strategies, which enable them to best meet the needs of the patients and the organization. The form of governance they choose to provide skilled nursing services is the topic of this research and the framework is transaction cost economics.

The Theoretical Framework

In 1937 Ronald Coase introduced Transaction Cost Economics in which he proposed that organizations evolved as a result of market failure (Coase, 1937). He further questioned the point at which transaction would be carried out within the firm as opposed in the open market involving more than one firm. Coase further proposed that there were costs other than production costs, which

influenced a firm's decision to make or buy. These transaction costs were involved in preparing and monitoring contracts with suppliers, employees, and customers. Central to TCE is the concept of uncertainty and that its presence is the reason firms emerge. Different organizational forms emerge as a result of specific types of transactions.

Williamson (1975, 1985, 1991) elaborated on the original theory by adding hybrid structure to the market and hierarchy dichotomy. According to Williamson (1981), transactions have three dimensions: uncertainty, frequency, and asset specificity. Uncertainty reflects an inability to predict future events and is associated with two of the theories assumptions: bounded rationality and opportunism. Bounded rationality means that a manager's knowledge and decision–making is limited. Williamson as "self interest seeking with guile" describes opportunism. The two types of uncertainty encompass environmental uncertainty and human behavioral uncertainty. Asset specificity is the scope of specialized investment, physical and human resources, which might be needed to support a transaction. Transaction frequency is how often a transaction occurs. According to Williamson (1985), as the degree of uncertainty, specificity, and frequency increases firms tend to form more complex governance structures such as hierarchical, in order to minimize transaction costs. Variables, which have been used in prior research, may also merit consideration as they relate to Williamson's transaction cost theory. Lehrman & Shore (1998) and Mick & Conrad (1990) measured the dimensions of transaction cost, uncertainty,

frequency and asset specificity as follows:

- Transaction Uncertainty: area average hospital occupancy rate, hospital occupancy rate, average Medicare length of stay, SNF beds to elderly population ratio, and SNF occupancy.
- Transaction Asset Specificity: number of hospital geriatric services, and number of licensed staff
- Transaction frequency: proportion of Medicare discharges to total

The dynamics of healthcare economics are uncertain as regulation and reimbursement change. As hospitals struggle with these changing uncertainties in order to maximize revenue and reduce transaction costs, it is important to know which strategies are most successful. A further study of the post acute market and the effect of vertical integration decisions could yield valuable information, which could serve as a resource to organizations' planning efforts.

The unit of importance in TCE is the exchange between buyer and supplier and the dimensions and attributes of transaction are responsible for the selection of a preferred governance form. Forms that evolve may include spot market in which an organization, in this case the hospital, may rely on the availability and willingness of local nursing homes to accept its patients. This arrangement does not require a formal relationship. The second arrangement is contracting or joint venture and is a hybrid form of governance. This mode requires developing and monitoring contracts to guide exchanges and ensure compliance. Lastly, the most extreme form is vertical integration or hierarchy, in which an organization

would bring services in house and has complete control over the supplier. In the case of hospitals, they would add the provision of skilled care to their service offerings thereby guarding against the lack of community resources or their opportunism in selectively accepting more desirable patients.

Purposes of the Study

The purpose of this study is to understand hospitals' decision to make or buy skilled nursing services before and after the BBA. Specifically, to identify organizational and environmental factors associated with the decision to arrange or provide skilled nursing care. The dramatic change in the reimbursement and regulatory environment brought about by the BBA might have caused hospitals to make different arrangements than before. Another purpose of this study is to empirically test a theoretical model based on transaction cost theory using a model previously tested by Chiu (1995). Transaction cost theory has been previously used in healthcare research to explain hospitals' decision to vertically integrate some or all components of PACS (Conrad and Dowling; 1990 Robinson, 1997; and Zinn, 2003). Unique to this study is replicating a study using data before and after an environmental change to determine its continued applicability.

Research Questions

In order to evaluate the determinants of a hospital's decision to deviate from traditional inpatient care and vertically integrate skilled nursing care services, this study addresses the following research questions:

1. What are the determinants associated hospital selecting a mode of control from market, hybrid or vertical integration to provide skilled care?
2. Were the decisions different before the BBA than after?
3. Can Williamson's transaction cost theory be useful in explaining hospitals' decisions to provide skilled care services?

Outline of Remaining Chapters

Chapter 2 begins with a review of the beginning of skilled nursing care in America and the evolution of Post Acute Services (PACS). Changes in reimbursement and its effect on hospitals are presented with a discussion of the Balanced Budget Act (BBA) and the end of cost based reimbursement for PACS and change to prospective payment. This is followed by a discussion of hospitals' diversification into PACS before and after the change in reimbursement environment. Some examples of vertical integration in both the non–healthcare and healthcare industries are described.

Chapter 3 defines the theoretical framework on which this study is constructed, and reviews articles in healthcare, which also use TCE to explain health care organizations' response to market failure. Non-healthcare research is also discussed which employed a TCE approach. Hypotheses are then derived for the three constructs of the conceptual model.

Chapter 4 starts with a discussion of the study design and sample to be used. Then a description of the data sources, model specification and measurement variables is presented. Following this section is the plan of

analysis, which includes a discussion of the model building analysis and a multivariate logistic regression.

Chapter 5 contains the results of the data analysis including the descriptive statistics, model building, and multivariate logistic regression analysis.

Chapter 6 presents results related to the individual hypotheses testing of the three constructs. A discussion of the success of the testing in answering the research questions is presented. Limitations of the study are then discussed with implications for further research.

CHAPTER 2: LITERATURE REVIEW

Introduction

This chapter begins with an overview of Post Acute Care Services (PACS) including its history and evolution of reimbursement. This is followed with a discussion of the Balanced Budget Act (BBA) of 1997 and its impact on hospitals and PACS as well as the changes in the Act following concern from providers. The next section, presents research on access to care as well as the financial status of hospitals and post acute providers. Lastly, vertical integration is discussed as a response to reimbursement changes both before and after the BBA.

Overview

History of Skilled Nursing

In the early 1900s there was no federal assistance to help pay for care for the elderly or disabled. States sent their impoverished citizens to "poor farms' or "almshouses" which were known for their poor care and dilapidated facilities. In the 1930s the government's "New Deal' determined that elderly citizens should receive federal benefits on the basis of need and Social Security became universal. Social Security provided matching grants to states for Old Age Assistance except to those living in public institutions. By the 1950s there were

substantial amendments to the Social Security Act, which included mandates to the states to license nursing homes, and lifted the ban on assistance to those in public institutions. Also a change in federal law provided funds for the construction of nursing homes in conjunction with hospitals in an effort to raise the quality of the nursing homes. This enabled nursing homes to transition from being part of the welfare system to being part of the health care system. During the next forty years a variety of legislation was passed in attempts to alternately improve quality, or reduce costs. One of these was the Miller amendment that established intermediate care as an alternative to expensive nursing home care. The Institute of Medicine issued a report in 1985, which became the basis for legislation in the Omnibus Reconciliation Act (OBRA) in 1987. This represented the biggest overhaul of federal regulations for nursing homes.

Response to federal payment changes resulted in the emergence of new sub acute services for patients released from the hospital, but still needing care. After a period of rapid growth in expenditures for this segment of healthcare, the Balanced Budged Act of 1997 was enacted to cut the amount of money the government was paying to providers. (www.pbs.org/newshour/nursing homes/timeline.html 2002)

Nursing home demographics in 2000 showed that the average facility was 83% occupied and had an average of 107 beds. For- profits comprised 66 percent of the total, with 27% being not for profit, and the remaining 7 percent were government operated. Medicare is responsible for 8 percent of their

reimbursement; Medicaid is 68 percent and 23 percent is private pay. Chains own 52 percent of the nursing homes and the remainder is individually owned. (www.efmoody.com/longterm/nursingstatistics.html)

Post acute providers include skilled nursing facilities; long term care hospitals, rehabilitation, and home care services. Patient qualifications, for discharge to a PACS, vary according to the setting and care needed. In order to qualify for skilled care a patient must have had a three-day inpatient stay within thirty days of a skilled admission. Medicare part A helps pay for SNF when certain conditions are met such as the three day in acute care hospital, treatment for the same condition treated in acute, and a medical professional certifying the need for daily skilled nursing or rehabilitative care. The number of days for skilled care is limited to 100 days per benefit period with a co payment requirement from 21 to 100 days. After this time, Medicare part B benefit continues to pay for physician services as well as other part B benefits.

PACS Evolution

Hospitals have also been subjected to regulations and reimbursement changes which have resulted in responses designed to maximize reimbursement and reduce costs. In 1983 hospitals transitioned from cost based reimbursement to prospective payment using diagnostic related groups (DRGs), incentives to move patients out of expensive inpatient care to a lower level were created. Since hospitals began to be paid a preset amount for defined diagnoses, regardless of cost or length of stay, it was imperative to discharge patients to a

lower level of care such as a post acute setting. These providers were still being paid on a cost- based system that gave providers access to new reimbursement sources.

As a result, the number of people accessing skilled nursing units between 1989 and 1996 grew from 6 to 15 percent of all Medicare spending. The number of patients using SNF increased from 638,000 to 1.1 million, causing the number of SNF days to rise from 25.1 million to 40.2 million between 1990 and 1996. Concurrently, the number of patients in home care nearly doubled in the same time period from 1.9 million to 3.7 million. The per-user visit went from 36 to 77. (Gage, 1999)

Further adding to the cost of care was the addition of new regulations that added steps to processes of care as well as required additional monitoring and reporting to the payer. The American Hospital Association (AHA) (2001), in a study with Price Waterhouse found almost a hundred new regulations. These were reviewed and found to consume from thirty minutes to one hour for every hour of care delivered depending on the setting. The resulting time needed for regulation compliance has added to the cost of delivering care and contributed to the declining margins. Other studies have proposed regulation as a tax as well.

Gay et al (1989), for example studied South Carolina hospitals' response to regulation following the implementation of PPS for hospitals in 1983. In addition to administrative data, data from interviews with randomly selected CEOs and CFOs were included. The authors employed Cook et al (1983) framework, which

proposes that regulation, serves as a tax on hospital behavior, and can result in responses that can result in reduction in quality, quantity and type of hospital output. It is predicted that as a result of regulation intensity that hospitals will seek areas unaffected by regulation or "the unregulated margin." Responses can occur at the institutional, managerial or technical level. The institutional level response might include legal resources, board education or perhaps identifying new markets. Managerial response to regulation may include redistribution of resources, increasing staff to deal with the new regulation or sharing of non-clinical resources with another facility. Changes in practices or products define a technical response. Indicators of practice were length of stay, admission sources, admission to special care units, use of inpatient procedures, and place of discharge. The surveys were used to measure institutional level response. Results of the interviews revealed that administrators increased staff to work with regulatory agencies and government officials. Financial accountability was displaced to lower level management and increased emphasis was placed on public relations. While length of stay did not decrease for this population, strategic implementation of pre admission testing was increased as was home health services. Readmission rates increased from 0.6 to 12.3 percent indicating that patients may have been discharged prematurely. A similar decrease was not evident among non–Medicare patients. While this study was small in scope and only analyzed one states data, its relevance to this study is in examining hospital responses to regulations that result in reduced reimbursement and add to the

overall cost of direct care as well as the indirect cost of regulatory compliance.

This section presented an overview of post acute services and an historical look at the evolution of skilled nursing care in America. From the beginning of the twentieth century until now, the provision of care to this population of patients has relied on government support and is highly regulated.

Cost of Care

Medicare spending on these services rose at an average annual rate of thirty percent from the mid–1980s through 1997(GAO, 2002). Medicare is the primary payer for most post acute care. The number of Medicare recipients of post acute care has increased and those receiving care are in need of more intensive services. Medicare spending increased more than $33 billion in the ten years from 1986 to 1996. According to the Office of the Inspector General (OIG), in 1989, Medicare paid $2.8 billion to nursing homes and by 1997 this number had increased to $12.2 billion or about 5.9% of the total Medicare budget. (OIG, 2000). The number of providers also increased in rehabilitation, skilled nursing, home care, and long-term care. Of note is that this time period encompasses the beginning of prospective payment for hospitals, and the implementation of the Balanced Budget Act of 1997, which marks the beginning of the end of cost based reimbursement for post acute services. These providers can be found in free standing, hospital owned, for profit or not for profit arrangements. In 2001 there were 1,813,665 total nursing facility beds and 16,995 total nursing facilities. Of these facilities 13% were hospital based and about 85% are free standing.

Balanced Budget Act

Impact on Hospitals

The BBA froze Medicare inpatient payments for 1998 and then reduced price increases for four year subsequently (Health Care Advisory Board, 1999). Prior to this, length of stay reductions were a reliable means of reducing costs. This was partly generated by quick transfers to skilled nursing facilities and home care. Then by spreading costs onto non- inpatient income statements, additional Medicare reimbursement was realized which covered some fixed costs. Skilled nursing was also paid based on cost of services provide and was highly profitable. Many hospitals converted unused beds and swing beds into skilled nursing facilities to provide step down care for mid acuity patients. This allowed patients to be discharged from a payment-restricted environment to one where payment was relatively unlimited. While the shift to less intensive care was desirable, PAC providers faced few restrictions on the volume of service or days they could deliver within a covered benefit.

Congress responded to the unrestricted growth of PACS, by establishing a new cost containment system by changing the hospital payment policy for discharges to PAC. In response to higher costs and utilization of PAC services as well as rising hospital costs, congress enacted the Balanced Budget Act of 1997 (BBA). The major reforms of this act include broad changes that effect hospital operations. Included was slowdown in inpatient price increases from prior years, which was about one percent less than inflation rate (Advisory Board, 1999).

Additionally included were early transfer penalties for ten DRGs. This meant that if a patient were moved earlier than a predetermined length of stay, the payment for that patient would be at a transfer rate. Traditionally, a transfer to SNF or HH would capture different dollars under a different reimbursement scheme. Prior to the BBA, these services were cost reimbursed on historic and current costs including some hospital costs. However the provisions of the BBA changed that to a prospective payment system (PPS). For SNF, that meant a per diem system, which helps contain costs by establishing in advance a unit price for each service. (Liu, et al 1999)

In October 1998, the BBA required that hospital discharges of ten specific DRGs, which have lower than average lengths of stay will be viewed as a transfer for reimbursement purposes. Patients with the same DRG may be provided post acute care in more than one setting. Of the 32 DRGs accounting for 62 percent of all PAC episodes, nearly one fifth of the episodes involved more than one type of provider. Some patient diagnoses are present in all three PAC providers, but others are confined mostly to one type of setting. For instance, less than one percent of obstructive pulmonary disease was found among patients who receive PAC from a rehabilitation center (Liu et al, 1999)

Impact on PACS

Reimbursement for PACS has changed in response to rising demand and rising costs for Medicare population, which is the largest user of this service. Since the initial implementation of the BBA, Congress has made several changes

to PPS, which have made differences in the way reimbursement is implemented.

Gage (1999), in an article exploring the potential impact of the BBA on post acute utilization, reports that between 1989 and 1996 the combined share of Medicare expenditure for SNF and HH grew from six to fifteen percent. Furthermore, the number of people using SNF doubled and HH utilization almost doubled from 1.9 million to 3.7 million visits. Also, the number of SNFs rose from 10,508 in 1990 to 15,553 in 1996 along with HH agencies doubling during this time. As the number of provider and services grew the amount of Medicare payments grew in double digits from 1990 to 1996, with one year as high as a 56% increase in payments to SNFs.

In other provisions of the BBA, home care was mandated an interim payment system (IPS) to capture Medicare savings until PPS was implemented. The IPS modified Medicare's home care payment by reducing the cost limits for each service, and adding a new cost limit criterion. The other elements of the BBA address outpatient payment modification, and teaching hospital disproportionate share cutbacks. The overall effect of these changes has been to reduce hospital revenue and increase the per discharge expense.

Prior to 1997, PACS were reimbursed using a cost based method, which was attractive for providers, but also to hospitals who were able to transfer patients from acute settings to lower levels of care and reduce their length of stay. This was particularly attractive since hospitals had been reimbursed under a prospective payment system since 1983, and reducing length of stay became

essential to improving or maintaining the bottom line. After 1997, prospective payment was based on Fiscal Year 1995 Part A and B cost adjusted using the SNF market basket index, the case mix from the resident assessments and geographical wage variations. Market basket represents the inflation factor. Case mix is designed to take into account varying resident acuity and levels of care. (OIG, 2001). Resource utilization groups (RUGS) are used to place a patient into one of 44 categories. The determination of the patient's classification is gleaned from the Minimum Data Set (MDS), which is required on all patients. The MDS is an assessment or standardized set of clinical and functional status measures and is completed on each resident by the 5^{th}, 14^{th}, 30^{th}, 60^{th} and 90^{th} days of their stay. Prior to PPS, the MDS was used solely for care planning.

The classification system, which classifies patients according to resource utilization groups or RUGS, has been a source of concern for the Medicare Payment Advisory Council (MEDPAC) since the implementation of PPS. The RUGS includes seven categories, which is associated with a payment rate that is based on a number of factors such as the need for therapy and the level of functioning measured in terms of the activities of daily living. The concern is that hospital based skilled nursing units are being under compensated for the more complex patients and that this complexity is not being captured on the RUGS. This leaves the hospital units with more difficult patients incurring higher costs. MED PAC has recommended the revision of this classification tool.

MedPac is a federal body established by the BBA to advise Congress, which may affect the Medicare program. In addition to advising on the payment for care they are also charged with analyzing access to care, quality of care and other issues related to Medicare. (www.MedPac.gov, 2005)

Rehabilitation patients are required to receive three hours of therapy a day to include speech, occupational, and or physical therapy. To qualify for home care it must be documented that the patient is homebound and cannot get to an outpatient center for care. Supporting the conclusion that there has existed a shift in site of care for Medicare patients, (MedPac, 1999), reported large increases in the volume of post acute services which have coincided with decrease in hospital length of stay. Additionally, length of stay declines has been the greatest for those DRGs, which utilize PACs the most. Finally, hospitals that operate hospital based PACS have lower lengths of stay than those who do not. While length of stay has dropped for those accessing PACs, there has also been a more modest decline for those who are discharged to home without further assistance. Advances in medicine and technology can possibly explain this for all patients.

The GAO, 2002 reports that the margin for free standing SNF facilities in the first full year under PPS, was slightly over eight percent, but rose to nineteen percent after the temporary payment increases were implemented. However, nearly one fourth of the SNFs in 2000 had margins exceeding thirty percent and about one fifth had negative Medicare margins. Contrary to the freestanding SNFs, ninety percent of the hospital owned facilities had negative Medicare

margins. Under PPS, per diem payments dropped significantly, while costs rose during the same time period. Higher costs may have been a result of differences in services offered by hospitals as opposed to freestanding facilities. Under PPS, SNFs receive per diem payment based, which considers differences in geographic differences in labor costs and for differences in the resource needs of the patients served. However, MEDPAC, and the GAO that the patient classification system may not sufficiently reflect patients who are complex and need drugs, laboratory services, and imaging have expressed concern. (GAO, 2002)

This information is important to consider for hospitals, which might have higher cost patients that are not captured by the classification system and result in improper payment. This combined with negative Medicare margins could effect hospital decisions on integration of PACS, but specifically skilled care.

A consequence of the BBA to hospitals was that increases in inpatient Medicare payments for 1998 were frozen and price increases were reduced for the following year (Medpac, 2001). The number of hospitals in systems declined between 1997-1998, but increased again in 1999. Horizontal integration was useful in achieving economies of scale, but there was a trend away from vertical integration. The American Hospital Association (2001) cites Medicare reimbursement changes with hospitals divesting of PACS following the BBA.

Hospitals ability to discharge from DRG reimbursed inpatient services to cost reimbursed post acute services, such as skilled nursing and home care was

dramatically altered. Post Acute Services such as these, along with rehabilitation services and outpatient services came under timelines for conversion to PPS. This change diminished hospital opportunities to maximize revenue by moving patients to lower levels of care from higher–level acute care. Under the new rules, reimbursement will no longer be linked to individual hospital cost, exposing hospitals to the realities of the market for post acute services. While the benefits to an integrated system remain, the decision to own non–inpatient businesses such as SNF and Home Care must be judged using a different economic structure.

CMS estimated that PPS would decrease total payments an average of 17 – 19 percent. Most effected would be hospital–based SNFs, with estimated losses of 19 percent for MSA and 18 percent for non–MSA potentially reducing the value of vertical integration. Freestanding facilities are likely to experience an average reduction in payments of 17 percent (anonymous health care financial management 1998), further curtailing the availability of community based skill beds. Taken together these changes created a challenging environment for hospitals trying to discharge patients.

Following the BBA, the number of certified SNFs decreased between 1998 and 2000, from 15,035 to 14, 835 for all facility types. Hospital–based facilities declined from 2171 to 1897 (Egger, 1999). Hospital–based units have historically comprised approximately 13% of the total (American Health Care Association, 2001). Implementation of the BBA created a timeline for the

prospective payment in the post acute sector for healthcare, which reduced payments to post acute providers. The first sector affected was Home Health, followed by SNF, outpatient services and finally Rehabilitative services were targeted for prospective payment in fall of 2001. Since then, 2500 home care agencies have closed their doors, and unprecedented numbers of nursing home chains have sought protection in the bankruptcy court.

The Centers for Medicare and Medicaid Services (CMS), in a 2003 industry update reported Wall Street concerns that the for–profit, publicly–traded sector of nursing homes were experiencing declining margins both before and after the transition provisions of the BBA. Additionally, some non-profits were experiencing even more damage to their margins and may be less able to absorb losses because of more fragile operating margins. The consequence of this financial uncertainty may cause an inability to further subsidize Medicaid whose patients typically comprise 65 – 75 percent of nursing facility residents. This worry is heightened because states are experiencing fiscal shortfalls and may need to reduce or freeze Medicaid payments. Liability costs are skyrocketing, access to capital is limited, and the cost of operations is rising all adding to a turbulent financial environment.

Modifications to the BBA

The congressional budget office (CBO) projected that there would be an additional $160 billion in spending reductions following implementation from 1998 – 2002. Medicare reductions alone were projected save $112 billion, $44 billion

of that was slated to come from reductions in payments to hospitals inpatient and outpatient lines of business. (Lewin group, 2000). However, according to CBO Medicare savings were actually more that 70% over what was projected, which confirmed that the impact on providers was greater than anticipated.

In the fall of 1999, the BBRA, or Balanced Budget Refinement Act was enacted to respond to providers' concerns that the reductions in payment were too severe. This change included a 4% across the board increase in payments to SNFs for the years 2001 and 2002 and a temporary twenty–percent increase to 15 RUGS for patient conditions considered medically complex. In addition, several costly non–therapy ancillary services such as ambulance, prostheses and chemotherapy were excluded from PPS and paid for separately. Additionally, in 2000 Congress adjusted the payment rates under the Benefits Improvement and Protection Act (BIPA), which increased the inflation update to the full market basket for the year 2001 and raised the nursing component of the RUGS by 16.6 percent in hopes of improving the nursing ratios for patients.

The BBRA increased 20% reimbursement to three rehabilitation RUGS which was spread across all 14 special RUGS as a 6.7% increase. This act restored an estimated $17 billion of the BBA's reductions and extended it to 2004. About half of this restoration went to acute care hospitals. The majority of payment reductions were targeted to inpatient services, which included acute, long–term, rehabilitation, psychiatric and outpatient services. However, hospitals had integrated other services to provide more continuum care such as post acute and

long–term care. Consequently, while reductions were being felt on the acute side, those with expanded offerings were also subject to payment reductions across the continuum. The result was a serious challenge to break even on Medicare patients. These changes went into effect in April 2001. (OIG, 2001)

Post BBA Research

Access to PACS

Access to this part of the continuum of care has become uncertain as the cost of delivering this service has increased and companies have gone out of business. This leaves hospitals with the problem of complex high cost discharges, which may increase length of stay and costs. According to the Advisory Board (2000), hospitals account for 53.3% of skilled nursing admissions. If access to these services becomes limited, hospitals will be faced with discharge placement barriers that could further affect their declining revenue and increasing costs of providing care.

The effects of the BBA on number of patients accessing home care and the number of visits have been dramatic. McCall (2003) reports that there has been a 22 percent decrease in the number patients using home care and a 39 percent decrease in visits per patient among Medicare patients. These findings support government curtailment of reimbursement as an incentive to reduce utilization.

Table 3 represents the utilization of post acute services in 1997 within one day of hospital discharge. It is evident that hospitals are a major supplier.

Table 3. 1997 Post Acute Use by Provider Within One Day of Hospital Discharge

Type of Provider	# of Discharges Post Acute Care	%of Hospital Discharges	%of Post Acute Admissions
Total	2,476,412	25.3	100
SNF	1,320,701	13.5	53.3
Home Health	799,893	8.2	32.3
Rehab Facility	278,073	2.9	11.2
Psychiatric Facility	43,794	0.4	1.8
Long–term Care	39,951.	0.3	1.4

In summary, the BBA was created to curtail Medicare spending on this segment of healthcare and has had far-reaching effects on both post acute as well as acute care providers. Along with spending decreases there has been a parallel increase in regulation resulting in increasing costs and decreasing revenues, challenging both segments of health care.

Angelelli, (2002) examined access to post acute nursing care before and after the BBA in Ohio. The study data was all Medicare Part A claims for those receiving hospital or nursing facility care from 1996 through 1999. In order to identify patients most likely to have access problems, 1996 SNF data was linked to the hospital claim. Non–therapy ancillary charges were used to characterize the relative costliest post acute patients. These charges included medications, laboratory, radiology, medical supplies and IV therapy. They were adjusted using a cost to charge ratio, and then summed across each Medicare covered nursing facility stay and linked to the preceding hospital claim. The hospital claim was used to predict the adjusted non–therapy ancillary costs in a multivariate linear

regression model. Results showed that among the highest cost patients, the percentage discharged to freestanding nursing homes fell from 14.2 percent to 12.9 percent in the first six months of 1999, following an increase from 1996 to 1998. Average length of stay increased slightly for the costliest patients by approximately four tenths of a day, which is a reverse of the trend from 1996 to 1998. The author's findings suggest little effect of BBA related policies on access in Ohio, but do caution that close attention to access in needed in the future as policy changes are considered.

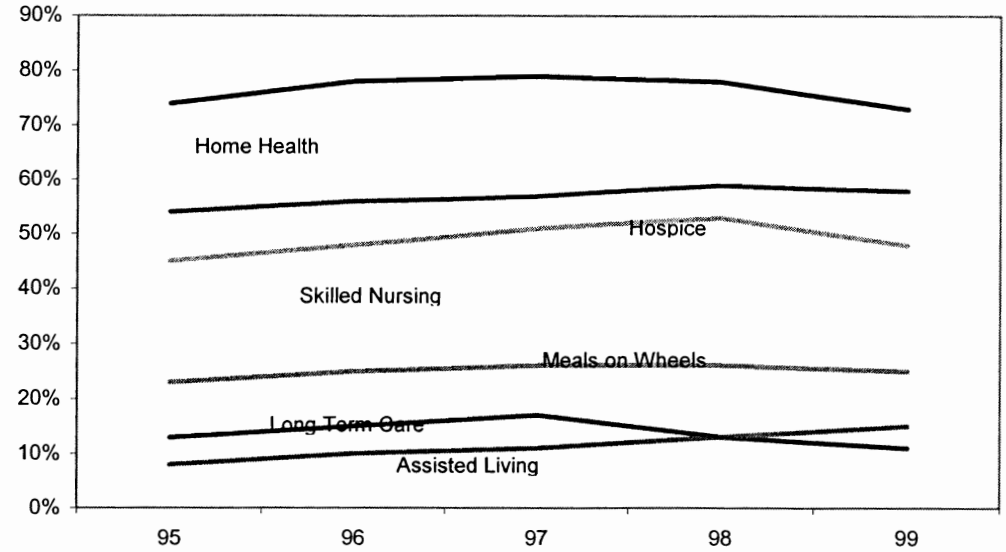
In a report from the OIG (2000), results from interviews with a random sample of 202 hospital discharge planners were presented. Almost all planners reported that they were able to place Medicare beneficiaries in SNFs. About 14 percent of the planners estimated that between 1 and 5 percent cannot be placed, while the remaining 5 percent of planners put the estimate to more than 5 percent. When queried about delays in placing patients, 44 percent reported delays in placing patients and 12 percent of the discharge planners report that they usually or always experience delays in placing Medicare patients in SNFs.

Hospitals' Financial Status

Nineteen eighty–three PPS legislation for the hospital industry is describe by a Lee (1997) as a "major jolt" which produced dramatic changes in organizations. By 1989, fifty seven percent of hospitals reported losing money on Medicare patients and declines in margins lowered hospital credit ratings and limited their access to capital (Shortell, Morrison & Friedman, 1992). Private insurers

responded out of fear that cost shifting would increase their costs by implementing their own prospective payment programs. This further restricted hospitals access to resources necessary for operations and future viability. Concurrently population demographic changes of aging, chronic diseases, growth in the uninsured, increased patient expectations and technology advances made for a complex uncertain environment. These dynamics forced organizations to seek new ways to fund care through improved revenues, reduced cost, and better throughput. Some of the strategies employed have been mergers, acquisition, horizontal and vertical integration.

The hospital industry represents the largest category of health spending and Medicare is the largest single purchaser of hospital services. In order for beneficiaries to have access to high quality care, hospitals financial success is important to monitor. Their success depends on volume of care, costs of providing that care, and the price those private and public purchasers agree to pay. According to a report for the American Hospital Association by the Lewin Group (2001), the number of community hospitals dropped to an all time low of 5000 in 1999, at the same time more hospitals were seeking affiliation with systems and were going away from vertical integration strategies. Medicare reimbursement changes were cited as a possible reason. Figure (2) demonstrates the change in percent of hospitals offering non-acute care services from 1995 – 1999.



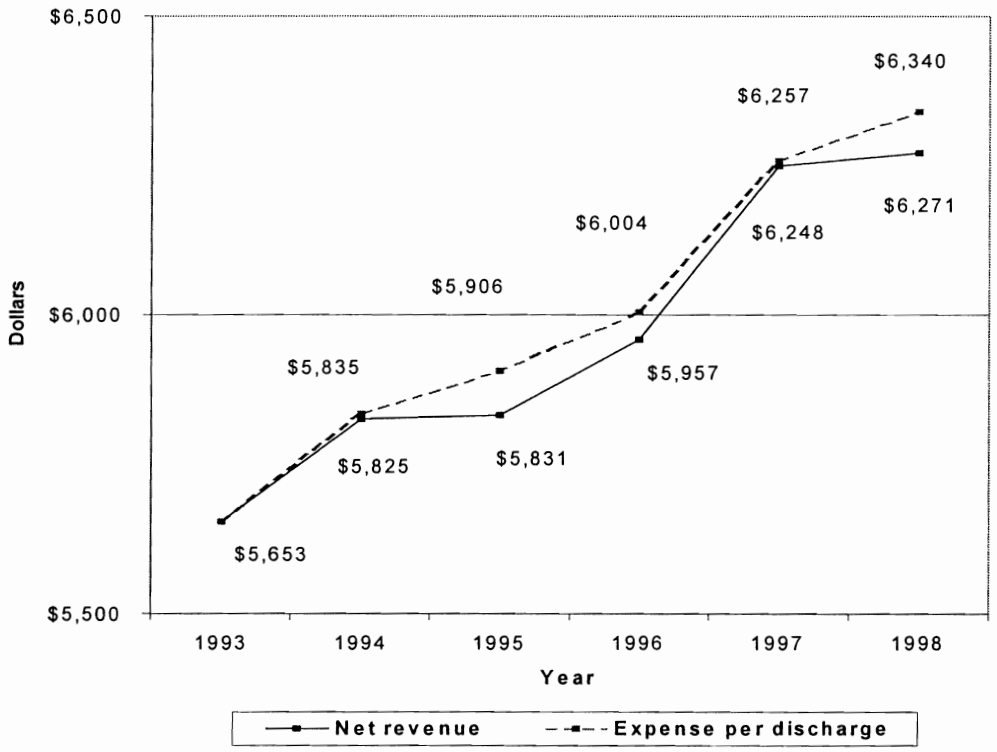
Source: The Lewin Group analysis of American Hospital Association Annual Survey data, 1995-1999 for

Figure 2. Percent of Hospitals Offering "Non–hospital" Services 1995–1999

As hospitals experienced increased pressure to reduce costs in response to decreased payments, they took actions to reduce cost growth, which initially improved financial performance. Additionally they chose to expand into related lines of business such as physician practices, health insurance subsidiaries, home health agencies, and skilled nursing units. Unfortunately, as revenues continued to decline and costs started to increase again, these lines of business began to produce losses. Results of efforts to reduce costs are evident in the real decline in length of stay seen from 1990 to 1999.During this time the length of stay dropped more than 32% (Medpac, 2001-62) and Medicare real cost per case fell almost 1 percent. Reduction in LOS was greater for hospitals in urban areas, possibly due to availability of post acute services.

With the advent of prospective payment, managed care, and the balanced budget amendment, hospitals have seen a decline in reimbursement; shorter

lengths of stay, higher case mix, and increased regulatory environment, and rising costs. This combination has created an ever changing, uncertain environment. Hospital responses to these uncertainties can be observed in the amount and type of integration, merger with systems, closures, non-hospital services, use of non-operating income to augment shrinking revenues from the core business. Figure (3) depicts the net revenue and expense per discharge. There is a rise in expense since 1994 and net revenue until 1997, when there is a departure and expenses exceed revenue.



Source: Advisory Board, 2000

Figure 3. Net Revenue/Expense per Discharge: 1993–1998

Under PPS, hospitals receive predetermined payments for capital and operating expenses. Operating payments are supposed to cover costs for providing inpatient services, except for capital, graduate medical education and other training programs.

Provisions of the 1997 BBA projected five–year savings in payments to hospitals of $32 billion. Prior to this, payments were updated annually to hospitals. Under BBA, updates were set below market basket through 2002, and then were restored to the full level in 2003. In addition this reduction in payment, BBA identified ten DRGs, which would be treated as transfers if they were discharged to skilled nursing, or in some cases home care. This resulted in an average per diem amount prior to the transfer. This was estimated to cut payments by 0.6 percent. Disproportionate share (DSH) payments were cut 5% in 1% increments beginning in 1998. These cuts and changes in the way hospitals have been reimbursed has resulted in increased pressures to find ways to reduce cost, maintain access to care as well as remain financially viable into the future. Trends in Medicare inpatient PPS margins show a pattern in cost growth over time. Margins in the early years of PPS were double digit, but as costs rose throughout the rest of the 80s margins fell and dropped below zero in 1990 and to –2.4 in 1991. As cost growth slowed, margins became positive again in 1993 and jumped to 15.3 in 1996. Medicare inpatient accounts for about one third of total Medicare revenue. Others payments are for psychiatric, rehabilitation, skilled, outpatient, ancillary, home care. Throughout the 1980s and

into the early part of the 1990s both revenue and cost rose at similar rates of about 9%. In 1993, however revenues began a sharp decline, as did expenses. (Medpac, 1999).

Hospitals financial condition worsened significantly in 1998 and 1999, from a combination of Medicare and third party payers. The Medicare inpatient margin fell to 12 % from a high of 16.9%. Outpatient margins were also negatively affected. Even during times of high inpatient margins, such as 1996 and 1997, nearly one in four hospitals lost money on Medicare inpatient services. The drop in this margin in 1998 and 1999 saw concurrent increases in the proportion of hospitals with negative margins. The 1999 proportion was 34%. The combination of reduced Medicare was a significant contributor to this, but the reduction in private payments contributed more than Medicare to hospitals declining fortunes. According to the AHA (2003), one in three hospitals is now losing money on Medicare inpatient services. Further evidence of an uncertain bottom line can be found in the following: 58% of hospitals lose money treating Medicare patients, 34% lose money on Medicare inpatient alone, and 32% have negative overall margins since they are being paid less than the cost of delivering care.

PACS Provider Financial Status

Examining cost at the patient diagnosis level, Chen, et al (2000) compared cost effectiveness for patients with five diagnosis related groups across four PAC settings. Patient level data from 51 hospitals in three cities in the US were used. Data came from interviews, hospital records and Medicare billing information.

The cost effectiveness analysis for home care, rehabilitation and SNF revealed that home care demonstrated the best functional improvement with the lowest cost of all three settings for stroke and hip fracture patients. Obviously not all patients are eligible for home care and would need care in other more appropriate setting. For instance, PAC was not cost effective in SNF and yielded less functional improvement in patients with strokes when compared to home care. This finding of negative cost effectiveness may be a determinant in hospitals decisions in arranging for post acute discharge destination, whether in the community or as part of a hospital integrated system.

Pizer et al (2001) examined the differences in costs of hospital based skilled nursing units to free standing ones. Data from the Minimum Data Set, which represents patient characteristics and acuity, as well as Staff Time Measurement data from 1995 and 1997, and claims data for non–therapy cost, were analyzed. Results of the research indicated that higher costs associated with hospital–based SNFs were a result of setting and not resident characteristics. However, their fixed costs accompany relatively low marginal costs associated with admitting high acuity patients. Hospital–based SNFs assume a position of readiness for higher acuity patients whom they might always admit, but this adds to the fixed costs. A total of 1,304 residents incurred a daily total observed cost of $235. About one fourth of these were provided care in a hospital based unit at an average cost of $81 more, or $294. Differences were noted between freestanding, independent, for profit, and hospital based providers. Any future

study would need to control for ownership and profit status. Quality measures were not considered and the conclusion was that PPS should not unfairly penalize hospital based SNFs.

Vertical Integration

Vertical integration represents the combining of distinct production parts, distribution, selling, or other economic processes within a single firm. (Porter, 1980). Porter also contends that vertical integration decision encompasses more than the economic factors, and should include the strategic issues of integration versus use of market transactions. Accordingly the benefits depend on the volume of products or services the firms buy or sell relative to producing in house or in the market.

There are four broad types of models used for empirical analyses of organizational change and diversification (Snail, 1998). Cause of change models use the type of organizational change or degree of change as the dependant variable. Determinants of change generally represent characteristics of hospitals and markets. A weakness of this model is that the direction of change between the change and organizational performance is often unclear. The second and third models are the cost function and financial performance models which attempt to measure the change in expenditures associated with change. Often, the dependant variable is some measure of performance other than cost, such as operating margin. The third model discussed is the operational change model, which uses the type of restructuring as the dependant variable, such as closing a

line business or changes in staffing levels. The most common problems with this approach are selection bias, latent effects from long term restructuring after merger and omitted variables.

This paper outlined a conceptual framework of organizational diversification and provided an assessment of empirical research on hospital organizations. Criteria for inclusion were studies, which had occurred after the era of cost reimbursement, had a sample of at least 10 hospitals, and hypotheses were subjected to significance testing. Empirical findings on horizontal integration, vertical integration, diversification, and physician hospital organization were discussed. Designs of the studies included sample size, and the independent and dependant variables. Only one study was identified on vertical integration that met the criteria, Robinson (1993).

A study of the effect of managed care and vertical integration on hospital efficiency and financial performance found that managed care was a key force in hospitals decisions to vertically integrate. (Bingblong et al, 2001). Backward integration into physician practices, for example yielded better operating margins, returns on assets, and net cash flows, but did not improve productivity. However, forward integration into post acute services, for example, was positively associated with better productivity, and negatively associated with financial performance. The study employed a correlation, cross sectional design, using 363 California acute care hospitals. Data sources were the AHA annual survey, HCFA data file, Area Resource Files and the California Hospital Annual

Disclosure Report. Four categories of variables were developed which included the exogenous construct, managed care concentration, endogenous variables of forward and backward integration, and endogenous constructs which represented productivity and financial performance. Control variables included market and hospital characteristics.

Indicators of productivity were: adjusted admissions per bed and adjusted admissions per FTE. Financial indicators were operating margin, return on assets, net cash flow, and adjusted net patient revenue. The six indicators of financial performance were positively and significantly related to the performance construct. However the productivity indicators were less strongly associated with the performance construct.

Possible explanations for the negative effect of forward integration into long term care on financial performance were discussed. They were: costs of operating LTC in hospitals is higher, reimbursement is less, it is primarily a market strategy for hospitals, and lastly the mission and management team of a hospital and LTC facility are very different.

According to Conrad and Dowling (1990) Vertical integration is when a health care organization offers directly or through arrangement with others a broad range of health services and support services in a functionally unified manner" Different components of the production of healthcare are linked in order to provide a full range of services and smooth throughput. Conrad and Dowling list four dimensions of vertical integration. First is the breadth of integration, which

would include the DRGs, cared for by a hospital. Secondly, the degree of within firm purchases and sales of like services compared with outsourced ones. A third dimension is the number of process components integrated. Lastly the form of integration is dimension and refers to whether an organization owns or contracts a process. Determinants of vertical integration include: production cost savings, transaction cost savings, information economies, negotiation and administration savings, coordination of services, overcoming market imperfections, management and internal organization factors and environmental factors.

Walston (1996) disagrees that there is any evidence to support the promise of owned vertical integration .The promise is that of lowering costs and eliminating unneeded services, economies of scale, increased market power, better recruitment and retention of physicians, and environmental acceptance. Following and extensive review of empirical literature, the author suggested that owned vertically integrated arrangements do not reduce organizational costs or yield efficiencies, but do suggest that higher production costs, higher administration costs are present. Difference in the health care environment compared to other industries are that outputs are difficult to clarify and measure, production is influenced by emergent situations, little tolerance for error, and weak organizational control over the chief decision-maker, the physician.

In an article discussing the promise and performance of integrated systems, Conrad and Shortell (1996), contend that market place advantage will go to those who coordinate care through information, human and physical resources.

However they also argue that hospitals may not be dominant in ownership, governance or operational control of the mechanisms that are developed to coordinate and integrate the delivery of care to defined populations. The control of health services will default to those who are able to keep down production costs as well as other "transaction costs" of producing health care. According to the authors, vertical integration is a "combination in a single firm of two or more firms that were previously separate, but whose products or services are inputs to, or outputs from the production of one another's services." Reasons for integration are to lower transaction costs and to reduce average production costs. These savings are unlikely to produce increased prices or reduced production.

The current healthcare environment of rising costs, reduced revenue, higher complexity and regulation may incentivize organizations to vertically integrate more services, specifically those of post acute services. (Coburn (2002), in a study of rural integration in Maine that integration is not an end in itself, but a means towards which access and care are improved for the elderly. Linkage and coordination may be as effective and more feasible in for some rural settings.

Clinical and functional integration are the two relevant types to healthcare. Clinical integration is the extent to which patient care services are coordinated within and across an organization, whereas functional integration focuses on the coordination of administrative and other support functions needed to deliver care. (Giles, 1993) Clinical integration is the most important and may involve horizontal

or vertical linkages in the organization, such as common assessment tools, or medical records. Functional integration includes the sharing of support departments such as human resources, information systems or quality assurance. These forms of integration may be independent of each other. Vertical integration is the classic form of integration and is an example of a hospital owning a nursing home. The second form a tight but flexible contractual relationship in which the hospital would have a contractual agreement with a nursing home but have separate ownership and governance. While each of these may have different degrees of integration, they are generally defined by mutually beneficial financial incentives, and strategic management is greatest in situations where there is common ownership.

Management tends to be highly coordinated or even centralized. The reason to integrate is to improve the overall performance of the organization, not just the individual service line. In order to offer a full of healthcare services a hospital might integrate into primary, tertiary, prevention, wellness, and PACS. Advocates of integration tout that integration affords patients with higher quality care; opponents believe that vertical integration adds unnecessary bureaucracy, which leads to inefficiency. (Healthcare Advisory Board, 1999) The argument for vertical integration cites an increase in quality for the patient, which can be accomplished without increased cost if managed properly. Coddington (1996) notes “Integration is a tool, not an outcome. It creates organizations in which more activities and resources are under one set of controls. It creates

circumstances under which activities, that were previously carried out by many groups with differing motives, values, and incentives can be more closely coordinated. However, there are no guarantees. Ultimately, whether the effects of integration are positive, negative or neutral depends on what is done with those controls."

According to D'aveni (1994), vertical integration can result in economies and vertically integrated lines of business are more cost effective in the areas of general administration, selling, advertising and research and development costs. However higher production costs and only slightly better profitability. Backward integration is identified with the higher production costs due to lack of full exposure to market pressures. Forward integration on the other hand, was associated with lower transaction costs. Historically vertical integration is thought to raise costs because the complexity of the structure creates problems in control and coordination. However more contemporary thinking indicates that there is evidence that there is incentive for firms to integrate. The success of integration varies from the type of production, transaction costs, assets, market power and uncertainty. (D'Aveni, 1994)

This finding is also in agreement with a 2001 study by Wan et al, which found that forward integration with long-term care was positively associated with hospital productivity. Additionally backward integration into physician practices or outpatient services produced better operating margins, return on assets and net cash flows but were not associated with better productivity.

Research seems to suggest that an integrated system is basically a strategic rather than a financial advantage. The development of a continuum is expensive and financial gain may be a long-term accomplishment. However the advantages may be economies of scale, increased market power, and an increased ability to adapt to environmental uncertainties.

Market and environmental factors were not related to integration and diversification strategies employed by rural hospitals during the mid to late eighties (Mick et al, 1993). This time period surrounded the implementation of PPS for hospitals, but did not consider this change to be the only factor effecting hospital decisions to adopt any or all of thirteen diversification or integration strategies studied. It was hypothesized that during this period there was an increase in strategic management activities, such as vertical integration or diversification by rural hospitals. Results demonstrated an increase of an average of 1.3 vertical and horizontal activities in 1983, and an increase to an average of 3.7 by 1988. In 1983, 30.7 percent of the hospitals had no strategic activity, but by 1988 this number dropped to 0.6 percent.

Coddington (1995), while discussing physician practice integration cites the following as some of the advantages of vertical integration: increased patient volumes, decreased hospital days, more efficient use of resources, and prevents service duplication. These same advantages could be applied to other combinations of healthcare services when examining the effects of integration strategies on healthcare organizations.

Hospital Diversification into PACS

Pre–BBA

Identifying differences between hospitals that owned PACS to those that did not, to determine utilization trends, Kenny (1993) found that hospital affiliation with nursing home or home care influenced utilization of PACS particularly for certain DRGs such as stroke, COPD, CHF and joint replacement. Additionally, it was found that hospitals with higher Medicare populations were more likely is discharged to a PAC post acute setting.

The financial, market and organizational determinants of hospital diversification into sub acute services following the implementation of PPS for hospitals were explored by Wheeler (1999). A cross sectional, time series study using data from the AHA, HCFA Medicare cost reports, latitude and longitude listing for all community hospital addresses, and the Area Resource Files from 1985 through 1991 was conducted. Assumptions for providing sub acute inpatient services were: sub-acute inpatients may provide good return on investment, may stabilize financial risk, and could provide services valued by the community. Constraints faced by hospitals in diversifying include access to capital and other resources, regulations such as Certificate of Need, and demand for services. The two most critical resources were identified as doctors and nurses. Both of these are necessary to develop and implement a sub acute service. Characteristics of demand variables were operationalized as competition, percent population that was over 65, per capita income and the

acute care occupancy rate. Number of sub acute beds was the dependant variable, with predictor and control variables were lagged one year, except for cash flow and occupancy rate.

Results of this research revealed that investor owned hospitals provided 31.3 percent less sub acute care than not for profits and were more sensitive to financial risk than not for profits. Other findings were that they higher resource availability, particularly more nurses. More doctors were associated with less diversification possibly due to a lack of concern for adequate inpatient admissions during this time period before PPS was a factor for post acute services. Higher production costs for inpatient acute care was related to likelihood that a hospital would divert resources to sub acute. The level of sub acute care rose by 0.46 percent for each one percent rise in the level of expense. Other factors, which were positively associated, the dependant variable were per capita income, higher hospital occupancy, and the number of competitors. Number of citizens over 65 had no effect and as outpatient services increased the likelihood of diversification decreased. Questioning the direction of causality, the study found that financial performance was an indicator of hospital diversification into sub acute services, but that diversification into sub acute was not a strong predictor of financial performance.

According to Blewitt (1996), patient characteristics rather than hospitals characteristics were better predictors of hospital referrals to PACS. Data from 52 hospitals in three cities in the United States included 2,572 patients within five

diagnosis related groups. The study was designed to examine the path of hospitalized Medicare patients from acute to post acute services. Patient level information was combined with hospital level characteristics. Binomial logistic regression was used to estimate an equation for each of the five DRGs, and looked at whether the patient received any post acute care after discharge from acute care.

Results revealed that very few hospital characteristics influenced prediction of PAC use. However, significant were whether the hospital owned a post acute service, Medicare volume and teaching status. Patient characteristics were more influential in determining placement following discharge. Poor functional status was a significant predictor as was activities of daily living dependence. Significant and positive effect of PAC ownership was evident in two–of–the–five DRGs.

Liu et al, (1998) also examined the determinants and cost of PACS provided by SNFs and HHAs using the 1991 Medicare Current Beneficiary Survey as well as corresponding claims from the 1992 and 1993. This data source provided beneficiary characteristics. Findings provide a pre BBA baseline of the users of these services. Characteristics of patients that were more likely to use HHA or SNF or both were predicted from the statistical model used. Data on the beneficiary characteristics were from sample patients from 1991, which was just before the 1992-1993-observation period for Medicare use and payment for SNF and HHA. The sample consisted of 1195 people who were enrolled in both Medicare Part And B, and did not have renal failure and were not in health plans

that did not submit Medicare claims. The sample population did have a hospital stay sometime in 1992 or 1993.

Consistent with previous studies it was found that patients who were older in age, more functionally disabled or had less access to family care at home were more likely to use either HHA or SNF services. A higher supply of Medicare SNF beds per 1000 enrollees was not significantly related to post acute use, nor was the number of home care nurses per 1,000 enrollees. Findings, suggesting that patient characteristics are more significant predictors of PACs are consistent with the Blewitt results.

With the intended savings from the BBA it is important to monitor this population's access to these services. In addition it was identified that with the decrease in federal money for these post hospital services that states will experience added demand for Medicaid qualification for payments to PACs. The results of this research indicated a possible substitution of Medicare for Medicaid expenditures. With declining federal dollars there could be a subsequent decline in state funding as well for dually eligible beneficiaries.

Kane et al (2002) researched the geographic variation in the utilization of post acute services, questioning the consistency and stability of variation. Findings supported the presence of wide variation across regions supporting the conclusion that variation was not just a statistical phenomenon. Correlations were not significant with payment levels or length of stay but were more related to differences in practice patterns and supply of post acute services. Some LOS

was even longer for certain DRGs that resulted in an admission to a PAC. However, the DRGs related to orthopedic procedures and inpatient stays were found to have acute stays that were shorter in length of stay. So, while LOS is still a valuable indicator of cost, this study did not support it has an indicator of use of PAC following a hospital stay.

Ownership of home care agencies is cited as an indicator of hospital referrals to this post acute service (Dansky, 1996). 1990 data from 61 Pennsylvania hospitals were analyzed to study the simultaneous effects of vertical integration and environmental complexity on home health referrals. Environmental complexity was found to influence the use of home care in rural versus urban areas particularly as it relates to areas with more competition. Rural areas with less competition did not need to integrate home care since transitions were smoother because linkages were formed with the local agencies. Hospitals with home health agencies were found to be more likely to make referrals to home care. Research results as to the determinants of hospital decision to integrate skilled nursing vary from patient characteristics, profit status, financial gain, patient volume, ownership of other PACS, and the availability of local services. The next section examines vertical integration strategies in both health care and non-healthcare settings.

Identification of significant factors in the decision process used to determine the discharge destination of Medicare patients is the focus of research by Picone et al (2003). The interchangeability of hospital and post acute care is determined

by the patient's health, availability of post acute services and the hospitals discharge policies. These factors determine length of stay and destination of the patient. Discharge destination is cited as a result of a patient's net marginal benefit from additional stay in either setting or the anticipated financial effect on the hospital. Four destinations were included: death, discharge home, discharge to a skilled facility, and discharge to home care. The dependant variable was length of stay. A competing risk model was used to study the length of a hospital stay, which took into account the likely correlation of LOS with discharge destination. The sample was drawn from hospitalizations in 1984, 1989, and or 1994 panels of the National Long Term Care Survey. Data were restricted to include only four DRGs: hip fracture, stroke, coronary heart disease and congestive heart failure. This along with other restrictions yielded a sample size of 5031 hospitalizations for the four DRGs.

Results revealed that the market conditions surrounding the hospital and the post acute provider significantly influenced the discharge destination decision. The supply of hospital beds was also strongly negatively related to transition to SNF and HHA discharge destinations. Per capita income and population density also influenced LOS. Release home is associated with patient income and area income. Higher patient income is associated with lower transition home rates. Medicare payment policy had a strong influence on LOS and transition rates to home, skilled and home care.

Robinson (1996) examined the influence of governmental payment methods under Medicare following the 1983 conversion to PPS, on hospitals' contractual

relationships with nursing homes and vertical integration. This change in reimbursement structure, made nursing home bed availability a prime concern of hospitals. They had become strongly incentivized to discharge patients "quicker and sicker". The limitations of contract negotiations, with freestanding nursing homes, favored hospital ownership of nursing home beds. The implementation of PPS for hospitals created disequilibrium between hospitals and nursing homes by paying the hospital per admission the nursing home per diem based on cost. Administered pricing by Medicare hospital based and free standing SNF; cannot compete for patients on price. Hospital discharge planners through consultation with patient and physicians, usually accomplish selection of nursing home for hospitalized patients. Provisions in the BBA require that hospitals not specify or otherwise limit qualified providers of post acute care and must disclose to the patient any financial interest the hospital may have (Federal Register, 2000). It is not an automatic transfer to the hospitals own facility, but is left to the patient's discretion.

The author states that previously there were two primary explanations for a hospital to vertically integrate using a transaction cost model, asset specificity and difficulty in writing and enforcing contractual arrangements. Noting that payments from the government were the same to all institutions regardless of cost or patient complexity, made contract negotiation for higher rates limited to the organizations providing the services. So, it is proposed that reason for the decision to integrate vertically was a function of price inflexibility from the payer

source, Medicare. The supply and subsequent distribution of nursing homes in a local market should determine decisions by hospitals to own their own nursing home. Economic theory would predict higher availability of nursing homes beds would limit the number of organizations deciding to integrate SNFs.

Using data from 1982, 1986 and 1990 on acute care hospitals in California and skilled nursing facilities, Data analysis revealed results, which were consistent with the hypotheses that Hospital PPS influence, increased over time and the number of hospitals adding skilled nursing units rose from 7.4% in the early period to 17.6 % in the later period. Additional findings were that hospitals with a bigger percentage of Medicare patients, larger hospitals were significantly more likely to vertically integrate SNFs. Capacity utilization was less important than scale economies as a factor in hospital decisions to vertically integrate.

Robinson concluded as a result of this research that hospitals decisions to vertically integrate SNFs do not support the two major explanations for vertical integration, asset specificity and difficulty in writing and enforcing contracts. Instead, a third factor that or governmental uniform pricing prevented hospitals and nursing homes from developing flexible pricing rules and incentive alignments for the buyers and sellers of the beds.

In a study by Banks et al (2001), a profit maximization model suggested that the post 1984 system of prospective payment for hospitals, coupled with the cost based reimbursement for nursing facilities created underutilization of hospital services and over use of skilled care. This study also predicted that perspective

payment for PACS will not reduce the demand for vertical integration, and will not result in inefficiency unless vertical integration does not occur. However bundled payments will result in efficiency whether integration takes place or not. Vertical integration in the healthcare industry is unique in its reliance on a third party to reimburse for services rendered. Unlike private industry, downstream producer, SNF in this instance, accepts the hospitals treatment decision as given. If the hospital has not been efficient in giving care then the inefficiencies are passed on to the SNF. Closer collaboration is needed and is more likely when the hospital owns the SNF.

Evaluating revenue effects of seven vertical integration strategies in California hospitals was the focus of a 1996 study by Cody (1996). The population was 242 hospitals in California during a study period from 1983 – 1990, post PPS for hospitals. The strategies investigated were, managed care contracts, physician affiliations, ambulatory care, home health services, inpatient rehabilitation, and skilled care. Pre hospital strategies were found to produce significant revenue, while post hospital integrations did not. Specifically, inpatient rehabilitation actually reduced revenue. Pre hospital services are attempts to capture demand for inpatient care, while post acute services are an attempt to reduce inpatient length of stay. During this time period both pre and post care was billable on a cost basis. Increased vertical integration was evident among hospitals in this study, but so was competition from free standing facilities for the same services.

Potential for Change in Decision to Vertically Integrate

The implementation of the BBA brought about dramatic changes in reimbursement to both post acute providers and acute care hospitals, but what will its effect be on the relationship of hospitals and skilled nursing facilities. Will hospitals make a different decision about vertically integrating skilled nursing services as part of their continuum, post BBA than they did pre BBA?

Chiu, (1995) examined determinants of hospitals' vertical integration with SNFs using a transaction cost theory framework. Using 1990 data, ten hypotheses and four propositions were proposed which examined transaction frequency, uncertainty and specificity. Administrative data from the American Hospital Association as well as Area Resource Files, and National Minimum Data Set for Skilled nursing facilities, and state stringency measures for Certificate of need, were analyzed using multivariate regression analysis to contrast various modes of transaction. The author contends that the more transactions a hospital has the more likely they are to integrate skilled nursing care. Additionally, the more asset specificity and uncertainty associated with nursing home transactions the more likely the hospital is to use higher levels of integration. While interaction effects of the main concepts were studied, it did not yield appropriate estimates for the interaction terms.

A similar conceptual model was utilized in a study by Xu (2000), in which provision of home care services was the focus. Data from 1993 AHA, ARF, and Provider of Service Files were analyzed for support of seven hypotheses. Results

were that the determinants of hospital arrangements for home care were hospital size, the percentage of Medicare inpatient days, experience in geriatric care, and the supply of SNF beds in the area. Transaction frequency and asset specificity were supported, but uncertainty was not.

In summary this chapter has presented the history of the evolution of post acute services, specifically the skilled nursing industry. The impact of changes in reimbursement and regulation are discussed in both the skilled nursing and the inpatient hospital arenas. The effect of these changes is then discussed as it relates to the effect on hospitals decision to make or buy skilled care, before and after a 'jolt' such as the balanced budget act of 1997. Chiu (1995) and Xu (2000), using a similar model of transaction cost economics theory studied two different components of post acute services. While results were not identical, they had some similarities and both used pre BBA data. Neither study used multiyear data to compare trends or changes in hospital strategies following major environmental upheavals. Changes in reimbursement from cost based to prospective payment systems for the hospital industry has been the subject of prior research. BBA introduced a similar change for post acute services. Empirical studies, which utilized data before and after the BBA to examine determinants of hospitals decisions to vertically integrate, have not been published. This study will replicate the Chiu study, but test it using data before and after the BBA and evaluate the applicability of the model using multiyear data, which straddles a complete change in reimbursement resulting in increased

uncertainty. Data from this time period includes an increasing Medicare population as well as declining access to post acute services. The next chapter presents transaction cost economics theory, proposes a conceptual framework for this research and derives the study hypotheses.

CHAPTER 3: THEORETICAL FRAMEWORK

Introduction

This chapter describes the conceptual model developed from the transaction cost framework and deduces related hypotheses. It begins with a description of the transaction cost framework, empirical research in non-health disciplines followed by related health care studies. This is followed with a discussion of vertical integration in the hospital industry and relevant empirical studies. Finally a conceptual model is presented with hypotheses to be tested.

The Transaction Cost Framework

Transaction Cost Economics (TCE) was introduced by Ronald Coase in 1937, The Nature of the Firm. He proposed organizations were evolved as a result of market failure, and questioned when a transaction would be carried out within a single firm rather than by two separate firms transacting within the market (Berlin, 2001). Coase argued that, aside from production costs, firms are faced with a variety of transaction costs. These costs involve preparing and monitoring agreements with their suppliers, employees, and customers. Central to this framework is uncertainty, which Coase defines as the inability on the part of economic decision makers to predict with accuracy the outcome of any event or action. It is due to the existence of uncertainty that firms emerge. The firm represents a central place of coordination with authority that realigns tasks and

offers new pricing. Firms also arose because there were costs in using the price system. Coase believed that specific types of transactions followed the emergence of different organizational forms. This insight was an important step in an effort to devise a comparative logic of economic organization in which transaction cost economizing was a core feature (Williamson, 1991). Williamson contributed more elaboration and development to Coase's original theory by adding the hybrid structure to the dichotomy of the market and hierarchy and by specifying the dimensions of transactions. Williamson contrasts two main governance's structures, the market and the organization. The market encompasses exchanges that are negotiated contracts in which all parties are believed to operate in self–interest. The uncertainty of exchange is reduced if it is brought under an organized group of people with a framework, which includes rationality and mechanisms to discourage opportunism. The most important adaptation to the existence of transaction costs is the emergence of the firm. The existence of transaction costs means that firms will emerge to organize in structures that minimize these costs. Oliver Williamson expanded the firm structure from a market hierarchy dichotomy to continuum including diverse hybrid and specified dimensions of transactions (Williamson, 1991) Hybrids can be found from formal mechanisms such as contractual provision sand equity arrangements to informal mechanisms such as contracts and equity arrangements to more informal arrangements such as information sharing.

Transaction cost theory suggests that organizations emerge as a result of market failure when governance structures provide the most efficient mode of exchange. According to Williamson (1981) transactions have three dimensions: uncertainty, frequency with which transactions occur, and asset specificity. Asset specificity refers to the lack of transferability of assets intended for use in one transaction to another transaction. There are three types of asset specificity: site, human and physical. If asset specificity is low, markets have advantages in production cost and governance cost. As assets become more specific, the benefits of the market are reduced and governance costs of markets increase. Market exchange is efficient when assets are not specific to the trading partners. Hybrid structures arise as assets become more specific and hierarchical forms displace markets as assets become highly specific. The basic proposition of transaction cost analysis is that economic organizations align transactions, which differ in their attributes, with governance structures, which differ in their cost and competencies in transaction cost economizing way (Williamson, 1991). In the market, exchanges are negotiated contracts where all parties are assumed to cooperate in self-interest. In its pure form little knowledge about the other exchangers is needed and pricing is purely based on individual interests. Little coordination costs are needed in this pure market. Transaction costs are associated with the monitoring and enforcing of contracts including legal costs. They also include search and information costs, and the cost incurred in consulting, completing or changing agreements. (Williamson, 1985).

Williamson introduced the market failure framework to explain why in some situations, bringing exchanges into organizations is better than leaving them in the market place. In situations where exchangers have good opportunities to cheat, and there a few exchangers to choose from, it is better to bring the exchanges inside the organization where there can be better surveillance and monitoring and monitoring and more defined systems that reduce opportunism. In Williamson's market failure model, he made some paired assumptions. Uncertainty and bounded rationality, and small numbers and opportunism are the pairs of assumptions he proposed. The framework of TCE rests on two main assumptions of human behavior, bounded rationality and opportunism. It also includes two assumptions, which are dimensions of transactions, asset specificity and uncertainty. Figure 4 displays the assumption relationships as well as information impactedness. Information impactedness explains that information related to a transaction may be unequally distributed among the parties involved in the exchange. Bounded rationality is the limitation of any individual as an information processor since everyone cannot anticipate every contingency. So, rationality is bounded by the limitations of human and environmental factors. When the environment becomes more complex these limits are quickly achieved. Opportunism is defined as "self interest seeking with guile" and refers to the possible deceitful practices of partners. Opportunism is the source of behavioral uncertainty in transactions.

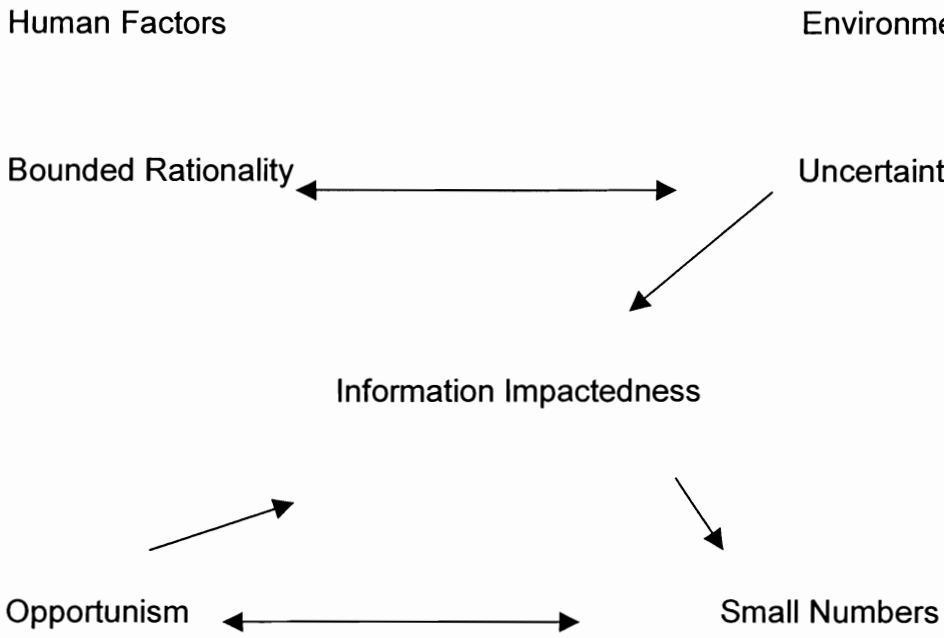


Figure 4. Assumption of the Market Failure Framework

According to Williamson there are several characteristics that are of special importance to organizational economics: frequency with which transactions occur, the uncertainty to which they are subjected, and the degree to which transactions are supported by transactions specific investments.

The Application of Transaction Cost Analysis in Other Fields

Boerner (2000), in an assessment of the TCE empirical literature reports that an extensive review of the literature yielded 2500 abstracts from which over 600 articles actually empirically tested some aspect of TCE. The research was categorized into related fields of interest such as law, economics and political science. The most prevalent research dependant variable is the form of organization, with transactional properties and control variables serving as independent variables. Health economics and policy are recognized as using

TCE extensively, with main impetus being the changes taking place in such areas as regulation, advances in technology, and reimbursement. While the quantity of empirical research using TCE is considerable, the quality was found to be variable. Limitations cited were the precise measurement of key transaction cost variables such as asset specificity which is usually a proxy variable. Additionally measurement concerns were identified with opportunism and the few studies that measured interaction effects among TCE variables.

Parks (2000) describes different organizational structures of firms in the U.S. related to the make or buy decision. It is acknowledged that the single most important factor, according to TCE is the transaction cost. A questionnaire was sent to 1500 firms purchasing managers evaluating their monitoring of suppliers, with a varying response rate. The empirical research was reviewed and reported that the make strategy is disappointing for quality, on time deliver, and cost and cooperation. A reduced number of suppliers appear to be a widening strategy. General Motors for instance once had 3500 suppliers compared to 200 that supplied Toyota. U.S firms have begun to model this reduced supplier relationship. According to the author, in order to "make" a company needs to have a core competency and to constantly improve it. What this strategy lacks in market power it compensates for in economies of scale and scope.

In a critique of TCE, Ghoshal (1996) argues that opportunism is not solved by creating hierarchical governance structures and that it has an important role in the firm's ability to adapt and change. Coase (2000) refers to the General Motors

acquisition of Fisher Body in 1926, in which it is widely believed that this vertical merger was a result of concerns over specific investments. Coase reminds that GM already owned 60 percent of the company and that there was no evidence of hold up behavior before the merger.

Ashwin (1999), integrated TCE, and relational exchange theory (RET), to explain the determinants of commitment and opportunism. A conceptual model integrating the two identified three antecedents of commitment and opportunism: transaction specific assets, environmental uncertainty, and relational norms. Dependence and long term orientation expand the framework and mitigate the outcomes. High asset specificity/uncertainty transactions are governed by hierarchy mechanisms, and low asset specificity/uncertainty are governed by using the spot market in order to minimize the sum of production and transaction costs.

Anderson et al. (1984) tested a model of integration of a marketing function, personal selling. The model was derived from transaction cost and was tested using logistic regression. Integration was associated with increasing levels of asset specificity, difficulty of performance evaluation, and the combination of the two. In opposition to transaction cost theory, neither frequency of transactions nor integration of specificity and environmental uncertainty is significantly related to vertical integration.

Spekle, (2001), examined management control structures using a TCE perspective, which contends that governance structures are matched with

transactions. Using the three types of structures from TCE, it was proposed that market control is useful when transactions are low on asset specificity since the risk of opportunity costs is low. Hybrid control is better as asset specificity increases. Hierarchies are needed to reduce conflicts. Hierarchies are supportive of cooperation, but risk bureaucratic inertia. Williamson (1985) p. 79 proposes that the matching of governance structures with transactions only considers the dimensions of asset specificity and frequency. He contends that uncertainty is significantly present to create an "adaptive, sequential" decision problem.

Alexander (1991), questioned the impact of heightened environmental uncertainty on adaptation of control between multi–hospital systems and their corporate headquarters. The introduction of prospective payment systems for hospitals occurred in 1983 and served to increase environmental uncertainty for healthcare organizations. Since exchange relationships between providers, payers and consumers is viewed as based on local markets, uncertainty may reduce the ability of a less local headquarters to direct the individual hospitals operations. So what was the response of local systems in adapting management control to this uncertainty?

A survey was conducted of 252 CEOs from multi–hospital systems that were listed in the 1982 and 1985 AHA database. Data from these years straddled the introduction of PPS. Only 97 systems were common to both years. Results from the panel study support the hypothesis that multi–hospital systems adapt their control mechanisms in response to significant environmental changes. Multi–

hospital systems were found to decentralize decision making especially for local strategic decisions; however the magnitude of change was modest and did not result in structural changes. This finding supports M form organizations as being able to adapt in response to increasing environmental uncertainty.

Application of Transaction Cost Theory in Healthcare

Transaction cost theory has been tested in healthcare as well as non-healthcare settings, in particular as it relates to the development of governance structures in response to environmental factors. In a comprehensive review of empirical studies evaluation the relationship of uncertainty and vertical integration, Krickx (2000), found that performance ambiguity and general measures of uncertainty are positively related with vertical integration. Technological uncertainty is negatively related, while market uncertainty and complexity are not systemically related to vertical integration. Transaction cost theory attempts to explain governance choices by firms and uses uncertainty as an explanatory variable. Exploring the relationship between uncertainty and vertical integration through a review of empirical literature, the following insights: 1. uncertainty does not influence vertical integration simply but depends on the type of uncertainty, 2. performance ambiguity and uncertainty are positively related to vertical integration, which is consistent with transaction cost thought, and 3. technological uncertainty is negatively related to vertical integration and is not consistent with the positive relationship proposed by Transaction cost theory.

Transaction cost theory is appropriate for the current issues surrounding post

acute care brought about by the BBA. As access to patient placement in post acute care becomes more complex and uncertain, hospitals will look for governance structures, which will reduce transaction costs. How will their decisions to vertically integrate or not affect their financial performance? Researchers have used transaction cost theory to examine the post acute market and vertical integration strategies by healthcare organizations.

Mick (1988) suggests that hospitals are naturally vertically integrated with the provision of laboratory, imaging, physical therapy, dietary and others. So that even if the organization is not integrated into home health and other post acute services it is nonetheless it is a complex assortment of vertically integrated components. Therefore venturing into skilled nursing services would not be foreign to management. It is argued that vertical integration is a dynamic phenomenon in health care and what may be seen as vertical integration at one time may not be seen as such at a different or later time. Williamson (1982) suggests that the decision to shift transactions from firms to markets is determined by the level of environmental uncertainty. For example, the greater the uncertainty the greater the need to internalize transaction to provide the capacity to adjust changing circumstances. However, the use of Transaction cost theory to explain or predict hospitals decision to vertically integrate services over time periods, which could reflect a changing environment, has not been explored.

Lehrman and Shore (1998) concluded in a study of 1,523 hospitals that when hospitals own skilled nursing unit's transaction costs are lower but this ownership

creates cost, access, and quality compromises. Included in the transaction cost list is: searching for and negotiating with skilled nursing facilities to accept discharged patients, assuring quality of free standing facility and monitoring losses if the nursing home placements are delayed or not available. Accordingly transactions costs rise with lack of asset specificity, increased uncertainty, and when the demand for exchanges is frequent. Hospitals need access to skilled care in order to move patients out of expensive acute care beds to a lower level of care. Placement becomes problematic for the most acute with the least amount of payment sources, coupled with uncertain and unpredictable demand, and the lack of capacity in the market place. These factors create higher transaction costs and according to transaction theory will create an environment in which an organization may seek to vertically integrate a service.

The changing dynamics of the physician practice in America is the focus of organizational analyses by Robinson (1997). The author examines the integration of physician practices and hospitals using three economic perspectives; agency theory, TCE and the dynamic capabilities view of the firm. Agency theory focuses on the need to align divergent interests among individuals under conditions of uncertainty and uneven information. The relationship between the principal and agent is central to this reconciliation. The physician/ patient relationship is a classic example. While TCE has the same underlying concepts of uncertainty and asymmetrical information, agency theory is based on versatility of contracting for aligning incentives. TCE on the other hand points out

the limitation of formal contracts and the need for better coordination of activities According to Robinson, contractual networks and virtual arrangements outperform internal organizations and vertical integrations. Vertical integration is viewed as the solution of last resort. The dynamic capabilities view of the firm is based on technological experimentation, learning, and innovation. Successful firms have assets and competencies that differentiate them from competitors.

Zinn et al (2003) utilized a TCE framework to examine free–standing SNFs decision to make or buy therapy services during the 90s both before an after the BBA. Citing Williams' statement that environmental uncertainty requires adaptation between exchange parties and therefore increases transaction costs, the researchers supported the BBA as creating uncertainty. Demand uncertainty was measured using fluctuation in Medicare admissions. The dependant variable was the arrangement the facility had in order to provide therapy services. This was divided into four categories: No PT/OT, all contract, mixed, and all staff. Results from the logistical regression analysis supported most of the hypotheses. Organizations with more Medicare had a 57% increase in the odds of transitioning to either a mixed therapy or to all staff arrangement. Thus, more frequent transactions were aligned with more control and therefore resulted in bringing the services in house as opposed to contracting for them. Uncertainty related to changes in demand was also associated with increased odds of transitioning to a mixed or all staff arrangement.

Healthcare transactions are defined as the production and coordination of care in an article by Stiles and Mick (2001). The potential to incur transaction costs in healthcare processes exists at every point in which there is a hand off, and in all aspects of the organizing and coordinating of that care. Without management the cost of those transactions in an open market may be higher than when processes are coordinated internally. As a result of responding to an RFP by Ford motor company to produce an insurance product, which included the principles of both population management and disease management, the University of Michigan Health System responded with a proposal. The innovation was the assignment of a cost to the coordination of care as separate from the delivery of care. The University of Michigan Health System (UMHS) assumed that Fords support of care coordination would reduce demand for services as well as inappropriate and duplicative services. Sources of transaction costs in healthcare are aligned with the transaction dimensions of bounded rationality, opportunism, asset specificity and uncertainty. Non-value added transactions were evaluated for elimination or transition into productive processes. TCE may be beneficial in helping managers analyze the markets in which they operate, and determine the proper strategic action.

While most research using TCE have focused on asset specificity and uncertainty, Coles (1998) added quality and economies of scale as possible determinants of hospitals decisions to make or buy. Thirteen transactions in 196 hospitals were analyzed using a questionnaire sent to hospital administrators.

Quality was felt to be an important dimension since hospital reputation and continued utilization could be damaged by a negative quality perception. The authors hypothesized that the greater the potential for patient harm the more likely and organization was to integrate the service. Furthermore, economies of scale were less of an issue and asset specificity increased. Questionnaires were sent to hospital administrators and there was a 27% return rate, which resulted in a 25% of the sample size. Correlations were positive for size of the hospital and the size of the market as was the size of the market and the for profit status. Additional findings demonstrated a strong relationship between training time and technologic uncertainty and hospitals decision to integrate. Type of transaction was found to be an important factor in the make or buy decision and one that mitigates the firms and industry economies of scale environment.

Stiles (1997) also examined the costs of quality using a transaction cost approach. Failure to recognize the cost of transactions once a process has been centralized can result in miscalculations regarding the cost savings of the reorganization. Using Donebedian's, structure, process, outcome framework, hypotheses are formulated which would test these features of quality using quantity, uncertainty and complexity from TCE.

In a national study of horizontal and vertical integration in rural hospitals, Mick et al (1993) examined factors, which influenced governance structures in rural hospitals, such as market, hierarchical and hybrid arrangements. While strategic management activities were the main focus of this study, a transaction

cost model was used to explain why health care organizations develop hierarchical or vertically integrated services. Basically, it was stated that transaction costs were those that are encountered in organization and management of health services production. If the costs of dealing with the market increase to obtain a service, the organization will attempt to integrate vertically or secure services internally. Uncertainty was hypothesized to increase transaction cost but only weakly supported in the results, except for the affiliation with nursing homes and ambulance services.

Conrad and Dowling (1990), present a theoretical framework to explain the determinants of vertical integration and its benefits and costs. The purposes of vertical integration in health care are to enhance the completeness and continuity of patient care and to control the sources of patients or other users of systems services. Accordingly the major drivers of vertical integration are presented as:

- Production costs savings
- Transaction costs savings and improved coordination of service
- Overcoming market imperfections
- Responding to management and internal factors
- Responding to environmental changes that alter market conditions, technologies and transaction relationships

The authors, additionally, proposed that there were two critical environmental forces behind the evolution of vertically linked systems: (1) new prospective payment arrangements that alter the interdependencies between economic

agents and (2) dramatically increased cost and price sensitivity by purchasers of health care services which creates need for increased organizational efficiencies. Prior to this, in 1986 the American Hospital Association argued that the new vertically integrated hospital had three advantages over non integrated organizations: new ambulatory business to offset declining inpatient volumes (2) delaying physician competition and (3) enhancement of inpatient utilization from the new integrated service lines. (In Mick 1988)

Factors associated with hospital arrangements in providing home care services were the topic of dissertation research conducted by Xu (2000). Transaction theory was the framework utilized to conduct the study. A cross sectional design was used to study 3590 short–term hospitals. Results from the multivariate analysis revealed that determinants of hospital governance structure were the hospital size, proportion of Medicare inpatient days, hospital experience in providing home care related services, ownership of a SNF, and the supply of SNF beds in the market. Transaction uncertainty was not supported, but frequency and asset specificity were the dimensions of the theory, which were supported.

A study exploring factors associated with hospitals vertical integration into the SNF business also employed the transaction cost framework, (Chiu, 1995). The framework included 4 propositions and 10 hypotheses for the dimensions transaction frequency, transaction uncertainty, and transaction specificity. Results yielded strong support for transaction uncertainty, which was measured

by average hospital occupancy. Also supported was asset specificity, which was measured using hospitals depth of experience in geriatric services. The other measure, which was the number of licensed staff, was not as strongly supported.

Conceptual Model

In a transaction cost framework, market failure is viewed as resulting from environmental uncertainty following a major change in reimbursement for hospitals and Post Acute Services, specifically skilled nursing facilities. The major force behind this destabilization was the change in reimbursement from cost based to prospective payment, which occurred with the Balanced Budget Act of 1997. The BBA was scheduled and its propositions were published to hospitals and nursing homes before they were enacted, creating intensive uncertainty as to the future of revenues and how to respond. Effects of the BBA and its reimbursement reductions were varied among hospitals based on their tax and teaching status, rural or urban location, population and economic demographics, size and teaching status. Some organizations chose to divest of PACS, and rely on the market to provide a discharge option while others remained integrated, or actually became integrated. Transaction costs are increased due to decreased availability of PACS as a patient discharge option for more complex patients, as well as increased regulations which require additional staff to implement and monitor availability of new drugs and technology, shortage of healthcare professionals, and other operational expenses such as liability insurance.

Opportunism from community based skilled nursing facilities could be a threat to hospitals if patients were selected based on payment source, reimbursement changes for certain conditions and patient acuity. This could leave hospitals with only the more costly, less reimbursed patients on their acute care units, which subsequently adds to the organizations length of stay and costs of care under hospital PPS. This adds to the uncertainty of the environment. As the cost of the discharge transaction rises the frequency of patient demand for the service has increased as the population ages and suffers from more chronic illnesses.

Acute care hospitals have the specific assets to operate a SNF unit such as licensed nurses, therapists, pharmacists and physicians. Ancillary services such as dietary, laundry, and housekeeping are already in place. Additionally, rooms are already equipped with the technology to care for sicker patients. This asset specificity could enable hospitals to transition to SNF ownership since the components of care are present in the acute setting. More geriatric services are offered by hospitals that are in areas with more Medicare eligible demographics, and increase their asset specificity.

The dimensions of uncertainty, frequency, and asset specificity are viewed as determinants of hospitals response and governance structures, or what arrangements they will form to reduce transaction costs of providing post acute care for their inpatients following discharge. This study models Chiu's (1995) , which proposes that hospital arrangements for skilled nursing care are affected by transaction frequency, transaction uncertainty, and the degree of asset

specificity of the transactions., but applies the model using data which straddles the BBA of 1997. This model proposes that to integrate standard transactions, which the market tends to aggregate, tends to result in loss. However if the transaction is highly specific, in the presence of increasing uncertainty, there will be larger contractual gaps, which require more adaptation and this will result in an environment, which will favor vertical integration. A moderate situation in which the cost disadvantage is lowered but remains positive, and is matched with intermediate degrees of asset specificity, will result in the organization choosing a hybrid arrangement such as a long-term contract. Basically, market competition has scale economies when asset specificity is low. Bringing a service in house is an advantage when asset specificity is high. Lastly, hybrid governance is favored when there is an intermediate level of asset specificity.

The more frequent transactions that are required between a hospital and a skilled nursing facility, the more likely it is that a hospital will employ a higher degree of integration of that service. This is further influenced by the demand for skilled care as represented in the demographics of an aging population and the density of the Medicare population. The more uncertainty that is present will result in hospitals use of higher levels of integration to provide skilled nursing care. Referrals to local nursing homes may be hampered by opportunistic behavior as the skilled facilities become more selective on the patients they accept, in an effort to stay viable. An increase in asset specificity will result in a hospitals increased likelihood of a higher degree of integration for skilled nursing.

The provision of more geriatric services positions hospitals to offer an integrated skilled service at a lower transaction costs than dealing with the spot market or some form of hybrid contracting, which has become more difficult with regulations mandating patient choices. The effect of interaction of these three dimensions will not be included in this study, even though the Chiu study included them, but did not produce significant results in supporting transaction cost framework. Figure 5 is the conceptual model.

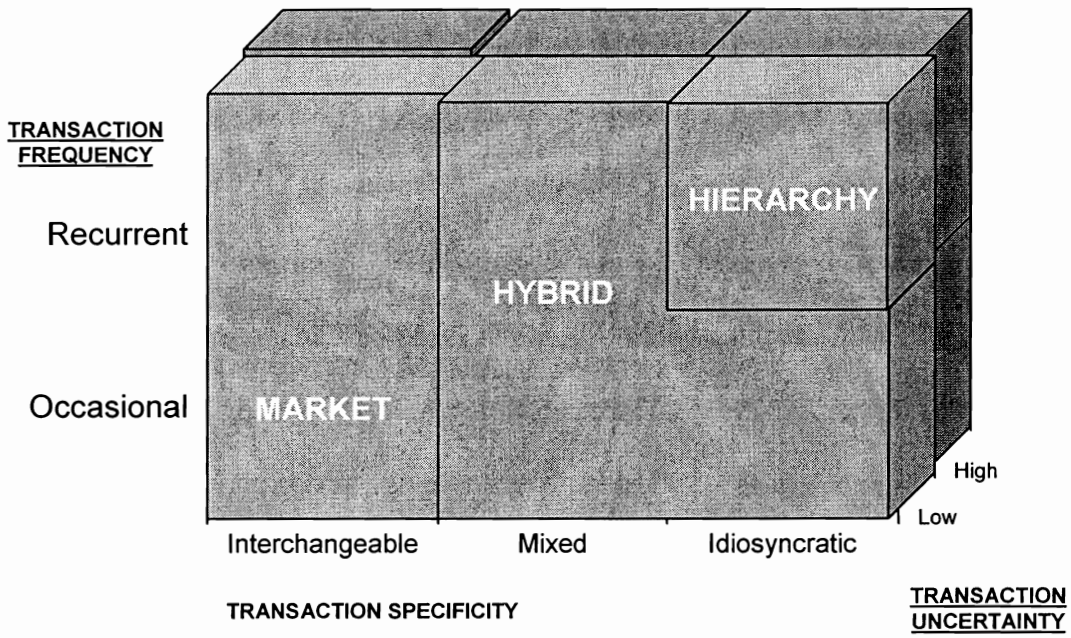


Figure 5. Conceptual Model

The question facing hospitals in making the decision to integrate, or contract for SNF services for their patient is whether it is more expensive to establish, monitor and administer the unit than it is to find, contract, and monitor the vendor quality, and negotiate price. Fear of opportunism is an issue if the contracted

skilled facility only takes patients with an adequate payment source and need less expensive care, leaving the hospital with the higher cost, more complex patients which can add to length of stay long beyond what the DRG reimburses.

Relying on the market, or integrating SNF, or negotiating hybrid long-term contracts are the hospital decisions being studied. Contracting with a local nursing home, when there is competition of other nursing homes is less likely than it once was, since patients are mandated to be given a choice of placement once level of care is determined, so the advantage of ready placement is somewhat diminished if others are available and selected by the patient or family.

Looming over this decision process were the changes wrought by the BBA of 1997 and hospitals and community based provider's response to it. Only by examining factors associated with the decision to vertically integrate before and after the BBA, can we assess both the robustness of the TCE explanation and determine if it was affected by the altered incentives of the BBA.

The advent of perspective payment with enactment of the BBA, created an increase in environmental uncertainty. Concurrently the population is aging and creating increased demand for health care along points of the continuum. Prior to the change in reimbursement, hospitals developed integrated models of care delivery, which enabled them to move patients out of expensive acute care to lower levels of care, which were reimbursed, on a cost basis. Discharge to these levels was provided by the hospital or arrangement with a select community provider, or in the event of ample supply, a spot market approach was utilized.

The effect of reduced reimbursement resulted in a decrease in supply of community resources, as well as some hospitals divesting of other post acute services such as home care. The changing dynamics brought about by the BBA will effect hospitals decisions in the provision of skilled care for their population of patients. In fact the BBA's conversion to PPS for post acute services may create an altered perspective for hospitals. While the change may create less of an incentive to own and operate a skilled unit, the establishment of payment rules may establish a better environment.

Hypotheses

Transaction Uncertainty

Uncertainty of transactions surrounds issues of reimbursement changes and supply of appropriate levels of discharge from willing recipients. Opportunism is a clear danger as freestanding skilled nursing facilities seek to maximize profits from Medicare patients in order to offset the lower paying Medicaid patients, which comprise the majority of the residents in community care settings. While community SNFs are reimbursed under the same provisions as hospital based units, they can elect to take those patients whose projected costs are not likely to exceed revenue. Patients with complex wounds or in need of long term IV therapy, or with infectious conditions may not be admitted. This causes a potential discharge problem for acute care hospitals looking for a discharge plan for this population. As a result, the transaction costs of seeking placement, in a place that offers the proper level of care, increases as more resources are

needed and the length of stay goes over the DRG payment. As the supply of community skilled nursing bed has diminished, the hospital may vertically integrate skilled care.

Transaction uncertainty can arise from environmental or behavioral conditions (Williamson, 1985), Environmental uncertainty in this case refers to the mix and number of patients that might need skilled nursing care at any given time and the availability of community beds. Behavioral uncertainty is when the supply of beds is not sufficient to meet the demand from the hospitals and the potential for community facilities to deny access depending on their own financial situation and goals.

H1: Hospitals in communities with more skilled nursing beds to elderly population will be less likely to integrate skilled care.

H1a: The influence of the number of skilled beds in the community on the decision of hospitals to integrate skilled nursing care will be the same in 2002 as it was in 1995.

The aging of the population is accompanied with more complex, chronic illnesses the availability of health care at the proper level of acuity may become scarce. Opportunism is a threat from the market place as they become selective in the patient population they will accept from acute care. The reduction in reimbursement for certain care, such as IV's and wound care has decreased below the costs incurred by the provider. Extended stays and costs from patients will burden hospitals with only Medicare as a payer source and no ability to pay

additional costs privately. Medicare is not the largest payer for nursing homes, but Medicaid is and qualification for this classification varies from state to state. Medicare payments offset the loss from Medicaid, so it is necessary to be selective in the patients accepted into community SNFs.

H2: Hospitals in an area with a more indigent population of elderly will implement a higher degree of vertical integration to provide skilled nursing services.

H2a: The influence of a more indigent population elderly population on hospitals decision to vertically integrate skilled services will be the same in 2002 as it was in 1995.

Hospitals with high occupancy rates experience uncertainty from the environment because of the potential lack of available discharge choices. These hospitals may place more emphasis on discharge planning for their existing elderly patients, as there are new patients waiting for admission beds. The lack of availability of acute care beds can present system problems particularly in the emergency room while they wait for beds or have to transfer patients or other facilities. This creates opportunity costs for the hospital as new patients are turned away and the current occupancy is made up of elderly for which cost has exceeded reimbursement. The ability to move patients along a continuum of care eases possible capacity problems, and allows for more accommodation of the increased demand from Medicare population.

H3: Hospitals with higher occupancy rate will be more likely to employ a higher degree of vertical integration to provide skilled nursing care.

H3a: The influence of higher occupancy rates on hospitals decision to vertically integrate skilled care will be the same in 2002 as it was in 1995.

Prior to the implementation of perspective payment system, which was a mandate of the BBA, hospitals were able to discharge patients to lower levels of care and capture new sources of reimbursement, if they had an integrated skilled nursing unit. When hospitals were able to rely on the spot market, or have a contractual arrangement, they were able to keep their length of stay under control, by transferring patients to lower levels of service. Following the BBA, the shift from cost based reimbursement the market place became less accommodating and more selective as to the patients that were accepted for admission. When this occurs, the cost of finding another source of placement will increase as well as the increased cost of keeping the patient in a more expensive setting and the opportunity cost of caring for another patient in limited beds. The change to PPS has seen decline in the number of skilled facilities, and would be expected to influence hospitals to integrate their own units in order to keep length of stay from exceeding the DRG payment.

H4: Hospitals with lower lengths of stay will be more likely to have implemented higher levels of integration of skilled nursing services.

H4a: The influence of lower lengths of stay on hospitals decision to integrate skilled nursing care will be the same in 2002 as it was in 1995.

Asset Specificity

The more services that are offered the more expert the organization becomes in caring for a distinct population. Services may include special testing for Alzheimer's disease or diagnostic services to assist in determining individual's medical, psychosocial, or functional abilities. By having more experience with the geriatric population a hospital is better positioned to operate a skilled nursing service and understand the needs of the population.

The availability of other owned geriatric services enables the organization to access complementary services for the skilled patient without encountering possible opportunistic pricing from community based services, thereby reducing transaction costs. The higher the asset specificity a hospital has the more likely it is to vertically integrate skilled care.

H5: Those hospitals that provided geriatric services are more likely to have a higher degree of vertical integration of skilled nursing care

H5a: The influence of providing geriatric services on hospitals decision to vertically integrate skilled nursing care will be the same in 2002 as in 1995.

Asset specificity can be measured in terms of human asset specificity such as the number of nurses, doctors, therapists, and pharmacists. The ability to redeploy or retrain existing staff to a skilled unit is possible when hospitals have excess capacity or fluctuating demand for acute care beds. Since staff already cares for the geriatric population in other services, the transition to a skilled unit is easier.

H6: The higher number of licensed nursing staff per licensed bed, the more likely a hospital is to implement a higher degree of vertical integration.

H6a: The influence of a higher number of licensed nursing staff per licensed bed will be the same in 2002 as in 1995.

Transaction Frequency

Frequency of transaction can be viewed as the volume of acute care discharges, which would increase the number needing placement in a skilled care unit. When transaction volume is low, transaction cost framework would predict that the firm would choose a market arrangement the cost of the transaction would be lower .The higher the volume of Medicare discharges the more likely an organization is to choose to bring the service in house to reduce costs, especially if asset specificity and uncertainty are high. The volume of discharges can be affected by hospital size and location.

H7: Hospitals with a higher percentage of Medicare patient discharges will be more likely to vertically integrate skilled nursing services.

7a: The influence of a higher percentage of Medicare patient discharges on a hospitals decision to vertically integrate skilled services will be the same in 2002 as in 1995.

Medicare is the single largest payer for skilled services and hospitals receive the largest portion of Medicare money, its follows that hospitals with a larger concentration of Medicare patients are more likely to choose an integrated arrangement for the provision of SNF, rather than rely on a potentially

opportunistic market or costly contract arrangement. As the population ages and has more co morbidities, patients in acute care settings are requiring more expensive resources and discharge planning becomes more difficult which can result in an longer length of stay that is not reimbursed based on cost. The added complexity of the patient increased the frequency of transactions necessary to properly place the patient after acute care in not needed. The patients being discharged to SNF from hospitals to their own units are generally more acutely ill and need more complex care, creating a situation in which community SNFs might not be able or willing to take on additional costs which is not accompanied with added reimbursement.

H8: Hospitals with a higher Medicare case mix will be more likely to employ a higher degree of vertical integration SNF services before and after the BBA.

H8a: The influence of a higher Medicare case mix on hospitals decision to vertically integrate skilled care will be the same in 2002 as in 1995.

The main focus of this study is test the applicability of transaction cost economics in hospitals make or buy decision related to skilled nursing services. Eight hypotheses are developed for transaction uncertainty, four for asset specificity, and four for transaction frequency. Table 4 is a summary of the hypotheses for this study.

Summary

This chapter presents an overview of transaction cost economic theory and related empirical studies which have been conducted in both health care and non

health care settings. Williamson's market failure concept is presented and a model developed for this study, which is depicted in figure (4). Hypotheses are developed which will test the three dimensions transaction uncertainty, frequency, and asset specificity. This study will be a replication of Chiu's 1995 dissertation research, but will be unique in that it will test the model to see if it is applicable before and after an environmental upheaval such as the BBA.

Table 4. Summary of the Study Hypotheses

H1: Hospitals in communities with more skilled nursing beds will be less likely to integrate skilled nursing care.

H1a: The influence of the number of skilled nursing beds in the community on the decision of hospitals to integrate skilled nursing care will be the same in 2002 as it was in 1995.

H2: Hospitals in an area with more indigent population and less community skilled nursing beds will implement a higher degree of vertical integration to provide skilled nursing services.

H2a: The influence of a more indigent population and fewer community skilled beds on hospitals decision to integrate skilled nursing care will be the same in 2002 as it was in 1995.

H3: Hospitals with higher occupancy rate will be more likely to employ a higher degree of vertical integration to provide skilled nursing care.

H3a: The influence of higher occupancy rates on hospitals decision to vertically integrate skilled nursing care will be the same in 2002 as it was in 1995

H4: Hospitals with lower lengths of stay will be more likely to have implemented higher levels of integration of skilled nursing services.

H4a: The influence of lower lengths of stay on hospitals decision to vertically integrate skilled nursing care will be the same in 2002 as it was in 1995.

H5: Those hospitals that provided geriatric services are more likely to have a higher degree of vertical integration of skilled nursing care.

H5a: The influence of providing geriatric services on hospitals decision to integrate skilled nursing care will be the same in 2002 as it was in 1995.

H6: The higher number of licensed nursing staff per licensed bed, the more likely a hospital is to implement a higher level of vertical integration of skilled care.

H5a: The influence of a higher number of licenses nursing staff per licensed bed on hospitals decision to integrate skilled nursing care will be the same in 2002 as it was in 1995.

H7: Hospitals with higher percentage of Medicare discharge patients will be more likely to implement a higher level of vertical integration of SNF services.

H7a: The influence of a higher percentage of Medicare discharges on hospitals decision to integrate skilled nursing care will be the same in 2002 as it was in 1995.

H8: Hospitals with a higher Medicare case mix will be more likely to employ a higher degree of vertical integration SNF services.

H8a: The influence of a higher Medicare case mix on hospitals decision to integrate skilled nursing care will be the same in 2002 as it was in 1995.

CHAPTER 4: METHODS

Introduction

This chapter presents a description of the research study design. Following this is a description of the data sources, model specifications, and a discussion of the study variables. The plan of analysis is then presented and the chapter concludes with a summary of methods and a discussion of study limitations,

Study Design and Sample

The purpose of this study is to investigate hospitals decision to vertically integrate into skilled nursing facilities, by utilizing a transaction cost economics theory framework as proposed by Williamson. This study will replicate Chiu, (1995) but will use data from two time periods, before and after the Balanced Budget Act of 1997, to evaluate the models applicability following a major change in reimbursement. According to Williamson, the type of governance structure selected was a function of the three dimensions of transaction, such as transaction uncertainty, transaction frequency and asset specificity. A cross sectional design using two time periods, before and after the BBA, will be used to determine the association of types of hospital governance with the three dimensions of transactions. By straddling the enactment of the BBA we can determine its possible effect on the hospitals decisions to vertically integrate

skilled facilities. The study sample includes all of the non-federal, acute care general hospitals in the 50 states and district of Columbia in the United States that were included in the American Hospital Association annual survey in 1995 and 2002. These years represent a time period before and after the BBA. By looking at data two years before the BBA, hospitals were not being affected by reimbursement changes but were perhaps beginning to plan for its eventuality. Two full years after the implementation, should reflect the effect of the changes on hospitals response in selecting a governance form for the provision of skilled service, and not be contaminated by transition effects. In order for a hospital to be selected as part of the study must have responded to the AHA annual survey both years of the study. The two advantages of including almost all non-federal hospitals are that the sample approximates nearly all hospitals of interest, which reduces selection bias, and the population is all U.S. hospitals, which enhance generalizeability.

Unit of Analysis

The purpose of this study is to analyze hospitals decisions to vertically integrate skilled nursing facilities before and after the balanced budget act of 1997, and learn if different decisions were made following this major change in environment. The unit of analysis is the individual hospital.

Data Sources and Sampling

Data for this study are from the American Hospital Association (AHA) surveys in 1994, 1995 and 2001,2002 and the Area Resource Files (ARF) for the same

years, and the state stringency measures for CON regulation from the National Directory of Health Planning, Policy, and Regulatory Agencies. Each of the data sources is described in the following paragraphs.

The AHA annual survey contains information on all hospitals in the U.S. Since 1946 the American Hospital Association has surveyed hospitals and compiled information related to facilities and services and their use, staffing, finances, and administration. (www.pop.psu.edu/data/archive/daman/ahas.html, 2002). It is widely recognized and utilized in healthcare empirical research by many researchers who use the individual hospital as a unit of analysis. (Alexander and Morrisey, 1989).

Area Resource file includes information on all counties in the United States. The data include information on health care facilities, health professions, and utilization of services, population, economics, environmental factors, and vital statistics. The database contains over 6000 variables and is used for health service research, health care policy analysis, and other geographic based activities (http://www.arfsys.com/, 2005).

Certificate of need by state data have been used by health care researchers in the past to determine its effect on hospital behavior (Luke, 1995), and may increases uncertainty in local markets. Certificate of need regulation places restraints on bed expansion as well as the purchase of major capital and the addition of skilled nursing beds.(AHPA, 2004). Data will be used from 2004, since it is the most current and no changes have occurred since 1995.

Model Specifications

Hospitals face challenges as they try to find discharge options in an environment that is uncertain as to supply of nursing home beds and reimbursement. As uncertainty increases it is more difficult to rely on the spot market and so long term contracting, or a hybrid arrangement, or vertical integration become more attractive. These three modes of provision of skilled care are the decisions facing hospitals seeking post acute services for their patients. If the hospital decides to use the spot market, it is vulnerable to the number of beds available in the community. Also it is susceptible to the skilled facilities willingness to accept patients from the hospital without opportunistically selecting those patients, which may have less cost associated with their care. If the hospital decides to integrate skilled nursing, the degree to which this is implemented must be decided, that is hybrid or hierarchy. Complete vertical integration is the most extreme and occurs as a result of lack of community resources to provide the care.

Five primary models are established to examine the differences in arrangements a hospital makes to provide skilled care. The three dimensions of the transaction cost framework are transaction uncertainty (UNCER), transaction specificity (SPEC), and transaction frequency (FREQ), and are the independent variables of the study. Control variables (CONTRL) are used to avoid bias and include such characteristics as CON stringency, demographic factors, and hospital characteristics. . Model 1 represents whether or not a hospital decides

to integrate skilled nursing facilities (Hierarchy/Hybrid vs. Market). Model 2 examines why hospitals use total vertical integration to accommodate patient discharges (Hierarchy vs. Market). The third model identifies factors, which affect a hospitals choice between different forms of integration (Hierarchy vs. Hybrid). Model 4 explores whether hospitals that use the hybrid form are different from the ones that select the market (Hybrid vs. Market). Lastly, model 5 studies the factors affecting a hospitals decision to employ total integration rather than the hybrid and spot market (Hierarchy vs. Hybrid/Market).

All five models will be conducted on data pre and post BBA. Results from both years will undergo significance testing to determine if the differences are significant. Table 5 contains the description of model specifications.

Table 5. Description of Model Specifications

Model 1	Hierarchy/Hybrid vs. Market = f(UNCER, FREQ, SPEC, CONTRL)
Model 2	Hierarchy vs. Market= f(UNCER, FREQ, SPEC, CONTRL)
Model 3	Hierarchy vs. Hybrid = f (UNCER, FREQ, SPEC, CONTRL)
Model 4	Hybrid vs. Market = f (UNCER, FREQ, SPEC, CONTRL)
Model 5	Hierarchy vs. Hybrid/Market = f(UNCER, FREQ, SPEC, CONTRL)

Measurement of Variables

Variables for this study are divided into to three categories. The dependant variable is which form of governance has been chosen by a hospital to facilitate patient discharge from acute care to skilled nursing. The independent variables represent the dimensions of transaction cost economics, uncertainty, asset specificity, and frequency of transactions. Finally, the control variables are

utilized to reduce possible bias in the influence of the independent variables.

Dependent Variables

The three types of arrangements chosen by hospitals to discharge patients to skilled nursing facilities are abstracted from the AHA databases from 1995 and 2002, which are results from the Annual Survey of Hospitals. The survey questions of interest to this study are whether a hospital offers a Medicare certified skilled nursing unit, or whether it offered other skilled care. Hospitals are asked to respond to questions about whether they provide, contract, or do not provide skilled care. Possible answers are that: 1) care is provided by the hospital, 2) it is provided by others through a formal arrangement, and 3) it is not provided by the hospital. The spot market is assumed based on a hospital responding that they do not contract or provide skilled care. These responses represent three levels of vertical integration, which is the dependent variable in this study. Not providing skilled services is assumed to represent the spot market =1, contracting for services or hybrid =2, and finally if the hospital responded that they provide skilled services =3.

Independent Variables

Three transaction cost constructs, frequency, uncertainty, and asset specificity are represented by the independent variables. Transaction uncertainty can arise from environmental or behavioral conditions (Williamson, 1985), Environmental uncertainty in this case refers to the mix and number of patients that might need skilled nursing care at any given time and the availability of

community beds. The county in which the hospital is located is used as the market area, and has been used by researchers as a delineation of a healthcare market boundary (Alexander &Morrissey, 1989) Behavioral uncertainty is when the supply of beds is not sufficient to meet the demand from the hospitals and the potential for community facilities to deny access depending on their own financial situation and goals. Hospitals with higher lengths of stay are anxious to discharge patients to skilled nursing beds. Uncertainty is increased if the number of skilled beds decline. The operational definitions for uncertainty are in Table 6.

Table 6. Operational Definitions of Transaction Uncertainty Variables

SKF_OLD	Ratio of skilled nursing beds to people over 65 in a market
BEH_UNC	Percentage of elderly indigent to population
H_OPY	Individual hospital occupancy rate
ALOS	Average length of stay

Uncertainty of finding an appropriate nursing home bed for patient being discharged form an acute care hospital may be influenced by the number of beds available, and source of coverage of the patient. Factors, which may increase the hospitals, need to find a discharge bed is the length of stay as well as the hospitals individual occupancy rate, which is measured by HOPY, or the individual hospital occupancy rate. If the hospital is pressed to find beds for incoming patients, a smooth discharge of patients is necessary. If there is not an acceptable post acute service, such as a skilled bed then the hospital must keep the patient longer incurring additional costs beyond what is reimbursed, which is

reflected in the length of stay of their Medicare patients Hospitals which utilize PACS more have lower lengths of stay, and those who own SNFs have lower lengths of stay than those who do not. (Med Pac, 1999)

The ratio of skilled nursing beds to population of people over 65, SKFOLD reflects the relationship of demand to supply of nursing home beds by the elderly. If there are not enough beds then acute care stays become longer. Additionally, the number of people who may not have adequate resources for skilled payment or who may be Medicaid may be seen as undesirable by the nursing home industry who may opportunistically reject them as admissions. The BEHUNC variable represents the percentage of elderly in poverty in the hospital market. ALOS is a measure of the average length of stay and is calculated by dividing the number of patient days by the number of admissions.

The second construct is asset specificity. The more experience a hospital has in providing geriatric care the more likely it is to evaluate a discharge site for its geriatric patient critically. If all the elements of providing a geriatric service, such as equipment, staff, and experience are available in the organization, it is hypothesized that vertical integration of the service is more likely. Geriatric services are a binary variable for services offered to geriatric patients. If provided by the hospital it is coded as "1"and coded as "0" if it is not provided.

The number of licensed physicians and nurses were found to be an influence in hospitals decisions to vertically integrate skilled nursing services. The number of doctors and nurses was found by Wheeler (1999) was found to be a factor in

hospitals decision to vertically integrate skilled nursing. The number of licensed physicians is no longer queried on the AHA survey, so that only the number of employed doctors and dentists are reported. LICSTAFF is a ratio of the number of licensed nursing on staff to the number of licensed beds. Table 7 displays the operational definitions for the transaction specificity variables.

Table 7. Operational Definitions of Transaction Specificity Variables

GI	The number of geriatric services provided by the hospital including adult day care, Alzheimer's, diagnostic/assessment services, comprehensive geriatric assessment, emergency response for the elderly, geriatric acute care unit, geriatric clinics, respite care, senior membership. It is coded as "1" if provided "0" if not.
LICSTAFF	The number of licensed nurses divided by the Number of licensed beds.

Transaction frequency is hypothesized to increase vertical integration as the frequency of need for services increases. Since Medicare is the largest payer for skilled services and hospitals receive the largest proportion of Medicare budget, it is reasonable assume that hospitals with more concentration of Medicare patients will choose to vertically integrate skilled services rather than rely on a potentially opportunistic market place to place patients. (Robinson (1996). MCR-D is the measure of the proportion of Medicare discharged patients to the total discharges. As the number of Medicare discharges increases a hospital is more likely to have increased transactions with skilled nursing facilities. As this activity escalates, there is more internal pressure to increase discharge-planning activities.

Since the population of elderly has the highest likelihood of chronic illness the case mix index is an indicator of the severity of illness for Medicare. Subsequently, as hospitals see more and more of their patients are sicker and older, the importance of a discharge path increases. So, hospitals with higher case mixes will be more likely to integrate skilled nursing services. CASMX is the average Medicare case mixes for the individual hospital. Table 8 presents the operational definitions of the variables for the transaction frequency construct.

Table 8. Operational Definition of Transaction Frequency Variables

MCR_D	Proportion of Medicare discharges to total discharges of the Hospital, continuous variable
Case_Mx	Average case mix index of the hospitals Medicare patients

Control Variables

Table 9 depicts the control variables for this study. These are the hospital characteristics, which may co vary with the hospitals decision to integrate skilled nursing.

Table 9. Operational Definitions of Control Variables

CON	CON stringency in area hospital is located-summated
LOCAL	Whether a hospital is rural=1, or urban =0
TEACH	Teaching status =1, non teaching =0
MEMBER	System membership=1, non membership=0
TAX STATUS	Non profit =0, for profit =1
SIZE	Hospital staffed beds; continuous variable

System membership (MEMBER) is a dichotomous variable with a possible value of '0' or '1', where '0 represents freestanding hospitals and '1' is used if the hospital is a member of a system.

A designation of rural or urban (LOCAL) is given as a control variable indicating whether the hospital is in a non Metropolitan area, or an MSA with less than 100,000 and given a '0', or an urban hospital in an area of greater than 100,000 is identified as '1'.

Hospital tax status (TAX STATUS) is also a control variable. For profit hospitals have different missions than not for profit and may make different decisions regarding the integration of skilled nursing services. Hospitals will be categorized into profit and coded as '1'or not for profit and coded as "0". Government hospitals will not be included.

Teaching status (TEACH) is a also a dichotomous variable and has been identified in prior research as influencing the utilization of post acute services (Morrissey, 1988: Neu, 1989). Teaching status determined by hospitals self report on the AHA annual survey and is coded '0' if it is non teaching and '1' if it is a teaching hospital.

The last control variable is CON, but is a very important one since it has impact on the number of skilled beds that may be licensed in any state with CON laws. States which had CON laws related to skilled bed implementation were identified.

Analysis Plan

The individual hospital is the unit of analysis for this study. The plan of analysis contains three steps. The first is a descriptive analysis to determine the distribution of each variable. Next model building is employed to identify variables that will be included in the multivariate analysis. Finally, multivariate analysis will be used to determine the relationship between the independent variables and the hospitals governance form.

Univariate Analysis

In order to examine the terms of distribution and normality, variables are first examined through univariate analysis. If unreasonable or extreme values identified, these can be reevaluated for deletion. Variables, which are nominal or ordinal, are examined through frequency tables and bar charts.

Model Building

Model building includes factor analysis, univariate logit analysis, contingency table analysis, bivariate correlation, and collinearity diagnostic analysis to assess the proposed variables.

Factor Analysis is employed to in order reduce a large set of variables into a smaller set with common characteristics or underlying dimensions (Polit&Hungler, 1995). This procedure is used to identify and group together the variables. This will be done in this study on exploratory basis t determine how well the selected variables represent the three constructs.

Univariate logit analysis examines the relationship of the proposed variables to establish whether a variable is statistically adequate to be included in the multivariate models. They must demonstrate a certain level of association with the dependent variable in the absence of any other variables being controlled. The coefficient estimate, standard error, p-value, odds ratio, and the likelihood ratio for the significance of the coefficient for each variable is evaluated.

Bivariate correlation analysis is useful to determine possible collinearity problems among the study variables. A correlation matrix is produced to examine the two-way relationships between pairs of variables. Collinearity is declared if the correlation coefficient is at 0.95, which indicates that one of the variables contains all the information contained in the other (Afifi & Clark, 1990). This is important in order to get parameter estimates; no independent variable can linearly correlate to another. The consequence of collinearity can result in unstable coefficients, which makes assessing the effect of individual variables on (Rawlings, Pantula, and Dicky, 1998) the dependent variable.

Multivariate Logit Analysis

Multivariate logistic regression is used to predict hospitals arrangements to discharge patients to nursing homes. This statistical analysis can be used to predict a dependent variable on the basis of the independent variables and to determine the percent of variance in the dependent variable explained by the independents. Furthermore, it can be used to rank the relative importance of the independents: to, assess interaction effects, and to understand the impact of

covariate control variables. Logistic regression applies maximum likelihood estimation after transforming the dependent into a logit variable, which is the natural log of the odds of the dependent occurring, or not. In other words, logistic regression estimates the probability of a certain event occurring. It does not assume the linearity of relationship between the independent variables and dependent, does not require normally distributed variables, and does not assume homoscedasticity.Goodness of fit tests, such as model chi-square may be used as indicators of model appropriateness.

Logistic regression is an appropriate method of analysis for this study since transaction cost theory involves comparing discrete organizational choices. Market contracting is at one extreme with total integration at the other end of the spectrum, and hybrid forms of arrangements of providing skilled services are in between. Other healthcare researchers have used logistic regression in studying hospital strategic decision-making. Alexander and Morrissey (1989) used logistic regression when doing research to examine hospitals decision to contract with multi hospital systems. Others, such as Blewitt et al (1995) examined whether hospital ownership of PACS increased access to post acute care also used logistic regression. Dansky et al (1996), used logistic regression, transaction cost theory and resource dependency theory to find that ownership of home health agencies greatly increased their usage.

Logistic regression estimates the probability of the occurrence of an event. In this case it will be used to predict hospitals decision to vertically integrate skilled

nursing facilities. In this model the outcome is coded as an event (coded as 1) or a non-event (coded as 0). The probability function is specified as:

P (event) = 1

where P = probability of hospitals SNF integration;

Bi= coefficient estimated from data;

Xj= vector of explanatory variable; and

e = the base of natural logarithms or approximately 2.718

The interpretation of the logistic coefficients is expressed in terms of an odds ratio. P represents the probability of an event, so that the logit (P) = P/(1-P) is a linear function of the predictor variables. The log of the odds ratio is: Pz/(1-pz). Odds ratio is used to predict the occurrence of an event, such as the integration of skilled nursing care.

How well the logistic regression model actually predicts the outcome, goodness of fit measures are utilized. Chi square values based on the difference between observed and fitted values, determine the fit of the logistic equation to the data. The differences are summated to form a chi-square value (X2). Large Chi- Square is indicative of poor fit and smaller indicates good fit. Additionally, small p-values represent poor fit. These procedures for analysis will be conducted on both 1995 and 2002 data.

Testing for Differences in Variable Effects between 1995 and 2002

An additional statistical analysis will be performed to test H 1a-H 8a to determine if there was a significant difference before and after the BBA in the

influence of the study variables on hospitals' decisions to vertically integrate skilled nursing services. The original model contains 8 predictor variables and 6 control variables giving the model 14 degrees of freedom. Data from each year of interest will be stacked and coded accordingly, with 0 =1994/1995, and 1= 2001/2002. Study variable values will then multiplied by the appropriate dichotomous assignment. Eight new predictor variables will then be created for each of the data by multiplying the predictor variables by the 0 for 1994/1995 data or 1 value for the 2001/2002. The eight new cross- product variables will be then added to this model. Logistic regression will be run and the chi square differences of the two models will then be evaluated for significance to determine if there was any significance between the study years between the models. The significance test of the individual coefficients on the cross product variables will provide the tests of H 1a through H 8a and will be reported in a summary table to indicate which variables had a significantly different effect in the post-period (2002) compared to the pre-period (1995).

Limitations

Limitations of this study are presented in this section. The limitations of the sample, design, data, and analysis are summarized.

Sample

The number of hospitals reporting both study years may be less than the whole population of hospitals in operation and responding only one year. If a hospital were purchased by a system between the years of interest, it would not

be included. Additionally if the hospital closed in the interim it would not be included. Smaller hospitals and or for profit hospitals may be less likely to report and may be underrepresented. This may affect the generalizebility of the study, even though the number included will no doubt be the majority of US hospitals.

Data

Variables will be extracted from the AHA data files, which are a result of hospital responses to an annual survey and may be subject to inaccuracies of reporting. Data from the Area Resource files as well as the CON stringency report from the American Health Planning Association will be used. All data are administrative and have limited control over quality.

Design

The non-experimental, cross sectional study design can establish association but not causality. However the advantage of longitudinal over the cross sectional design previously used by Chiu (1995) is to the extent that repeated measurements from the same subject are not perfectly correlated, they are more powerful than a cross sectional study for a fixed population.

Summary

This chapter has presented the analytical methods for this study. A longitudinal design is used and the individual hospital is the unit of measure. The annual AHA survey for 1995 and 2002, Area Resource files are the data sources as well as the CON data identifying states with certificate of need laws related to the number of skilled beds. Definitions of the dependent and independent

variables are specified. The likelihood of three forms of governance (hierarchy, hybrid, and market) is predicted by using multivariate logistic regression analysis to determine the influence of the variables for each year. The models are then subjected to significance testing for each year to determine if there was meaningful change after the BBA and which variables changed significantly.

CHAPTER 5: RESULTS

Introduction

This chapter presents the results of data management procedures and the results of the statistical analysis, which includes descriptive statistics, and other findings using multivariate logistic regression. Significance testing of the descriptive statistics is presented for both years of interest. How the data was managed is described and includes data sources and the processes that were used to select or eliminate certain variables from the study. Factor analysis results are then presented and are provided as validation of the constructs for both of the study years. Results are then displayed and discussed for the univariate and bivariate analyses followed by contingency table analysis and the co linearity diagnostics. The findings of the multivariate logistic analysis for both study years are presented along with significance testing to examine statistical significance

Descriptive Findings

In this section, data sources, study population, and the distribution of the study variables are presented.

Data Management and the Study Population

The individual hospital was the unit of analysis for this study. Three data files were used for all study years: the AHA database, the ARF data set and the CON files from the 2004 National Directory of Health Planning, Policy and Regulatory Agencies (NHPPR). The unit of study was variable depending on the data set. The AHA variable was 'hospital", 'county' from the ARF dataset, and "state" from the NHPPR files.

Originally, 4,894 hospitals met criteria for inclusion in the study in the 1994/1995 data and 4,525 in the 2001/2002 data. After eliminating hospitals, which meet criteria for both years, 4,301 remained. Hospitals with missing values and outliers were then dropped and 4,214 hospitals met criteria, namely being a general, acute, non-federal hospital that had reported data in all four years 1994, 1995, 2001 and 2002 in the AHA survey. The normality of the continuous variables was examined through univariate analysis. Outliers were determined to be those, which were outside the standard deviation of the norm. Hospitals were deleted which did not report data related to the dependent variable which was what arrangements they had for providing skilled nursing care to their patients. Mean substitution was employed for missing data for independent variables, which were continuous. This method substitutes a value, which is typical of the sample and is generally from the center of the distribution.

Dependent Variable

The dependent variable was what the hospital reported as their method of providing skilled care to its patients who qualified and were ready for discharge. The three types of arrangements are hierarchy, hybrid, and market. Hospitals that had integrated or owned at least one unit were categorized in the hierarchy group, which represents the highest level of vertical integration. Hospitals, which provide skilled care through long-term contracts or joint venture, were placed in the hybrid group. If the hospital relied on the spot market for a skilled bed they were considered to be in the market group. Table 10 is presentation of the distribution of the types of skilled nursing service arrangements that were reported by year.

Table 10. The Distribution of the Types of Skilled Nursing Services by Year

Variable	1994/1995		2001/2002		Total	
Hierarchy	1,445	(34.29%)	1,448	(34.36%)	2,893	(34.33%)
Hybrid	243	(5.77%)	291	(6.91%)	534	(6.34%)
Market	2,526	(59.94%)	2,475	(58.73%)	5,001	(59.34%)
Total	4,214	(100%)	4,214	(100%)	8,428	(100%)

As seen in table 10 in 1995, there were 1,445 (34.3%) hospitals that had integrated skilled nursing, 243 (5.77%) that had a hybrid arrangement and 2526 or 59.9% that relied on the spot market to provide skilled care for their patients. By 2002, those numbers had not changed much. The number that provided skilled care had only increased by three, but the number with contractual arrangements had increased from 243 to 291 or 6.91%. Those relying on the

spot market declined from 2526 to 2475 and accounted for 58.7% of the study group in 2001/2002.

Independent Variables

Descriptive statistics for the independent and control variables are presented in Table 11 for the 1994/1995 study years. Table 11 contains the means and standard deviations for continuous variables as well as the dichotomous variables. Another table presents the descriptive statistics in the same manner for the continuous and dichotomous variables for the 2001/2002 study years.

Table 11. Descriptive Statistics for Study Variables by Arrangements of SNF Services (1994/1995)

Constructs/ Variables	Arrangement of Skilled Nursing Services							
	Hierarchy (n=1,445)		Hybrid (n=243)		Market (n=2,526)		Overall (N=4,214)	
	Mean/ Proportion	(Std. Dev.)	Mean/ Proportion	(Std. Dev.)	Mean/ Proportion	(Std. Dev.)	Mean/ Proportion	(Std. Dev.)
Transaction Uncertainty								
SNF to elderly	0.05	(0.02)	0.04	(0.02)	0.04	(0.03)	0.04	(0.02)
Poverty	0.16	(0.06)	0.15	(0.06)	0.16	(0.07)	0.16	(0.06)
Occupancy	0.59	(0.17)	0.60	(0.17)	0.51	(0.19)	0.54	(0.19)
ALOS	5.66	(3.62)	5.61	(1.87)	5.81	(4.09)	5.74	(3.83)
Transaction Specificity								
Geriatric	0.42	(0.49)	0.41	(0.49)	0.27	(0.44)	0.33	(0.47)
Lic. Staff	0.92	(0.43)	1.28	(0.43)	1.08	(0.45)	1.04	(0.45)
Transaction Frequency								
MDischarges	0.46	(0.14)	0.38	(0.16)	0.45	(0.15)	0.45	(0.15)
Case Mix	1.26	(0.23)	1.38	(0.22)	1.23	(0.22)	1.25	(0.23)
Control variables								
CON	0.66	(0.47)	0.73	(0.45)	0.75	(0.43)	0.72	(0.45)
LOCAL	0.84	(0.37)	0.64	(0.48)	0.84	(0.37)	0.83	(0.38)
TEACH	0.04	(0.19)	0.12	(0.33)	0.05	(0.23)	0.05	(0.22)
MEMBER	0.51	(0.50)	0.80	(0.40)	0.47	(0.50)	0.50	(0.50)
TAXSTATUS	0.12	(0.32)	0.09	(0.28)	0.12	(0.32)	0.12	(0.32)
SIZE	196	(177)	271	(221)	152	(161)	174	(174)

It was hypothesized that selection of the hierarchical arrangement would be associated with uncertainty, specificity, and frequency of transactions. Uncertainty was measured by the ratio of skilled nursing beds to people over 65 in a market, the percent of elderly in poverty, individual hospital occupancy rate, and the hospitals' average length of stay. The means and standard deviations for the variables in the 1994/1995 study years are displayed in table11. The overall mean of skilled beds to elderly population ratio was .04 (0.02). The hierarchical arrangement was slightly higher at 0.05 (0.02 SD). Hospitals, which chose hybrid or market arrangements, were in areas with the same as the mean for the overall average. There was little difference in this variable across the arrangements. The overall percent of elderly in poverty was 16% with little difference among the three types of arrangements with an overall standard deviation of 6%. Hospital occupancy for the hierarchical group was 59% with a standard deviation of 17%. The difference between the hybrid and market groups was greatest with the hybrid group having occupancy of 60% and market group having occupancy of 51%. The standard deviations were 17% and 19% respectively. Average length of stay (ALOS) overall was 5.74 days with a standard deviation of 3.83. Hospitals with the market arrangement had the longest ALOS at 5.81 days (4.09), hybrid arrangements had the shortest ALOS at 5.61 (4.09) days. Hospitals with hierarchical arrangements had a average length of stay of 5.66 (3.62) days.

The results varied little among the years of interest, with overall results for uncertainty being very similar except for average length of stay. See Table 12. Average length of stay overall dropped to 5.02 days. The hierarchical group ALOS was 5.11 (4.16) days and was lower than market, but slightly higher than hybrid. Hybrid arrangements had the lowest ALOS at 4.71(1.24) days and market arrangements were at 5.01(4.45) days. The overall ALOS shifted downward with the various arrangements maintaining their positions from highest to lowest

Table 12. Descriptive Statistics for Study Variables by Arrangements of SNF Services (2001/2002)

Variables	Arrangement of Skilled Nursing Services							
	Hierarchy (n=1,448)		Hybrid (n=291)		Market (n=2,475)		Overall (N=4,214)	
	Mean/ Proportion (Std. Dev.)		Mean/ Proportion (Std. Dev.)		Mean/ Proportion (Std. Dev.)		Mean/ Proportion (Std. Dev.)	
Transaction Uncertainty								
SNF to Elderly	0.05	(0.02)	0.05	(0.02)	0.05	(0.03)	0.05	(0.03)
Poverty	0.12	(0.04)	0.11	(0.05)	0.12	(0.05)	0.12	(0.05)
Occupancy	0.59	(0.18)	0.63	(0.17)	0.51	(0.20)	0.54	(0.19)
Avg LOS	5.11	(4.16)	4.71	(1.24)	5.01	(4.45)	5.02	4.20)
Transaction Specificity								
Geriatric	0.45	(0.50)	0.52	(0.50)	0.32	(0.47)	0.38	(0.49)
Lic. Staff	1.05	(0.51)	1.47	(0.53)	1.24	(0.53)	1.19	(0.53)
Transaction Frequency								
MDischarges	0.45	(0.12)	0.37	(0.14)	0.44	(0.13)	0.44	(0.13)
Case Mix	1.24	(0.25)	1.38	(0.26)	1.22	(0.24)	1.24	(0.25)
Control variables								
CON	0.62	(0.49)	0.72	(0.45)	0.67	(0.47)	0.66	(0.47)
LOCAL	0.46	(0.50)	0.81	(0.39)	0.50	(0.50)	0.51	(0.50)
TEACH	0.04	(0.20)	0.15	(0.36)	0.05	(0.22)	0.06	(0.23)
MEMBER	0.52	(0.50)	0.90	(0.30)	0.52	(0.50)	0.54	(0.50)
TAXSTATUS	0.09	(0.28)	0.10	(0.30)	0.16	(0.37)	0.13	(0.34)
SIZE	192	(191)	238	(191)	144	(153)	167	(172)

The indicators for transaction specificity were whether the hospital offered geriatric services and the ratio of licensed staff to the number of licensed beds. The overall percentage of hospitals reporting that they had geriatric services for 1994/1995 was 33% with a SD of 47%. The hierarchical group revealed the highest percentage of geriatric services at 42% and a SD of 49%. The lowest finding was the spot market group with only 27% reporting geriatric services and a standard deviation of 47%. This changed in the 2001/2002 data in which the hybrid group reporting of geriatric services rose to 52% from 41% and became the group with the highest percentage of hospitals reporting geriatric services. The overall was 38% with a standard deviation of 49%.

The second indicator used to measure asset specificity was the number of licensed nursing staff to the number of licensed beds. In the 1994/1995 data analysis, the overall average was 4% more licensed staff to the number of licensed beds. The lowest ratio of licensed staff to licensed beds was found in the hierarchical model with 92% and a SD of 43%. The highest mean ratio was the hybrid group, which had 28% more licensed staff than licensed beds. The relationship of the groups remains constant in the analysis of the 2001/2002 data, with respect to the group's highest mean ratio to lowest. However, the overall mean ratio is higher with an increase in the overall to 19% more licensed staff to the number of licensed beds and a standard deviation of 53%.

The frequency construct was represented by the proportion of Medicare discharges to the total discharges of the hospital (MCR_D), and the average

case mix index of the hospitals' Medicare patients (Case_Mx). Hospitals, in the 1994/1995 data, which chose the hybrid arrangement, had the lowest mean percentage of Medicare discharges to total discharges at 38% (16%), followed by the spot market group with 45% (15%). The highest proportion of Medicare discharges was found in the hierarchical arrangement hospitals at 46% (14%). The overall average was 45% (15%). The same analysis of the 2001/2002 data for hospitals reveals nearly identical results, which show an overall mean of 44% (13%).

Certain variables were selected to be the control variables in order to investigate the pure effect of the three constructs on hospital decisions to vertically integrate skilled services. The control variables are whether the hospital was in a state which had certificate of need laws (CON), if the hospital was in an urban or rural area (LOCAL), whether or not it was a teaching hospital (TEACH), if a hospital was a member of a system or not (MEMBER), tax status (TAXSTATUS), and bed size (SIZE). The overall mean for the CON variable was 72% (45%) for 1994/1995. Sixty six percent of the hospitals, which had the highest level of integration or hierarchical arrangements, were located in states, which have CON laws regulating skilled nursing. The 2001/2002 data reveal that the only 62% of hospitals with integrated skilled units were located in states with CON laws for skilled beds. The Market group in 1994/1995 had the highest number of hospitals in CON states with 75 (43), but dropped to 67 (47) by 2001/2002. The overall mean went from 72 in 1994/1995 to 66 in 2001/2002

reflecting a trend among states to drop or alter their certificate of need laws. The largest hospitals in both years were in the hybrid groups as were urban hospitals and those, which were members of systems. The overall mean for teaching status and tax status in 1994/1995 was only 5 and 12 respectively. In 2001/2002, results for these variables change very little to 6 and 13 respectively.

Results of significance analysis revealed that the difference between hierarchy, hybrid and market was significant. Differences were significant between the different types of arrangements chosen at the p-value less than 0.05 except for percent of elderly in poverty, and average length of stay for the 1994/1995 data. In the 2001/2002 data, however, all differences were significant at the p-value of less than 0.05 except for average length of stay. See Tables 13 and 14.

Table 13. Mean/Proportion Comparison for Study Variables by Analysis of Variance (ANOVA) tests (1994/1995)

	Mean/Proportion			ANOVA tests	
Variable	Hierarchy	Hybrid	Market	F	p-value
Ratio SNF to Elderly	0.045	0.043	0.043	3.62	0.027
% Elderly in Poverty	0.158	0.152	0.159	1.5	0.223
Avg. Hospital Occupancy	0.586	0.595	0.508	94.12	0.000
Average Length of Stay	5.660	5.618	5.813	0.89	0.413
Geriatric Services	0.421	0.412	0.267	54.96	0.000
Licensed Nsg Staff	0.922	1.280	1.082	98.84	0.000
Medicare Discharges	0.459	0.378	0.451	31.65	0.000
Avg Case Mix	1.258	1.376	1.226	51.95	0.000
CON	0.658	0.728	0.752	20.16	0.000
URBAN	0.482	0.860	0.487	66.37	0.000
TEACH	0.038	0.123	0.054	15.45	0.000
MEMBER	0.509	0.798	0.470	49.23	0.000
TAXSTATUS	0.118	0.086	0.120	1.19	0.305
SIZE	196.371	271.461	152.182	72.53	0.000

Table 14. Mean/Proportion Comparison for Study Variables by Analysis of Variance (ANOVA) tests (2001/2002)

	Mean/Proportion			ANOVA tests	
Variable	Hierarchy	Hybrid	Market	F	p-value
Ratio SNF to Elderly	0.052	0.046	0.051	8.22	0.000
% Elderly in Poverty	0.118	0.108	0.124	19.87	0.000
Avg. Hospital Occupancy	0.586	0.630	0.506	114.71	0.000
Average Length of Stay	5.114	4.717	5.013	1.11	0.329
Geriatric Services	0.446	0.522	0.324	43	0.000
Licensed Nsg Staff	1.046	1.466	1.242	109.71	0.000
Medicare Discharges	0.446	0.375	0.436	36.97	0.000
Avg Case Mix	1.245	1.376	1.222	51.46	0.000
CON	0.618	0.718	0.672	8.46	0.000
URBAN	0.462	0.808	0.496	60.67	0.000
TEACH	0.040	0.151	0.053	29.36	0.000
MEMBER	0.522	0.904	0.516	84.58	0.000
TAXSTATUS	0.088	0.096	0.161	23.33	0.000
SIZE	191.857	237.598	144.388	62.89	0.000

Univariate Logit Regression Analysis

Table 15 presents the results of univariate logit regression analysis of the independent variables for the 1994/1995 data. All but two of the variables had p-values below the .05 level of significance. The percentage of elderly in poverty and Medicare discharges exceeded significance level of p=</05. Table 16 presents the same data for the 2001 data. Medicare discharges also exceeded the p-value with a .748. The ratio of elderly to skilled beds yielded a p-value of .659, which also exceeded the cutoff.

Table 15. Univariate Logit Regression for Hierarchy/Hybrid vs. Market Groups 1994/1995

	Beta Coefficient	P-value	Odds ratio
Transaction Uncertainty			
Ratio SNF to Elderly	2.773	0.028	16.01
% Elderly in Poverty	-0.406	0.406	0.666
Avg. Hospital Occupancy	2.362	0.000	10.615
Avg Length of Stay	0.044	0.000	1.045
Transaction Specificity			
Geriatric Services	0.686	0.000	1.986
Licensed Nsg. Staff	-0.550	0.000	0.577
Transaction Frequency			
Medicare Discharges	-0.148	0.483	0.863
Avg Case Mix	0.928	0.000	2.529

Table 16. Univariate Logit Regression for Hierarchy/Hybrid vs. Market Groups 2001/2002

	Beta Coefficient	P-value	Odds ratio
Transaction Uncertainty			
Ratio SNG to Elderly	0.547	0.659	1.728
% Elderly in Poverty	-3.646	0.000	0.260
Avg. Hospital Occupancy	2.425	0.000	11.302
Avg. Length of Stay	0.043	0.000	1.044
Transaction Specificity			
Geriatric Services	0.569	0.000	1.766
Licensed Nsg. Staff	-0.459	0.000	0.632
Transaction Frequency			
Medicare Discharges	-0.077	0.748	0.926
Avg. Case Mix	0.720	0.000	2.055

Table 17, presents the correlation matrix of the independent variables for 1994/1995. Table 18 presents the same information for the 2001/2002 data.

Table 17. Correlation Matrix for Study Variables (1994/1995)

	RATIO SNF TO ELDERLY	% ELDERLY IN POVERTY	AVG HOSP OCC.	AVG LOS	GERIATRIC SVCS	LICENSED NSG STAFF	MEDICARE DISCHARGES	AVG CASE MIX	CON	URBAN	TEACH	MEMBER	TAX	SIZE
RATIO SNF TOELDERLY	1.000													
% ELDERLY IN POVERTY	-0.136	1.000												
AVG HOSPITAL OCCUPANCY	0.007	-0.042	1.000											
AVG LOS	0.005	0.018	0.242	1.000										
GERIATRIC SVCS	0.040	-0.110	0.230	–0.002	1.000									
LICENSED NSG STAFF	0.033	-0.065	0.194	-0.145	0.064	1.000								
MEDICARE DISCHARGES	0.066	-0.009	-0.165	0.123	-0.072	-0.345	1.000							
AVG CASE MIX	0.006	-0.077	0.326	-0.004	0.2389	0.436	-0.405	1.000						
CON	-0.067	-0.061	0.170	0.057	0.038	0.030	0.163	0.012	1.000					
URBAN	-0.032	-0.141	0.275	0.011	0.198	0.315	-0.418	0.572	0.016	1.000				
TEACH	0.018	0.056	0.255	0.071	0.195	0.234	-0.221	0.396	0.057	0.222	1.000			
MEMBER	-0.044	0.007	0.055	-0.051	0.058	0.094	-0.159	0.268	-0.025	0.182	0.052	1.000		
TAX	-0.092	0.130	-0.146	-0.040	-0.077	-0.053	-0.071	0.113	-0.059	0.122	–0.076	0.245	1.000	
SIZE	0.016	-0.003	0.463	0.106	0.326	0.250	-0.352	0.672	0.122	0.495	0.548	0.177	–0.049	1.000

Table18. Correlation Matrix for Study Variables (2001/2002)

	RATIO SNF TO ELDERLY	% ELDERLY IN POVERTY	AVG HOSP OCC.	AVG LOS	GERIATRIC SVCS	LICENSED NSG STAFF	MEDICARE DISCHARGES	AVG CASE MIX	CON	URBAN	TEACH	MEMBER	TAX	SIZE
RATIO SNF TOELDERLY	1.000													
% ELDERLY IN POVERTY	-0.007	1.000												
AVG HOSPITAL OCCUPANCY	-0.103	-0.115	1.000											
AVG LOS	-0.003	0.005	0.307	1.000										
GERIATRIC SVCS	0.009	-0.120	0.244	0.046	1.000									
LICENSED NSG STAFF	-0.012	-0.141	0.233	-0.439	0.063	1.000								
MEDICARE DISCHARGES	0.171	0.062	-0.217	0.121	-0.071	-0.238	1.000							
AVG CASE MIX	-0.010	-0.180	0.406	-0.224	0.231	0.399	-0.341	1.000						
CON	0.002	0.001	0.052	-0.039	0.062	0.040	0.158	0.029	1.000					
URBAN	-0.158	-0.252	0.328	-0.207	0.160	0.258	-0.405	0.554	-0.027	1.000				
TEACH	0.002	0.010	0.258	-0.043	0.189	0.254	-0.232	0.413	0.044	0.227	1.000			
MEMBER	-0.063	-0.099	0.184	-0.145	0.129	0.132	-0.190	0.340	0.003	0.310	0.125	1.000		
TAX	-0.114	0.121	-0.079	-0.102	-0.051	-0.046	-0.050	0.082	-0.034	0.138	-0.063	0.219	1.000	
SIZE	-0.081	-0.070	0.461	-0.056	0.269	0.199	-0.334	0.679	0.077	0.483	0.537	0.268	-0.022	1.000

The correlations remained somewhat consistent for both years. For instance the highest correlation was between case mix and size at .672. This could reflect larger hospitals being able to accommodate more ill patients through more specialized services. Urban and case mix also had a high correlation with .572 and .554 respectively for 1994/1995 and the 2001/2002 data. Case mix and average length of stay was the third highest correlation in both years and seems to indicate that sicker patients result in the use of more licensed nurses. The correlation coefficients however were all well below .95 which indicates that one of the variables can convey all of the information contained in the other. (Afifi &Clark, 1990)

Multivariate Logistic Regression Analyses

Five primary models for both the 1994/1995 and 2001/2002 data were analyzed using multivariate logistic regression. This was performed to examine the simultaneous influences of the three constructs on the likelihood of the integration of skilled nursing services. Tables are included to present the results of multivariate logistic regression for both years of the study for all five models. This analysis shows the likelihood of vertical integration of skilled nursing facilities as a function of transaction uncertainty, specificity, and frequency while controlling for the five hospital characteristics of being in certificate of need state, tax status, location in a rural or urban area, hospital size, and teaching status. Model 1 compared the hierarchy/ hybrid and market groups and is presented in table format for each year. Model 2 compared the hierarchy and market groups

and results are displayed in tables. Model 3 compared the hierarchy and hybrid groups are discussed next. Tables are presented for the results from testing Model 4, which compared the hybrid and market groups. Tables are then presented which contain results from the testing of Model 5 for both years, which compared the hierarchy and hybrid/market group.

Model 1: Hierarchy and Hybrid vs. Market

This model differentiates whether or not a hospital decides to vertically integrate skilled nursing. As seen in Table 19, two of the four variables that measured transaction uncertainty were statistically significantly associated with a higher likelihood of vertical integration. Average hospital occupancy was statistically and positively associated with the event (p=. 000), and the ratio of skilled beds to elderly population had a positive and marginally significant association with a hospital's decision to choose the hierarchical or hybrid arrangement for providing skilled services (p=. 09, OR 10.93, CIE -.68, 175). Hospitals with higher occupancy were about 17 times more likely to employ hierarchy and hybrid arrangements than they were to rely on the spot market. Hospitals in areas with a higher percent of elderly in poverty had no significant association with choosing hierarchical or hybrid arrangements. Average length of stay was negatively, significantly associated with hierarchy and hybrid forms of provision of skilled services. Table 20 presents the data for 2001/2002.

Table 19. Model 1 Likelihood of SNF Integration: Hierarchy/hybrid vs. Market

1994/1995 N=4214	Coef.	P>z	Odds Ratio	[95% Conf.	Interval]
Ratio SNF to Elderly	2.392	0.091	10.93	0.68	175.60
% Elderly in Poverty	-0.011	0.984	0.99	0.34	2.90
Avg Hospital Occupancy	2.859	0.000	17.44	11.20	27.18
Avg LOS	-0.078	0.000	0.92	0.90	0.95
Geriatric Services	0.434	0.000	1.54	1.33	1.79
Licensed Nursing Staff	-1.064	0.000	0.35	0.29	0.42
Medicare Discharges	0.704	0.011	2.02	1.17	3.48
Avg Case Mix	0.866	0.000	2.38	1.49	3.78
CON	-0.687	0.000	0.50	0.43	0.59
URBAN	-0.185	0.039	0.83	0.70	0.99
TEACH	-1.079	0.000	0.34	0.24	0.49
MEMBER	0.224	0.002	1.25	1.09	1.44
TAXSTATUS	-0.016	0.890	0.98	0.79	1.23
SIZE	0.002	0.000	1.00	1.00	1.00
_cons	-1.846	0.000			
Goodness of Fit Statistic: Chi Square (14df)= 589.64					
Correct Classification Rate = 67.92%					

Table 20. Model 1 Likelihood of SNF Integration: Hierarchy/Hybrid vs. Market

2001/2002	Coef.	P>z	Odds Ratio	[95% Conf.	Interval]
Ratio SNF to Elderly	1.653	0.232	5.22	0.35	78.49
% Elderly in Poverty	-3.255	0.000	0.04	0.01	0.17
Avg Hospital Occupancy	2.537	0.000	12.65	8.33	19.19
Avg LOS	-0.035	0.000	0.97	0.95	0.98
Geriatric Services	0.283	0.000	1.33	1.15	1.53
Licensed Nursing Staff	-0.847	0.000	0.43	0.37	0.50
Medicare Discharges	0.445	0.134	1.56	0.87	2.79
Avg Case Mix	0.413	0.052	1.51	1.00	2.29
CON	-0.299	0.000	0.74	0.64	0.85
URBAN	-0.405	0.000	0.67	0.56	0.80
TEACH	-0.729	0.000	0.48	0.34	0.68
MEMBER	0.243	0.001	1.28	1.10	1.48
TAXSTATUS	-0.628	0.000	0.53	0.43	0.66
SIZE	0.002	0.000	1.00	1.00	1.00
_cons	-0.985	0.002			
Goodness of Fit Statistic Chi Square (14df) =541.29					
Correct Classification Rate = 66.56%					

Three of the four variables were significantly associated with the decision to vertically integrate skilled nursing as a service as opposed to only two in the prior year's data. The percent of elderly in poverty became significant in this data (p=0.00, OR 0.03, CIE .008, .17) and became more likely to be an influence on whether a hospital integrates this service.

The two variables measuring transaction specificity were significantly associated with the hospital's vertical integration decision. Providing geriatric services was positively and significantly a factor (p=000, OR 1.54, CIE 1.33, 1.78) indicating a hospital is 1.5 times more likely to integrate skilled, if they already were providing geriatric services. The ratio of licensed staff to licensed beds was negatively associated with this integration (p=0.000, OR 0.46, CIE .28,41) The less availability of licensed staff the less likely a hospital is to bring another service in house. This relationship and significance remained constant in the 2001/2002 data, which followed the BBA.

The variables for transaction frequency in Table 19 were both positively and significantly associated with the hierarchical arrangement for skilled nursing care. The proportion of Medicare discharges was influential as the number increases (p=0.01, OR 2.02, CIE 1.17, 3.48). However in the year's data following the BBA the variable is above the significance cutoff. Hospital case mix index was positively and significantly associated with vertical integration in both study years.

Hospitals, which were members of systems, were more likely to integrate skilled services than those who were not members. This was a consistent result for both years of data.

Model 2: Hierarchy vs. Market

Presented in Table 21 is the likelihood of integrating a SNF for the hierarchy and the market groups for the 1994/1995 data. Table 22 presents the same data for the study years of 2001/2002. The variables representing transaction uncertainty changed slightly in this model with the ratio of SNF to elderly becoming slightly more significant (p=. 04, OR 20.19, CIE 1.12, 364.99) in the 1994/1995 and even more so in the 2001/2002 results which show that the ratio of SNF to elderly was significant at the .05 level with an OR of 24.32 (CIE 1.45, 407.95). Average hospital occupancy remained significantly positively associated with a hospitals' decision to integrate skilled care. Average length of stay remained negatively and significantly associated and did not change much from one analysis to the next.

Table 21. Model 2 Likelihood of SNF Integration: Hierarchy vs. Market Groups

1994/1995	Coef.	P>z	Odds Ratio	[95% Conf.	Interval]
Ratio SNF to Elderly	3.005	0.042	20.19	1.12	364.99
% Elderly in Poverty	0.166	0.775	1.18	0.38	3.68
Avg Hospital Occupancy	3.054	0.000	21.21	13.29	33.83
Avg LOS	-0.082	0.000	0.92	0.90	0.95
Geriatric Services	0.487	0.000	1.63	1.39	1.90
Licensed Nursing Staff	-1.313	0.000	0.27	0.22	0.33
Medicare Discharges	0.963	0.001	2.62	1.46	4.69
Avg Case Mix	1.111	0.000	3.04	1.84	5.02
CON	-0.749	0.000	0.47	0.40	0.56
URBAN	-0.395	0.000	0.67	0.56	0.81
TEACH	-1.304	0.000	0.27	0.18	0.41
MEMBER	0.023	0.767	1.02	0.88	1.19
TAXSTATUS	0.145	0.222	1.16	0.92	1.46
SIZE	0.002	0.000	1.00	1.00	1.00
_cons	-2.140	0.000			
Goodness of Fit Statistic: Chi-Square (14df) = 640.31					
Correct Classification Rate = 71.09%					

Table 22. Model 2 Likelihood of SNF Integration: Hierarchy vs. Market Groups

2001/2002	Coef.	P>z	Odds Ratio	[95% Conf.	Interval]
Ratio SNF to Elderly	3.191	0.027	24.32	1.45	407.95
% Elderly in Poverty	-3.258	0.000	0.04	0.01	0.19
Avg Hospital Occupancy	2.517	0.000	12.39	7.99	19.20
Avg LOS	-0.035	0.000	0.97	0.95	0.98
Geriatric Services	0.279	0.000	1.32	1.14	1.54
Licensed Nursing Staff	-1.059	0.000	0.35	0.29	0.41
Medicare Discharges	0.823	0.010	2.28	1.22	4.27
Avg Case Mix	0.536	0.019	1.71	1.09	2.68
CON	-0.392	0.000	0.68	0.58	0.79
URBAN	-0.580	0.000	0.56	0.46	0.68
TEACH	-1.150	0.000	0.32	0.21	0.48
MEMBER	-0.008	0.920	0.99	0.85	1.16
TAXSTATUS	-0.523	0.000	0.59	0.47	0.75
SIZE	0.002	0.000	1.00	1.00	1.00
_cons	-1.149	0.001			
Goodness of Fit Statistic Chi-Square (14df) = 584.93					
Correct Classification Rate = 70.28%					

The variables for transaction specificity were both significantly supportive of the construct but the odds ratio for geriatric services dropped from 1.63 to 1.32 from 1994/1995 to 2001/2002 (CIE 1.39, 1.90 and 1.14, 1.54 respectively) The ratio of licensed nursing staff was once again negatively associated but changed little from each set of data to the next in significance or the odds ratio. Transaction frequency variables were both significantly and positively associated with choosing hierarchical arrangements vs. the spot market in both tables of data. However, the odds ratio for both Medicare discharges and the average case mix did decline slightly. Medicare discharges went from an OR of 2.62 (CIE, 1.22, 4.27) in the 1994/1995 study to 2.28 (CIE, 1.22, 4.27) in the 2001/2002 year. The odds ratio for the average case mix dropped from 3.04 to 1.71 in the subsequent years, which could signify that as length of stay increased hospitals

in the post BBA were less likely to choose the higher form of integration of skilled services.

Among the control variables, hospitals, which were members of systems and for profit, were more likely in 1994/1995 to employ integration instead of relying on the spot market for skilled services. However, following the BBA in the 2001/2002 analysis this changes and drops below an odds ratio of 1 for each of the control variables. All the variables are negatively associated with integration except size in the post BBA era.

Model 3: Hierarchy vs. Hybrid

This model focused on the comparison of hierarchy and hybrid methods of providing skilled nursing services to patients. Table 23 presents how the three constructs of Williamsons' transaction cost economic theory influenced the form hospitals chose to provide this service. Only one of the four variables, average hospital occupancy, measuring transaction uncertainty was positively and significantly influential in a hospitals' decision to select hierarchy over hybrid form of arrangement for skilled nursing. Hospital with higher occupancies were 3.52 more likely to vertically integrate skilled nursing with their organizations (p=.000, OR, 3.52,CIE 1.07,11.54). Only one of the four is positively and significantly associated with this construct in the post BBA (2001/2002) data, but it is the ratio of skilled beds to elderly (p-.000, OR 1.77E+. 06, CIE 747.17, 4.20E+. 09).

Table 23. Model 3 Likelihood of SNF Integration: Hierarchy vs. Hybrid

1994/1995	Coef.	P>z	Odds Ratio	[95% Conf.	Interval]
Ratio SNF to Elderly	4.858	0.239	128.82	0.04	4.22E+05
% Elderly in Poverty	0.726	0.603	2.07	0.13	31.90
Avg Hospital Occupancy	1.257	0.038	3.52	1.07	11.54
Avg LOS	-0.045	0.091	0.96	0.91	1.01
Geriatric Services	0.383	0.021	1.47	1.06	2.03
Licensed Nursing Staff	-1.521	0.000	0.22	0.14	0.33
Medicare Discharges	1.842	0.005	6.31	1.73	23.07
Avg Case Mix	0.983	0.047	2.67	1.01	7.06
CON	-0.800	0.000	0.45	0.31	0.66
URBAN	-1.564	0.000	0.21	0.13	0.33
TEACH	-0.443	0.154	0.64	0.35	1.18
MEMBER	-1.156	0.000	0.31	0.22	0.45
TAXSTATUS	0.823	0.003	2.28	1.32	3.93
SIZE	0.000	0.436	1.00	1.00	1.00
_cons	2.682	0.000			
Goodness of Fit Statistic: Chi-Square(14df) +287.17					
Correct Classification Rate=86.49%					

Whether or not a hospital provides geriatric services is positively and significantly associated with hospitals choice of provided skilled care through vertical integration in the 1994/1995 analysis (p=. 02, OR 1.47, CIE 1.06, 2.03). However this changes in the 2001/2002 when the same variable becomes less significant and is negative in its sign. (p=.737, OR, 0.95 CIE, .69, 1.30). The ratio of licensed nursing staff to licensed beds remains negatively and significantly related to influencing which decision is made by hospital in both data sets. Both variables are proposed as measures of transaction specificity.

The 1994/1995 data in Table 24 presents the variables for measurement of transaction frequency. Both the Medicare discharges and the hospitals case-mix are positively and significantly influential in this model. Medicare discharges had a p=0.00, OR of 6.31 (CIE, 1.73, 23.07). Average case mix is (p=. 05, OR, 2.67,

Table 24. Model 3 Likelihood of SNF Integration: Hierarchy vs. Hybrid

2001/2002	Coef.	P>z	Odds Ratio	[95% Conf.	Interval]
Ratio SNF to Elderly	14.388	0.000	1.77E+06	747.17	4.20E+09
% Elderly in Poverty	-0.268	0.883	0.76	0.02	27.38
Avg Hospital Occupancy	0.150	0.770	1.16	0.43	3.17
Avg LOS	0.022	0.595	1.02	0.94	1.11
Geriatric Services	-0.054	0.737	0.95	0.69	1.30
Licensed Nursing Staff	-1.111	0.000	0.33	0.24	0.46
Medicare Discharges	2.601	0.000	13.48	3.48	52.26
Avg Case Mix	0.061	0.893	1.06	0.44	2.60
CON	-0.924	0.000	0.40	0.28	0.56
URBAN	-1.117	0.000	0.33	0.22	0.49
TEACH	-1.144	0.000	0.32	0.17	0.59
MEMBER	-1.911	0.000	0.15	0.10	0.23
TAXSTATUS	0.341	0.173	1.41	0.86	2.30
SIZE	0.003	0.000	1.00	1.00	1.00
_cons	3.127	0.000			
Goodness of Fit Statistic: Chi-Square = 390.07					
Correct Classification Rate = 85.34%					

CIE 1.01, 7.06). The relationship of the Medicare discharges remains positive and significant in the 2001/2002 analyses, but the average case mix significance diminishes to .893.

Of the control variables only teaching status and size do not meet the significance cutoff for 1994/1995. All control variables in this model for the 2001/2002 analyses except for tax status are significant but negatively related to the decision to integrate versus select a contractual or hybrid arrangement to provided skilled care.

Model 4: Hybrid vs. Market

This model explored the likelihood of vertical integration in the hybrid and market groups for both 1994/1995 and 2001/2002. The 1994/1995 data is reveals that none of the variables for any of the constructs had any association

with SNF integration. This is presented in Table 25. The control variable of whether a hospital is in an urban area was positively and significantly associated with the decision to integrate skilled (p=000, OR 4.00 and CIE 2.56, 6.25) Hospitals in urban areas were 4 times more likely to choose vertical integration. System membership was also significantly and positively related (p=0.000, OR 3.73, CIE 2.66, 5.23).

Table 25. Model 4 Likelihood of SNF Integration: Hybrid vs. Market

1994/1995	Coef.	P>z	Odds Ratio	[95% Conf.	Interval]
Ratio SNF to Elderly	-2.345	0.545	0.10	0.00	189.74
% Elderly in Poverty	0.317	0.792	1.37	0.13	14.49
Avg Hospital Occupancy	0.253	0.665	1.29	0.41	4.05
Avg LOS	-0.055	0.260	0.95	0.86	1.04
Geriatric Services	0.141	0.370	1.15	0.85	1.57
Licensed Nursing Staff	0.291	0.139	1.34	0.91	1.96
Medicare Discharges	-0.147	0.803	0.86	0.27	2.74
Avg Case Mix	0.128	0.754	1.14	0.51	2.54
CON	-0.216	0.230	0.81	0.57	1.15
URBAN	1.386	0.000	4.00	2.56	6.25
TEACH	-0.442	0.124	0.64	0.37	1.13
MEMBER	1.316	0.000	3.73	2.66	5.23
TAXSTATUS	-0.783	0.002	0.46	0.28	0.76
SIZE	0.001	0.008	1.00	1.00	1.00
_cons	-4.452	0.000			
Goodness of Fit Statistic Chi-Square (14df) = 251.8					
Correct Classification Rate=91.19%					

Table 26 presents the same analysis of the variables for the 2001/2002 data and reveals some variables associated with integration. For uncertainty, the ratio of SNF beds to elderly population was negatively and significantly associated with vertical integration (p=0.02, OR 0.00 CIE 0.00, 0.25).

Table 26. Model 4 Likelihood of SNF Integration: Hybrid vs. Market

2001/2002	Coef.	P>z	Odds Ratio	[95% Conf. Interval]	
Ratio SNF to Elderly	-8.585	0.019	0.00	0.00	0.25
% Elderly in Poverty	-1.604	0.322	0.20	0.01	4.82
Avg Hospital Occupancy	1.748	0.001	5.75	2.14	15.46
Avg LOS	-0.100	0.070	0.91	0.81	1.01
Geriatric Services	0.347	0.014	1.42	1.07	1.87
Licensed Nursing Staff	0.046	0.760	1.05	0.78	1.41
Medicare Discharges	-0.843	0.138	0.43	0.14	1.31
Avg Case Mix	0.398	0.295	1.49	0.71	3.14
CON	0.196	0.202	1.22	0.90	1.64
URBAN	0.547	0.005	1.73	1.17	2.54
TEACH	0.104	0.694	1.11	0.66	1.87
MEMBER	1.867	0.000	6.47	4.27	9.79
TAXSTATUS	-0.971	0.000	0.38	0.24	0.59
SIZE	0.000	0.497	1.00	1.00	1.00
CONS	-4.162	0.000			
Goodness of Fit Statistic Chi-Square (14df) =319.19					
Correct Classification Rate = 89.52%					

Average hospital occupancy was positively and significantly associated with the choice to integrate skilled (p=0.00, OR 5.75 CIE 2.14, 15.46). Only the variable, which represented the hospitals, which provide geriatrics and is a measure under transaction specificity, showed a positive and significant association with vertical integration (p=0.01, OR, 1.42, CIE, 1.07,1.87). Neither of the measures of transaction frequency had any association with SNF integration.

Control variables urban, system membership and tax status were influential in the decision to integrate into skilled services. Both models had relatively low Chi Squares, and a low p (p=0.00), but in total had high classification rates indicating they were correctly classified.

Model 5 Hierarchy vs. Hybrid and Market.

Model 5 tested the probability of using vertical integration for the hierarchy group and for the hybrid/market group using data from 1994/1995 and data from 2001/2002. As displayed in Table 27, three of the four measures of transaction uncertainty were significantly associated with the decision to vertically integrate skilled.

Table 27. Model 5 Likelihood of SNF Integration: Hierarchy vs. Hybrid/Market

1994/1995	Coef.	P>z	Odds Ratio	[95% Conf.	Interval]
Ratio SNF to Elderly	3.069	0.036	21.52	1.23	376.67
% Elderly in Poverty	0.143	0.801	1.15	0.38	3.52
Avg Hospital Occupancy	3.024	0.000	20.56	13.02	32.49
Avg LOS	-0.082	0.000	0.92	0.90	0.95
Geriatric Services	0.488	0.000	1.63	1.40	1.90
Licensed Nursing Staff	-1.366	0.000	0.26	0.21	0.31
Medicare Discharges	0.942	0.001	2.57	1.45	4.53
Avg Case Mix	1.156	0.000	3.18	1.96	5.15
CON	-0.725	0.000	0.48	0.41	0.57
URBAN	-0.482	0.000	0.62	0.51	0.74
TEACH	-1.229	0.000	0.29	0.20	0.43
MEMBER	-0.075	0.322	0.93	0.80	1.08
TAXSTATUS	0.216	0.065	1.24	0.99	1.56
SIZE	0.002	0.000	1.00	1.00	1.00
_cons	-2.102	0.000			
Goodness of Fit Statistic Chi Square = 645.84					
Correct Classification Rate = 71.76%					

Table 28 shows the ratio of skilled beds to elderly population was positively and significantly associates, as was average hospital occupancy. Hospitals with higher occupancy were about 20 times more likely to integrate skilled nursing. The odds ratio for this variable declined to about 10 times more likely post BBA.

Table 28. Model 5 Likelihood of SNF Integration: Hierarchy vs. Hybrid/Market

2001/2002	Coef.	P>z	Odds Ratio	[95% Conf. Interval]	
Ratio SNF to Elderly	3.561	0.012	35.19	2.17	571.59
% Elderly in Poverty	-2.952	0.000	0.05	0.01	0.25
Avg Hospital Occupancy	2.391	0.000	10.93	7.10	16.81
Avg LOS	-0.034	0.000	0.97	0.95	0.98
Geriatric Services	0.240	0.001	1.27	1.10	1.47
Licensed Nursing Staff	-1.093	0.000	0.34	0.28	0.39
Medicare Discharges	0.952	0.002	2.59	1.41	4.78
Avg Case Mix	0.506	0.024	1.66	1.07	2.57
CON	-0.428	0.000	0.65	0.56	0.76
URBAN	-0.626	0.000	0.53	0.44	0.64
TEACH	-1.238	0.000	0.29	0.19	0.43
MEMBER	-0.153	0.049	0.86	0.74	1.00
TAXSTATUS	-0.437	0.000	0.65	0.51	0.81
SIZE	0.002	0.000	1.00	1.00	1.00
_cons	-1.119	0.001			
Goodness of Fit Statistic: Chi Square (14df) = 601.4					
Correct Classification Rate = 71.86%					

Comparing Pre- and Post-BBA Effects Results of Testing Hypotheses 1a to 8a

Significance testing was conducted on all five models to determine if there was a significant difference before and after the BBA in hospitals' decisions to vertically integrate skilled nursing services. The eight predictor variables and six control variables were combined giving the model 14 degrees of freedom. Data from each year of interest was stacked and coded accordingly, with 0 =1994/1995, and 1= 2001/2002. Variable values were then multiplied by the appropriate dichotomous assignment. Eight new predictor variables were created for each of the data by multiplying the predictor variables by the 0 for 1994/1995

data or 1 value for the 2001/2002. A ninth variable, 0 or 1 was then added to the logistic model creating 15 degrees of freedom.

Model 1: Hierarchy and Hybrid vs. Market

Results for this comparison are in Table 29. The chi–square is 1060.85 for 8428 observations. In this model, all of the predictor variables are significant at the p<. 05 levels.

Table 29. Model 1 Significance Testing 15 Degrees of Freedom

Variables	coef	P< z	Conf interval 95%	
Ratio SNF to Elderly	2.25	0.02	.339	4.17
% Elderly in Poverty	-1.01	0.02	-1.88	-.150
Avg Hospital Occupancy	2.58	0.00	2.28	2.88
Avg LOS	-0.05	0.00	-066	-.035
Geriatric Services	.361	0.00	.260	.463
Licensed Nursing Staff	-.921	0.00	-1.03	-.804
Medicare Discharges	.502	0.01	.111	.893
Avg Case Mix	.652	0.00	.345	.959
CON	-.480	0.00	-.584	-.375
URBAN	-.286	0.00	-.408	-.163
TEACH	-.908	0.00	-1.15	-.659
MEMBER	.239	0.00	.139	.340
TAXSTATUS	-.344	0.00	-.498	-.190
SIZE	.002	0.00	.001	.002
Year	.058	0.25	-.041	.159
Cons	-1.51	0.00	-1.96	-1.06
Chi Square (15df) 1060.85				

Eight new product variables were then added to this model. The model now contains 23 degrees of freedom. Table 30 contains the results.

Table 30. Model 1 Significance Testing 23 Degrees of Freedom

Variables	Coef.	P>z	[95% Conf. Interval]	
Ratio SNF to Elderly	2.282	0.103	-0.462	5.027
% Elderly in Poverty	0.235	0.644	-0.764	1.235
Avg Hospital Occupancy	2.629	0.000	2.204	3.054
Avg LOS	-0.080	0.000	-0.107	-0.053
Geriatric Services	0.414	0.000	0.269	0.560
Licensed Nursing Staff	-1.104	0.000	-1.291	-0.918
Medicare Discharges	0.459	0.086	-0.066	0.983
Avg Case Mix	1.031	0.000	0.619	1.443
CON	-0.464	0.000	-0.568	-0.359
URBAN	-0.298	0.000	-0.422	-0.175
TEACH	-0.900	0.000	-1.150	-0.651
MEMBER	0.235	0.000	0.134	0.336
TAXSTATUS	-0.333	0.000	-0.488	-0.179
SIZE	0.002	0.000	0.001	0.002
year	0.368	0.347	-0.399	1.134
Ratio SNF to Elderly_yr	9.243	0.001	4.025	14.460
% Elderly in Poverty_yr	-73.203	0.000	-103.130	-43.276
Avg Hospital Occupancy	-0.009	0.977	-0.585	0.568
Avg LOS_yr	0.046	0.006	0.013	0.078
Geriatric Services_yr	-0.108	0.289	-0.309	0.092
Licensed Nursing Staff_YR	0.286	0.018	0.049	0.522
Medicare Discharges_YR	0.152	0.688	-0.592	0.897
Avg Case Mix_YR	-0.688	0.005	-1.168	-0.207
Constant	-1.869	0.000	-2.493	-1.244
Chi Square (23df) = 1102.97				

The chi-square for this model was 1102.97. The difference, in the two-model chi–squares is 42.12. A Chi–square with eight df was then identified on the chi-square difference table at p<. 05 level. The difference between the two models was greater than the table value of 15.51. This indicates that the differences between the two years of data were significant. Even at the 0.001 levels it remained strongly significant.

Five of the product variables were significant at a p-value >.05. The following variables were significant: the number of skilled beds to elderly population, the number elderly in poverty, average length of stay, the ratio of licensed nurses to licensed beds, and the average case mix. A discussion of the significant variables will follow the model analyses. This finding supports rejecting the null hypotheses for 1a, 2a, 4a, 6a and 7a: that the BBA of 1997 will not alter the relative influence of uncertainty, frequency, and asset specificity on the decision of hospitals to implement a higher degree of vertical integration of skilled nursing services.

Model 2: Hierarchy vs. Market

The second and subsequent models were subjected to the same analysis. Results for Model 2 are found in Table 31 for the 1994/1995 data. The chi–square difference, was greater than the critical chi-square value at p–value >.05, indicating model significance. The same five variables were significant in this model as in model 1.

Table 31. Model 2 Significance Testing 15 Degrees of Freedom

Variables	Coef.	P>z	[95% Conf. Interval]	
Ratio SNF to Elderly	3.325	0.001	1.328	5.322
% Elderly in Poverty	-0.864	0.064	-1.779	0.052
Avg Hospital Occupancy	2.660	0.000	2.346	2.975
Avg LOS	-0.052	0.000	-0.067	-0.037
Geriatric Services	0.384	0.000	0.276	0.492
Licensed Nursing Staff	-1.154	0.000	-1.283	-1.025
Medicare Discharges	0.811	0.000	0.391	1.231
Avg Case Mix	0.829	0.000	0.498	1.160
CON	-0.561	0.000	-0.671	-0.451
URBAN	-0.480	0.000	-0.612	-0.349
TEACH	-1.238	0.000	-1.528	-0.948
MEMBER	0.015	0.780	-0.092	0.122
TAXSTATUS	-0.205	0.014	-0.369	-0.042
SIZE	0.002	0.000	0.002	0.003
year	0.064	0.241	-0.043	0.171
cons	-1.733	0.000	-2.222	-1.245
Chi Square (15df) =1153.94				

Table 32 contains the 23 degrees of freedom and indicates significance.

Model 3: Hierarchy vs. Hybrid

Significance testing for this model indicated that the difference before and smaller than the critical value for the chi–square indicating the null hypotheses cannot be rejected in this case. Only one variable, the ratio of skilled beds to elderly population was significant. Results are displayed in Tables 33 and 34 .

Table 32. Model 2 Significance Testing 23 Degrees of Freedom

Variables	Coef.	P>z	[95% Conf. Interval]	
Ratio SNF to Elderly	2.873	0.049	0.010	5.736
% Elderly in Poverty	0.561	0.299	-0.497	1.619
Avg Hospital Occupancy	2.784	0.000	2.338	3.231
Avg LOS	-0.084	0.000	-0.112	-0.057
Geriatric Services	0.461	0.000	0.307	0.616
Licensed Nursing Staff	-1.348	0.000	-1.553	-1.143
Medicare Discharges	0.777	0.007	0.213	1.341
Avg Case Mix	1.234	0.000	0.791	1.678
CON	-0.544	0.000	-0.655	-0.434
URBAN	-0.495	0.000	-0.627	-0.363
TEACH	-1.236	0.000	-1.528	-0.945
MEMBER	0.009	0.863	-0.098	0.117
TAXSTATUS	-0.190	0.023	-0.354	-0.026
SIZE	0.002	0.000	0.002	0.003
Year	0.437	0.302	-0.393	1.267
Ratio SNF to Elderly_yr	11.577	0.000	6.112	17.042
% Elderly in Poverty_yr	-84.135	0.000	-115.680	-52.590
Avg Hospital Occupancy	-0.146	0.636	-0.752	0.459
Avg LOS_yr	0.050	0.003	0.017	0.083
Geriatric Services_yr	-0.158	0.147	-0.371	0.055
Licensed Nursing Staff_YR	0.301	0.024	0.039	0.563
Medicare Discharges_YR	0.160	0.696	-0.645	0.966
Avg Case Mix_YR	-0.730	0.006	-1.248	-0.213
cons	-2.155	0.000	-2.830	-1.481
Chi Square (23 df) = 1203.58				

Table 33. Model 3 Significance Testing 15 Degrees of Freedom

Variables	Coef.	P>z	[95% Conf. Interval]	
Ratio SNF to Elderly	9.640	0.001	4.157	15.122
% Elderly in Poverty	0.519	0.634	-1.615	2.652
Avg Hospital Occupancy	0.576	0.131	-0.172	1.324
Avg LOS	-0.015	0.494	-0.060	0.029
Geriatric Services	0.140	0.219	-0.083	0.363
Licensed Nursing Staff	-1.278	0.000	-1.535	-1.021
Medicare Discharges	2.114	0.000	1.188	3.039
Avg Case Mix	0.566	0.085	-0.079	1.211
CON	-0.843	0.000	-1.096	-0.590
URBAN	-1.329	0.000	-1.630	-1.029
TEACH	-0.778	0.000	-1.202	-0.354
MEMBER	-1.498	0.000	-1.776	-1.220
TAXSTATUS	0.569	0.002	0.208	0.930
SIZE	0.002	0.000	0.001	0.003
yr	0.040	0.735	-0.194	0.275
_cons	2.861	0.000	1.855	3.866
Chi Square = 646.00				

Table 34. Model 3 Significance Testing 23 Degrees of Freedom

Variables	Coef.	P>z	[95% Conf. Interval]	
Ratio SNF to Elderly	4.31	0.29	-3.66	12.28
% Elderly in Poverty	1.38	0.30	-1.23	3.98
Avg Hospital Occupancy	0.72	0.21	-0.41	1.85
Avg LOS	-0.05	0.06	-0.10	0.00
Geriatric Services	0.31	0.06	-0.01	0.64
Licensed Nursing Staff	-1.51	0.00	-1.93	-1.09
Medicare Discharges	2.02	0.00	0.78	3.26
Avg Case Mix	0.52	0.25	-0.36	1.41
CON	-0.86	0.00	-1.12	-0.60
URBAN	-1.34	0.00	-1.64	-1.03
TEACH	-0.78	0.00	-1.21	-0.36
MEMBER	-1.50	0.00	-1.78	-1.22
TAXSTATUS	0.58	0.00	0.22	0.95
SIZE	0.00	0.00	0.00	0.00
yr	-1.13	0.19	-2.82	0.56
Ratio SNF to Elderly_yr	17.51	0.01	3.54	31.47
% Elderly in Poverty_yr	-60.36	0.16	-144.41	23.69
Avg Hospital Occupancy	-0.24	0.75	-1.71	1.23
Avg LOS_yr	0.08	0.11	-0.02	0.18
Geriatric Services_yr	-0.35	0.12	-0.79	0.09
Licensed Nursing Staff_YR	0.36	0.18	-0.17	0.88
Medicare Discharges_YR	0.15	0.86	-1.55	1.85
Avg Case Mix_YR	0.08	0.88	-0.94	1.11
_cons	3.35	0.00	1.92	4.77
Chi Square = 658.85				

Model 4: Hybrid vs. Market

Model four significance testing revealed that the chi square differences were This finding suggests that the null hypothesis cannot be rejected for this model Results are displayed in Tables 35 and 36.

Table 35. Model 4 Significance Testing 15 Degrees of Freedom

Variables	Coef.	P>z	[95% Conf. Interval]	
Ratio SNF to Elderly	-4.895	0.061	-10.017	0.228
% Elderly in Poverty	-0.411	0.667	-2.281	1.459
Avg Hospital Occupancy	1.044	0.006	0.302	1.786
Avg LOS	-0.078	0.035	-0.149	-0.006
Geriatric Services	0.271	0.009	0.067	0.475
Licensed Nursing Staff	0.177	0.136	-0.056	0.410
Medicare Discharges	-0.606	0.135	-1.401	0.189
Avg Case Mix	0.262	0.342	-0.279	0.802
CON	0.034	0.770	-0.193	0.260
URBAN	0.943	0.000	0.654	1.231
TEACH	-0.183	0.343	-0.562	0.195
MEMBER	1.548	0.000	1.290	1.806
TAXSTATUS	-0.882	0.000	-1.211	-0.553
SIZE	0.001	0.165	0.000	0.001
yr	-0.008	0.940	-0.221	0.205
_cons	-4.297	0.000	-5.201	-3.393
Chi Square = 548.58				

Table 36. Model 4 Significance Testing 23 Degrees of Freedom

Variables	Coef.	P>z	[95% Conf. Interval]	
Ratio SNF to Elderly	-2.132	0.571	-9.500	5.236
% Elderly in Poverty	-0.231	0.838	-2.438	1.976
Avg Hospital Occupancy	0.461	0.410	-0.634	1.555
Avg LOS	-0.040	0.368	-0.127	0.047
Geriatric Services	0.183	0.237	-0.120	0.487
Licensed Nursing Staff	0.239	0.211	-0.136	0.613
Medicare Discharges	-0.812	0.146	-1.907	0.283
Avg Case Mix	0.527	0.158	-0.205	1.258
CON	0.043	0.713	-0.185	0.270
URBAN	0.936	0.000	0.647	1.226
TEACH	-0.165	0.394	-0.545	0.215
MEMBER	1.549	0.000	1.290	1.807
TAXSTATUS	-0.890	0.000	-1.220	-0.561
SIZE	0.001	0.168	0.000	0.001
yr	0.571	0.451	-0.914	2.056
Ratio SNF to Elderly_yr	-4.389	0.507	-17.358	8.580
% Elderly in Poverty_yr	-8.401	0.819	-80.187	63.385
Avg Hospital Occupancy	1.092	0.139	-0.355	2.539
Avg LOS_yr	-0.076	0.294	-0.217	0.066
Geriatric Services_yr	0.163	0.429	-0.241	0.568
Licensed Nursing Staff_YR	-0.123	0.609	-0.593	0.347
Medicare Discharges_YR	0.456	0.540	-1.003	1.916
Avg Case Mix_YR	-0.504	0.271	-1.402	0.394
_cons	-4.632	0.000	-5.862	-3.401
Chi square =554.22				

Model 5: Hierarchy vs. Hybrid and Market

Results from testing this model indicate that the chi–square differences were significant and that the null hypothesis can be rejected. Five of the eight product variables were significant and were the same ones as were significant in models 1 and 2. Results are displayed in Tables 37 and 38.

Table 37. Model 5 Significance Testing 15 Degrees of Freedom

Variables	Coef.	P>z	[95% Conf. Interval]	
Ratio SNF to Elderly	3.532	0.000	1.558	5.507
% Elderly in Poverty	-0.803	0.079	-1.700	0.093
Avg Hospital Occupancy	2.586	0.000	2.277	2.895
Avg LOS	-0.051	0.000	-0.066	-0.036
Geriatric Services	0.358	0.000	0.253	0.464
Licensed Nursing Staff	-1.198	0.000	-1.325	-1.071
Medicare Discharges	0.864	0.000	0.454	1.274
Avg Case Mix	0.832	0.000	0.512	1.153
CON	-0.566	0.000	-0.675	-0.458
URBAN	-0.549	0.000	-0.678	-0.419
TEACH	-1.240	0.000	-1.520	-0.960
MEMBER	-0.104	0.054	-0.209	0.002
TAXSTATUS	-0.129	0.117	-0.290	0.032
SIZE	0.002	0.000	0.001	0.002
yr	0.055	0.301	-0.049	0.160
_cons	-1.678	0	-2.152	-1.204
Chi Square 1175.11				

Table 38. Model 5 Significance Testing 23 Degrees of Freedom

Variables	Coef.	P>z	[95% Conf. Interval]	
Ratio SNF to Elderly	2.903	0.045	0.069	5.736
% Elderly in Poverty	0.583	0.271	-0.455	1.621
Avg Hospital Occupancy	2.739	0.000	2.301	3.177
Avg LOS	-0.085	0.000	-0.113	-0.057
Geriatric Services	0.457	0.000	0.306	0.608
Licensed Nursing Staff	-1.396	0.000	-1.598	-1.193
Medicare Discharges	0.798	0.005	0.247	1.350
Avg Case Mix	1.208	0.000	0.778	1.638
CON	-0.552	0.000	-0.661	-0.444
URBAN	-0.563	0.000	-0.693	-0.433
TEACH	-1.234	0.000	-1.515	-0.954
MEMBER	-0.110	0.042	-0.216	-0.004
TAXSTATUS	-0.112	0.174	-0.274	0.050
SIZE	0.002	0.000	0.001	0.002
yr	0.341	0.407	-0.465	1.147
Ratio SNF to Elderly_yr	11.562	0.000	6.173	16.951
% Elderly in Poverty_yr	-81.552	0.000	-112.480	-50.624
Avg Hospital Occupancy	-0.199	0.511	-0.794	0.395
Avg LOS_yr	0.052	0.002	0.019	0.085
Geriatric Services_yr	-0.197	0.065	-0.405	0.012
Licensed Nursing Staff_YR	0.307	0.020	0.049	0.565
Medicare Discharges_YR	0.227	0.571	-0.557	1.011
Avg Case Mix_YR	-0.670	0.009	-1.172	-0.167
_cons	-2.048	0.000	-2.703	-1.393
Chi Square =1226.63				

Summary Comparison of Pre- and Post-BBA Influences

Only three of the five models, 1, 2 and 5 demonstrated an overall significance at the variable level the same five variables were significant in those three models. The ratio of skilled beds to elderly population (H1a), as well as the percent of elderly in poverty (H2a) and the average length of stay (H4a) are measures of uncertainty and demonstrate a significant difference between the H6a, which was a measure of asset specificity, also was significant. H7a, the number of Medicare discharges, a measure of uncertainty, was also significant in models 1, 2, and 5.

Multivariate Logistic Regression Analysis

Model fit was assessed at the level of the individual variable and then with summary statistics. Table 39 shows a comparison of the odds ratio and summary statistics for the five models for 1994/1995 and 2001/2002.

number of Medicare discharges, a measure of uncertainty, was also significant in models 1, 2, and 5.

Summary of Findings

The results of the data analysis are summarized and presented in this section. Multivariate analysis of 1994/1995 and 2001/2002 data will be presented and discussed. Additionally, there will be a summary of the significance testing that was done to evaluate significance of difference in results before and after the BBA.

At the variable level, the expected sign, beta coefficient, odds ratio, and statistical significance level were evaluated. The summary statistics included

Table 39. Comparison of Odds Ratios and Summary Statistics of Primary Models (only ratios with statistical significance are shown)

Constructs/ Variables	*Model 1*		*Model 2*		*Model 3*		*Model 4*		*Model 5*	
	A	*B*	*A*	*B*	*A*	*B*	*A*	*B*	*A*	*B*
Transaction Uncertainty										
H1 SNF/elderly			20.19	24.32		1.77E			21.52	35.19
H2 poverty		0.04		0.04						0.05
H3 Occupancy	17.44	12.65	21.21	12.39	3.52			5.75	20.56	10.93
H4 ALOS	0.92	0.97	0.92	0.97					0.92	0.97
Transaction Specificity										
H5 Geriatric	1.54	1.33	1.63	1.32	1.47			1.07	1.63	1.27
H6 Lic staff	0.35	0.43	0.27	0.35	0.22	0.33			0.26	0.34
Transaction Frequency										
H7 discharges	2.02		2.62	2.28	6.31	13.48			2.57	2.59
H8 Case Mix	2.38	1.51	3.04	1.71	2.67				3.18	1.66
Control Variables										
CON	0.50	0.74	0.47	0.68	0.45	0.40	0.81	1.22	0.48	0.65
Urban	0.83	0.67	0.67	0.56	0.21	0.33	4.00	1.73	0.62	0.53
Teach	0.34	0.48	0.27	0.32	0.64	0.32	0.64	1.11	0.29	0.29
Member	1.25	1.28	1.02	0.99	0.31	0.15	3.73	6.47	0.93	0.86
Tax status	0.98	0.53	1.16	0.59	2.28	1.41	0.46	0.38	1.24	0.65
Size	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Goodness of Fit Statistic										
Chi-Square	589.64	541.29	640.31	584.93	287.17	390.07	251.8	319.19	645.85	601.4
Concordant%	67.92	66.56	71.09	70.28	86.49	85.34	91.19	89.52	71.76	71.86

Model A = 1994/1995 data
Model B= 2001/2002 data

the chi–square and correct prediction of the classification table. Only those variables with significant association were entered, others were left blank Except for the 1994/1995 variables in model 4; all of the constructs had at least one significant independent variable. Hospital occupancy, which was measure of uncertainty, was positively and significantly associated with the event of integration in 4 out of 5 models in the 1994/1995 data, and was positively and significantly associated in 4 out of 5 models in the 2001/2002 data. This indicates that hospitals with higher occupancy were more likely to integrate skilled services. The variables, which measured transaction specificity, were the provision of geriatric services and the ratio of licensed nurses to licensed beds. If a hospital provided geriatric services was positively and significantly associated with integration of skilled nursing in 4 out of 5 models in the 1994/1995 data. The same relationship is observed in the 2001/2002 data. Licensed nursing staff ratio to licensed beds was negatively and significantly associated with skilled integration 4 out 5 models in both years of study data. Medicare discharges and average case mix were significant in 7 out of 10 models: 4 out of 5 for the 1994/1995 data and 3 out 4 for the 2001/2002 data.

Summary of Findings from Pre- and Post-BBA Difference Analysis

Significance testing found that models 1, 2 and 5 five demonstrated significant differences between the pre BBA period and post BBA period and the null hypotheses were rejected for those models. Individual variable testing results revealed that 5 of the eight variables were significantly different post BBA.

Table 40 displays the individual variables and in which models they were statistically significant.

Table 40. Individual Variable Significance

Variable	Model 1*	Model 2*	Model 3	Model 4	Model 5*
Uncertainty					
H1a Snf/Elderly	S	S	S	–	S
H2a % in Poverty	S	S	–	–	S
H3 Avg Occupancy	–	–	–	–	–
H4a ALOS	S	S	–	–	S
Asset Specificity					
H5a Geriatric	–	–	–	–	–
H6a Licensed Staff	S	S	–	–	S
Frequency					
H7a M Discharges	S	S	–	–	S
H8a Avg Case Mix	–	–	–	–	–

* S=indicates model significance

CHAPTER 6: DISCUSSIONS AND CONCLUSIONS

Introduction

This chapter begins by presenting the important implications of the findings of this study, which might be of interest to healthcare administrators, researchers, or policy makers. Implications for future research are then discussed followed by a summary of the significance of the study as well as examination of the limitations.

The purpose of this study was to examine factors, which influence hospitals decision to vertically integrate skilled nursing services before and after the BBA, by using Williamson's transaction, cost economics theory. The study replicates Chiu (1995) by using the five models that were used in that research to determine linkages between hospitals and nursing homes. However, some changes were made in the variables that were intended to measure the three constructs of the theory. Both the Chiu study and this one found support for transaction specificity. However in Chiu's study more support was evidenced for uncertainty. Frequency was more supported in this study. These differences could be attributed to the use of difference measures for the constructs. This study is also unique in that it straddles two time periods, before and after the BBA of 1997 in an attempt to determine if hospitals were influenced differently

after this legislation in their decisions to vertically integrate skilled care. The focus of the research is to examine the determinants of vertical integration as they apply to individual hospitals decision regarding the provision of skilled care following an acute stay for their patients. The arrangements may be hierarchical, which is the highest form of integration in which the hospital actually owns and operates its own unit. Hospitals may choose a lesser level of integration in the form of a hybrid arrangement, which would mean contracting with a local provider to take their patients. Lastly, an organization may rely on the spot market to have enough supply and willingness to take the hospitals patients.

This chapter begins by presenting the results of individual hypotheses testing of the effects of the three constructs whether supported or unsupported. This is followed with a discussion of whether there was a significant difference in hospitals decision to vertically integrate skilled nursing services before and after the BBA.

Hypothesis Testing and Interpretation

This study had three propositions and 16 hypotheses. The propositions and corresponding hypotheses are presented in order of the theory constructs: transaction uncertainty, transaction specificity, and transaction frequency. Discussion of the data analysis and its support or non–support of the propositions and hypothesis is presented. Tables 41 and 42 present a summary of the hypothesis testing.

Table 41. Results of Hypothesis Testing for All Five Primary Models 1994/1995

H *	Construct	Model1	Model 2	Model 3	Model 4	Model5
Uncertainty						
H1	Skilled/elderly	--------	--------	S	-----	S
H2	Poor Elderly	--------	S	-----	-----	----
H3	Hosp. Occupancy	S	S	S	------	S
H4	Avg LOS	S	S	S	------	S
Specificity						
H5	Geriatric	S	S	S	------	S
H6	Licensed staff	S	S	S	------	------
Frequency						
H7	Medicare discharges	S	----	S	-------	S
H8	Average Case Mix	S	S	S	-------	S

Table 42. Summary of Hypothesis Testing for All Five Primary Models 2001/2002

H *	Construct	Model1	Model 2	Model 3	Model 4	Model5
Uncertainty						
H1	Skilled/elderly	----	S	S	S	S
H2	Poor Elderly	S	S	--	--	S
H3	Hosp. Occupancy	S	S	--	S	S
H4	Avg LOS	S	S	--	--	S
Specificity						
H5	Geriatric	S	S	--	S	S
H6	Licensed staff	S	S	S	--	S
Frequency						
H7	Medicare discharges	--	S	S	--	S
H8	Average Case Mix	S	S	--	--	S

Transaction Uncertainty on Skilled Integration

Proposition one concerns the dimension of environmental uncertainty. As uncertainty increases the more likely a hospital is to integrate skilled services at a higher level. The dimension of uncertainty refers to environmental and behavioral uncertainty. Environmental uncertainty is representative of the supply of skilled beds as well as the demand for them. The dimension of behavioral uncertainty is a demonstrated in bounded rationality and opportunism. Hypotheses 1 through 4 are used to measure the uncertainty construct.

H1: Hospitals in communities with more skilled nursing beds will be less likely to integrate skilled nursing care both before and after the BBA.

As the supply of community skilled nursing beds has diminished, the hospital may vertically integrate skilled care. Transaction uncertainty can arise from environmental or behavioral conditions (Williamson, 1985), Environmental uncertainty in this case refers to the mix and number of patients that might need skilled nursing care at any given time and the availability of community beds. Behavioral uncertainty is when the supply of beds is not sufficient to meet the demand from the hospitals, and the potential for community facilities to be opportunistic and deny access to admissions depending on their own financial situation and goals.

H1 is not strongly supported by the 1994/1995 data analysis. The ratio of skilled beds to the number of elderly is only significant in 2 out of 5 models. However, it is significant in 4 out 5 models in the 2001/2002 data, which is the

post BBA era suggesting that factors influencing hospitals decision to vertically integrate skilled services were more influential in the years following the Balanced Budget Act. As the number of skilled beds in community diminished and the number of elderly grew hospitals are more likely to vertically integrate skilled beds. Data results support this happening in the post BBA era. This variable is significant for both years in the Model 2 analysis, which examines why hospitals adopt vertical integration to manage patient's discharges. Model 5, which examine factors affecting a hospitals' decision to use vertical integration instead of hybrid, or market, show this variable remaining significant in both years.

H2: Hospitals in an area with more indigent population of elderly in a community are more likely to implement a higher degree of vertical integration before and after the BBA.

Opportunism is a threat from the market place as nursing homes become selective in the patient population they will accept from acute care. The reduction in reimbursement for certain care, such as IVs and wound care has decreased below the costs incurred by the provider, thus creating the need to take patients with better reimbursement from the payers. Extended stays and costs from patients will burden hospitals with only Medicare as a payer source and no ability to pay additional costs privately. Medicare is not the largest payer for nursing homes, but Medicaid is and qualification for this classification varies from state to state. Medicare payments offset the loss from Medicaid, so it is necessary to be

selective in the patients accepted into community SNFs. Elderly in poverty was not significant in any of the models in 1994/1995 and therefore did not support H2. However, this variable was significant in Models 1, 2, and 5 in the 2001/2002 analyses, perhaps suggesting a change in uncertainty after the BBA. Model 1 differentiates whether a hospital decides to vertically integrate SNF. Model 2 examines why hospitals adopt vertical integration and is significant in the 2001/2002 analyses of the data.

H3: Hospitals with higher occupancy rate will be more likely to employ a higher degree of vertical integration to provide skilled nursing care before and after the BBA.

The DRG reimbursement system for hospitals influences hospitals to discharge patients more quickly in order to maximize revenue and keep costs down. In order to accomplish this, some hospitals vertically integrate post acute services such as skilled care to ensure a discharge destination. The more difficult a discharge becomes and the longer the patient stays in the hospital, the higher the hospital occupancy becomes and the more interested the hospital might become in vertically integrating skilled care. Higher average hospital occupancy also creates competition for existing skilled beds.

Hospital occupancy was the most supportive of the construct, being significant in four out of five models for both study years. H3 was supported for years in Models 1, 2, and 5. In model 3, H3 was supported in 1994/1995, but not in the other data year. In Model 4, H3 was supported in the post BBA year.

H4: Hospitals with lower lengths of stay will be more likely to have implemented higher levels of integration of skilled nursing services before and after the BBA.

When hospitals were able to rely on the spot market, or have a contractual arrangement, they were able to keep their length of stay under control, by transferring patients to lower levels of service. Following the BBA, the shift from cost based reimbursement the market place became less accommodating and more selective as to the patients that were accepted for admission. When this occurs, the cost of finding another source of placement will increase as well as the increased cost of keeping the patient in a more expensive setting and the opportunity cost of caring for another patient in limited beds. The change to PPS has seen decline in the number of skilled facilities, and would be expected to influence hospitals to integrate their own units in order to keep length of stay from exceeding the DRG payment.

Average length of stay was significant for both years in model 1, 2, and 5 and results demonstrated support for H4. The hypothesis was not supported in models 3 and 4. Average length of stay was not significant in either model 3 or 4 for either study year.

Transaction Asset Specificity on SNF Integration

Proposition Two is concerned with transaction specificity. When asset specificity is high, vertical integration may be selected over other forms of arrangement for skilled care. Williamson, (1985) identifies site specificity,

physical asset specificity, human asset specificity, and dedicated assets. In the case of hospitals and skilled care it is assumed that when already has experience in caring for the geriatric population it is more likely to vertically integrate a skilled nursing unit. It is hypothesized that a hospitals experience in caring for the elderly is essential to their decision to integrate skilled services.

H5 is strongly supported in both years for models 1, 2, and 5. In model three, support is found in only the 1994/1995 data. There was not significant support for model 4 either year.

H5: Those hospitals that provided geriatric services are more likely to have a higher degree of vertical integration of skilled nursing care before and after the BBA.

The number of licensed staff is a type of human asset specificity, so that when there is a higher ratio of licensed staff to beds, a hospital as the capacity and human resource to care for patients on a skilled unit.

H6: The higher number of licensed nursing staff per licensed bed, the more likely a hospital is to implement a higher level of vertical integration of skilled care before and after the BBA.

Much the same level of support is evident for H6, with significant values in all but model 4 for both years. These findings are consistent with Williams' belief that transaction asset specificity is very important in the decision to vertically integrate. Additionally, these findings are consistent with Chiu (1995) findings on asset specificity.

Transaction Frequency on SNF Integration

Proposition Three addresses the dimension of transaction frequency. Two hypotheses are derived for this construct. The proportion of Medicare discharges and the average case mix index are used as measures of the construct.

H7: Hospitals with higher percentage of Medicare discharge patients will be more likely to implement a higher level of vertical integration of SNF services before and after the BBA.

H7 is supported in models 1, 2, 3, and 5 for the 1994/1995 pre BBA analysis. This is similar to the Chiu study, which used this same measure, but did not find support for Model 3. Chiu observed that the proportion of Medicare discharges is only influential when more extreme forms of integration are to be decided upon. Since Model 4 was not supported, it may indicate that the proportion of Medicare discharges is not a factor when the decision does not involve the extreme hierarchy form as a choice.

H8: Hospitals with a higher Medicare case mix will be more likely to employ a higher degree of vertical integration SNF services before and after the BBA.

The results of analysis for H8 further support the transaction frequency construct as important in hospitals decision to vertically integrate skilled care. The results from the pre BBA data analysis supported H8 in 4 out of 5 models. Only model three was not significant. Average case mix was significant in 3 out of 5 models. It was not a significant factor in models 3 and 4.

Significance of Results Before and After the BBA (H1a to H8a)

Chi Square testing was conducted to determine if the difference between the data from 1994/1995 and 2001/2002 was significant. Results showed that models 1, 2, and 5 were significantly different. All three of these models contain the more extreme forms of integration either vertical integration or market. Model four is intended to differentiate hybrid from market, which is a more intermediate form of integration. The implementation of the BBA made an extreme change in reimbursement to skilled nursing units and hospital inpatient care. This change prompted hospitals to re examine their skilled care arrangements. The elderly Medicare population was also growing, and presenting more complex chronic illnesses, which could result in longer lengths of stay, which increased costs in a declining reimbursement environment.

Hypotheses 1a – 8a proposed that there was no difference in hospitals decisions to vertically integrate skilled nursing before and after the BBA of 1997. Five of the eight null hypotheses could be rejected based on significance testing. Three of the full models, 1,2,and 5 were significant for differences before and after the BBA. At the variable level, five of eight of the variables were significant. Hypotheses 1a, 2a, 4a, 5a and 7a were rejected since statistical differences were significant and the null hypotheses of no difference were rejected.

Summary of Hypothesis Testing

Major findings from this study are summarized in this section. Factors which were strongly influential in hospital decisions as to the way they would provide

skilled care for their patients were hospital occupancy, the provision of geriatric services, the ratio of licensed staff to licensed beds, the number of Medicare discharges, and the average case mix of the patients.

Of the three dimensions of transaction cost economics, transaction asset specificity and transaction frequency receive the strongest support from this study in both years of observation and analysis. The measures of asset specificity were equally supportive across the five models except for Model 4, which was not significant for licensed staff either year, and geriatric services were only significant in the post BBA years. Medicare discharges and average case mix were also strongly supportive measures of transaction frequency. Again model four had no support. Hospital occupancy was significant in four out of five models testing transaction uncertainty. Average length of stay was supportive in 3 out of 5 of the models only. Both were stronger measures of uncertainty than were the ratio of skilled to elderly and the percent of elderly in poverty.

The five models received varying support. Models 1, 2, and 5, which represent the more extreme choices, hierarchy/hybrid vs. market, hierarchy vs. market, and hierarchy vs. hybrid /market respectively were the most strongly supported in both years of the study data. Models 3 and 4 are less supported. Model four actually has no support in the pre BBA years and very little in the post BBA years.

The results for uncertainty in this study are different than those in the original study by Chiu (1995). This study did not find strong support for the uncertainty

construct, and was supportive of the frequency construct. This is probably due to the use of different construct measures in each study .The measures of uncertainty did not lend strong support in this study. Another similar study by XU (2001) found results, which also support transaction frequency and asset specificity.

The results of this study justify its purpose, which was to determine the usefulness of TCE in examining factors which might have influenced hospitals decision to vertically integrate skilled nursing care. The study also revealed that some of these factors were significantly different following the implementation of the BBA.

Limitations of the Study

Limitations of this study are presented in this section. The limitations of the sample, design, data, and analysis are summarized.

Sample

The number of hospitals reporting both study years may be less than the whole population of hospitals in operation and responding only one year. If a hospital were purchased by a system between the years of interest, it would not be included. Additionally if the hospital closed in the interim it would not be included. Smaller hospitals and or for profit hospitals may be less likely to report and may be underrepresented. This may affect the generalizability of the study, even though the number included will no doubt be the majority of US hospitals.

Data

Variables were extracted from the AHA data files, which are a result of hospital responses to an annual survey and may be subject to inaccuracies of reporting. Data from the Area Resource Files as well as the CON stringency report from the American Health Planning Association were used. All data are administrative and have limited control over quality or accuracy.

Design

The non–experimental, cross sectional study design can establish association but not causality. However the advantage of longitudinal over the cross sectional design previously used by Chiu (1995) is to the extent that repeated measurements from the same subject are not perfectly correlated, they are more powerful than a cross sectional study for a fixed population.

Measurement

Several variables did not prove to be good measures of the constructs. The percent of elderly in poverty was not significant in most models as a measure. This could indicate that this was not a factor in the hospitals' decisions or that this population is mostly Medicaid eligible and there were sufficient beds available to them. A stronger variable might have been to use the ratio of elderly on Medicaid to the number of Medicaid certified nursing homes in a geographic area. The same problem may be seen in the ratio of elderly to skilled beds, which was only influential in model 2 of the study. This may have been too strongly associated with the percent of elderly in poverty, although this was not a correlation issue.

A factor analysis was conducted and all of the variables loaded on the three constructs, but not in the precise order predicted. It was determined that the results were not supportive enough to include in the study. Results table is included in the appendices. Further testing of univariate and bivariate analysis lent adequate support to the variables, which were included.

Independent variables were lagged one year, which might not have been enough time to actually make a decision to integrate a skilled nursing unit and hospitals may have continued with current arrangements until this could be implemented. There was little change in the number or organizations, which had skilled units in the 1994 and the 2001 data. There was more of a change in the market to hybrid group for those years.

Implications of the Findings

Results have implications from a theoretical, methodological, managerial, and health policy prospective.

Theoretical Implications

This study replicated a 1995 study by Chiu in which 1990 data were used. Since that time there has been more empirical research in health care using Williamson transaction cost economics as a framework such as Lehrman and Shore (1998), Robinson (1997) and Zinn (2003). With the enactment of the BBA of 1997 the environment of reimbursement changed dramatically and presented a unique opportunity to study possible effects on hospitals decision to vertically integrate skilled care. This study is unique in its evaluation of this decision before

and after the BBA. The use of transaction cost economics in health care organizations research is supported. Asset specificity and transaction frequency are supported by the measures chosen, whereas the uncertainty construct was only strongly supported by one measure. Since the Chiu study demonstrated stronger support for uncertainty, the measures used in this study were not as useful in measuring that construct. However the results from this study suggest that the three dimensions of transaction cost economics are useful in identifying factors associated with hospitals decisions to vertically integrate skilled care. The effect of uncertainty is not as strong and may arise from the measures selected.

Methodological Implications

In addition to Chiu (1995), other researchers have used logistic regression methodology to examine hospital choices of post acute services (Blewitt 1995, and Dansky et al 1996). Since this study replicated an earlier work, the methodology is well established and the results indicate a recommendation for further refinement of the variables, which were selected to measure the uncertainty construct. Factor analysis did not prove useful in exacting the construct measures, but this could possibly be improved with a refinement of the measures.

Managerial Implications

As the environment becomes more uncertain for health care, with increased demand, diminishing reimbursement, and increasing costs, it is imperative to make decisions that are founded on empirical evidence. While this study is not

conclusive without further research, some aspects of the results are helpful to hospital administrators when considering expanding services in order to improve the overall performance of the organization. The reduction of transaction costs is an important component of managerial decision-making. This study demonstrated that hospitals that already provide geriatric services and have adequate licensed staff would be better prepared to vertically integrate skilled services. Additionally the more frequently they care for the Medicare population, which may have more complex, chronic illness, the more likely they will be to choose hierarchical form of providing skilled services instead of contracting or relying on the spot market.

Community skilled facilities may not be willing to accept the sicker patient, which consumes excess resources and is not reimbursed enough to cover costs. The hospital will want to consider the cost of keeping this patient in an inpatient acute setting as opposed to the cost of having their own skilled unit, or the transaction costs of monitoring contracts or relying on the spot market.

Health Policy Implications

The BBA had dramatic effects on the hospital and post acute industries. The implementation of prospective payment for the post acute services industry from a cost based one created the need for the hospital industry as well as the skilled providers to reconsider provision of this level of care. Historically, hospitals that had skilled units were able to capture new revenue for a patient by transferring them to a cost based unit from a DRG system. Med Pac (2005) has expressed

concern that hospital based skilled units are being under compensated for the more complex patient and has recommended a different classification system for hospital units which would more accurately reflect the cost of the care. By 2000, nearly ninety percent of hospital based SNFs had negative margins compared to the freestanding SNFs of which nearly one fourth had margins exceeding thirty percent (GAO, 2002). As a result of this legislation, certified SNFs decreased from 1998-2000 from 15,035 to 14,835. Hospital based skilled units dropped from 2171 to 1897 (Eggar, 1999). These changes brought about by the BBA had dramatic effects on the hospital and skilled care industry. As a result of the negative effect of the BBA, some revisions were made which delayed some changes to home care and restored some of the budget cuts. The Balanced Budget Refinement act restored about 17 million dollars of the BBA reductions and extended it to 2004. It is clear that health policy makers need to consider the full effect of budget changes on not just post acute services, but the full continuum of care, which includes hospital, owned skilled nursing units.

Certificate of need laws are a potential barrier to opening skilled care units, either free standing or hospital based. Yet, 66% of the hospitals in the hierarchy group were in CON states. It is unclear however if the beds were available and purchased from facilities going out of business or if indeed they filed a certificate of need. It would be necessary to examine individual hospital data that would report whether they took advantage of excess inventory or actually had to overcome the CON barrier. Or perhaps identify states with CON laws and

determine if they had an increase in the bed inventory of skilled nursing. The results of this study would not indicate that CON posed much of a barrier to integrating a skilled unit.

Suggestions for Future Research

Based on this empirical study, more opportunities for research have been identified. First, an extension of this study would be to examine the financial implications of a hospital's decision to vertically integrate a skilled nursing unit. This would include both the financial condition of the skilled unit as well as the inpatient business. Secondly, comparisons could be made with those hospitals that have chosen either hierarchy or hybrid as their means of providing skilled care. Thirdly, alternative measures for the construct of uncertainty would possibly strengthen the results for those hypotheses lastly; the study could be conducted over more time periods making it more longitudinal. Now that all of the changes of the BBA have been in place for almost five years, the changes that were made have had an opportunity to mature and perhaps yield different results.

Summary

This chapter discussed the major findings of this study, the results of the hypotheses testing, the implications of the findings, limitations of the study, and suggestions for further research.

Results from this study identify factors, which are influential in hospitals decision to integrate skilled care. The provision of geriatric services, ratio of licensed staff to beds, number of Medicare discharges, case mix index and

hospital occupancy were all significantly influential in this decision. Of the theory's three dimensions, uncertainty received the least validation from the measures. Transaction specificity and frequency however were well supported in the study.

Implications of the findings in regard to policy, management, theory and methodology were all discussed. Additionally, the limitations of the study were presented as they relate to design, measurement, data, and analysis. Recommendations for further research were made.

This study made a unique contribution to the validation of transaction cost economics and its use in health care research. Further expansion and refinement of this study could provide valuable information for policy makers and administrators.

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Vita

Betty C. Lucente was born December 15, 1946 in Huntington, West Virginia and is an American citizen. She graduated from Marshall University in 1978 with a B.S. in Nursing. In 1987 she received a Masters degree in Nursing from West Virginia University in Morgantown West Virginia. She is currently the Vice President for Patient Care Services for Augusta Medical Center in Fishersville, Virginia.