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Factors associated with hospital entry into joint venture arrangements with  
Ambulatory Surgery Centers

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

by

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## ABSTRACT

Factors associated with hospital entry into joint venture arrangements with Ambulatory Surgery Centers

by Reethi Narasimhan Iyengar, Ph.D.

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

Virginia Commonwealth University, Richmond Virginia, May 2011

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This study presented an empirical analysis of the key market, regulatory, organizational, operational and financial factors associated with hospital entry into joint venture (JV) arrangements with Ambulatory Surgery Centers (ASCs) as examined through the framework of resource dependency theory complimented with neo-institutional theory.

This study used a cross sectional design to examine hospitals that entered into a joint venture arrangement with ASCs in 2006 and 2007. The data for this study were drawn from five main sources: the American Hospital Association Annual Survey (AHA), the Area Resource File (ARF), the CMS (Center for Medicare and Medicaid Services) minimum dataset, the National Legislative Assembly Website and the CM case-mix files. Descriptive analysis and

multivariate logistic regression were performed to examine the association of various factors in this study.

The study found that market factors such as unemployment rate and percentage of elderly were strongly associated with the hospitals decision to joint venture with ASCs. Also organizational size (measured by bed size) was a significant factor in these decisions. Other factors which showed a marginal significance were Herfindahl-Hirschman Index, number of ASCs, certificate of need laws, ownership status, and operating expense per adjusted discharge of the hospital.

This research project sheds light on joint venture arrangements between hospitals and ASCs at a very opportune time. In light of the new Health Reform Legislation, studying hospital-ASC joint ventures is very important. For hospitals and ASCs, and their collaborative interests such as joint ventures, Accountable Care Organizations (ACO's) could either provide incentives to help improve quality of care to patients or stint on needed care by making them focus narrowly on higher margin services (Fisher and Shortell 2010; Shortell and Casalino 2010). Since policy measures should encourage the first and not the second outcome, it is important to have a transparent performance measurement system that can win the confidence of the provider organizations such as hospitals and ASCs. Lacking which, it may discourage joint venture arrangements between hospitals and ASCs in future.



## CHAPTER 1: INTRODUCTION

Historically, physicians have preferred to work independently as consultants rather than as employees of hospitals. Physicians have traditionally used hospitals for mutually beneficial arrangements such as exchanging the use of hospital facilities with taking emergency calls and serving on various hospital committees. They also preferred not to have formal financial ties with hospitals (Pauly and Redisch 1973; Starr 1982; Stevens 1989; Lake et al. 2003; Berenson et al. 2007). Thus the term, hospitals serving as “physicians’ workshops” (Robinson 1997; Casalino et al. 2008) was coined.

Over the last two decades, market conditions have drastically changed the relationships between physicians and hospitals. In the early 1990’s, managed care and the at-risk payment system of capitation led to the purchase of physician practices in the form of arrangements such as Organized Delivery Systems (ODS) and Physician-Hospital Organizations (PHO). Forming ODS and PHO arrangements provided hospitals the leverage to negotiate higher payments from Health Maintenance Organizations (HMOs).

During the above referenced period, hospitals competed primarily on price by providing services specifically targeted towards managed care plans that

contracted for large number of enrollees. This is often times referred to as 'wholesale strategies' in the healthcare literature (Devers et al. 2003).

By late 1990's, there was a change in this trend. Less than anticipated payment arrangements through selective contract arrangements resulted in the decline of the use of capitation to pay providers. As a result, hospitals shifted their focus from building ODS and PHO arrangements to creating strong relationships with specialists. This new strategic focus of hospitals towards 'branding, marketing and providing service' to individual physicians is referred to as 'retail strategy' in the healthcare literature (Devers et al. 2003; Berenson et al. 2007). Thus, hospitals switched from capitation-based wholesale strategy (price competition) to service line based retail strategy (non-price competition).

As a consequence, hospitals anticipated that this would lessen the threat of competition by specialists who delivered high-margin specialized services such as outpatient services (Berenson et al. 2006; Berenson et al. 2007). To counteract this retail strategy and compete directly with hospitals, loosely affiliated specialists opened their own facilities, primarily in the form of Ambulatory Surgery Centers (ASCs) (Berenson et al. 2007). ASCs are 'distinct entities that exclusively furnish outpatient surgical services not requiring an overnight stay' (MedPac 2004). Subsequently, the formation of these ASCs resulted in an increase in outpatient services and competition with hospitals for specific services such as Gastroenterology, Ophthalmology and Orthopedics (Devers et al. 2003; MedPac 2004).

Given the increase of specialist owned Ambulatory Surgery Centers (ASCs) in the early 2000's (Devers et al. 2003), hospitals began to pursue alternate strategies to better align with them. As specialists competed with hospitals in the same markets, specialists preferred owning their facilities as opposed to being employed by hospitals. Ownership of ASCs enabled the specialists to capture a facility fee previously paid to the hospitals and provided them with greater flexibility in terms of scheduling. This strategy led to higher efficiency and generally gave them more control over the care process, unlike in a hospital (Casalino et al. 2008).

In the mid 2000's, the healthcare market place witnessed a dramatic increase in the number of ASCs. From 2000 to 2006, the number of ASCs nationally grew dramatically by 55 percent, from 3,028 to 4,707 (MedPac 2007; Casalino et al. 2008). This growth trend in new ASCs continued at an annual rate of 6.7% till 2007; however in 2008, the rate of growth slowed to 3.7% (MedPac 2010). The decline in the growth rate from 2007 to 2008 has been attributed to the downturn in U.S. economy and the reductions in Medicare reimbursement for ASCs (MedPac 2010).

In 2002, almost 99% of ASCs were freestanding facilities owned by physicians, independent of hospitals (MedPac 2004). Only 1% of ASCs were owned by physician-hospital partnerships. By 2006, 61% of ASCs were owned by physicians alone (Kurtz 2010) and 20% of ASCs had an ownership model of hospital-physician joint ventures (Health Connect Partners 2010). Thus, over the

last few years, sole ownership of ASCs by physicians is declining and there is an increasing trend of joint venture arrangements with hospitals. A joint venture is an agreement between two entities towards the combination of their resources to accomplish a specific purpose.

The aim of this study is to present an empirical analysis of the key market, regulatory, organizational, operational and financial factors associated with hospital entry into joint venture (JV) arrangements with Ambulatory Surgery Centers (ASCs) as examined through the framework of resource dependency theory complimented with neo-institutional theory.

There is very little empirical literature on hospital-ASC joint venture arrangements, mainly because American Hospital Association Annual Survey (AHA) started reporting hospital joint ventures with ASCs, only from 2005. Prior studies were unable to empirically assess hospital-ASC joint venture arrangements due to non-reporting of this arrangement by AHA. In 2005, AHA started to report the joint-venture arrangement between hospitals and ASCs.

Table 1 depicts the increasing trend of hospital-ASC joint ventures since 2005. This table presents the rate of growth of Medicare-certified ASCs and rate of growth of hospital-ASC joint venture arrangements. The data for the number of ASCs have been obtained from the MedPac 2010 report and the data on the joint venture between hospitals and ASCs have been obtained from the American Hospital Association databases for various years.

Table1: Growth of ASCs and Hospital-ASC joint venture by year

	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>
Number of ASC Centers	4441	4700	4991	5174
% Growth from previous year	7.3	5.8	6.2	3.7
Hospital-ASC joint ventures	324	391	422	434
% of hospitals joint venturing with ASCs	5.1	6.2	6.7	6.8

\* Data is drawn from MedPac 2010 report and AHA datasets for various years.

*Joint venture:* An agreement between two entities towards the combination of their resources to accomplish a specific purpose

Table 1 shows that although both the number of ASCs and the number of hospital-ASC joint venture arrangements show an increase, the percentage of increase in hospital-ASC joint venture has been more consistent. In addition to this data, industry reports also predict an increase in the number of joint venture arrangements between hospitals and ASCs for the next 5-10 years (Kurtz 2010; Health Connect Partners 2010) as hospitals and healthcare systems prepare for Health Care Reform and Accountable Care Organizations (Kaiser Health News 2010; Paige 2010; Neuterra Healthcare 2010). This further reinforces the need to study the driving factors behind these increasing number of hospital-ASC joint venture arrangements. Thus, this research study adds to the understanding of such joint ventures by providing the theoretical and empirical foundation for analyzing factors associated with these arrangements.

### Transitioning Health-care Industry and the Effect on Hospitals

Rising costs of healthcare have become a top priority among issues addressed by Congress. Over the last four decades, Congress has introduced

many bills in order to curtail health care expenditures. The Stark Law of 1972, HMO Act of 1973 and Tax Equity and Fiscal Responsibility Act (TEFRA) of 1982 were three such early efforts followed by the Balanced Budget Act of 1997 and the more recent amendment “Phase III” of the Stark Law in 2007.

The Stark Law of 1972 was brought into effect in order to protect patients and federal health care programs from the adverse effect of corrupt influence of monetary incentives on health care decisions. This law essentially forbade anyone from offering, paying, soliciting or receiving money in order to induce/arrange any referral reimbursed by federal health care programs, such as the Center for Medicare and Medicaid Services (CMS).

The HMO Act which followed in 1973 brought a change in the payment structure by increasing funds for managed care programs. This change in payment structure resulted in a drastic growth in managed care enrollment, i.e., almost 20 % within a decade (Between 1990 - 2000), according to the latest statistics published by the Bureau of Census in 2008.

This was followed by the TEFRA Act of 1982. This further changed the payment system and introduced the concept of diagnostic related groupings (DRGs) and prospective payment system (PPS). The reimbursement for inpatient hospital services went from a retrospective payment mechanism to a prospective payment mechanism following subsequent regulation. PPS took into consideration all hospital costs with the exception of capital costs. TEFRA required hospitals to budget prospectively and hospitals were penalized for

exceeding their budgets. This resulted in putting the provider organization (hospitals) at risk. They felt pressurized and were forced to take measures that reduced their cost of treatment. These measures included reducing length of stay of patients, internal restructuring to improve efficiency and reducing operating costs (MedPac 2001). Despite these measures, hospitals could not fully compensate for changes resulting from TEFRA and faced adverse financial effects.

In 1997, Congress enacted the Balanced Budget Act (BBA) in order to stem the sudden rise in Medicare expenditures. In addition to inpatient services, the act also revised payment for outpatient services and other services such as rehabilitation, home health services and skilled nursing services. This resulted in a steep decline in profit and operating margins of the hospitals. Post enactment of BBA, there was a steady decline in revenues of hospitals and other health services providers (Harrison 2002).

Congress incorporated some safe harbors in the Stark Law in Phase III (referred to as Stark III) which favored the growth of ASCs. These safe harbors were incorporated in order to protect small business investments as well as to open strategic expansion avenues for hospitals. Hospitals began to consider strategies such as joint venture arrangements with physicians, in order to supplement their financial resources. In 1999, OIG finalized the ASC safe harbor. Revision of Stark III is another important regulatory change relevant to this study. CMS has continued its effort to reduce the regulatory burden on health care

industry, with ongoing revisions to Stark III. It has also modified the previous exceptions to Stark III of general prohibition on referrals, reviving the increasing trend of hospital-physician ventures (Jones 2004).

### Significance of the Study

This study empirically assesses the factors that are associated with hospitals entry into JV arrangements with ASCs. In addition to enhancing the current body of knowledge on hospital joint venture arrangements, this study will also provide better understanding of the application of resource dependency theory and neo-institutional theory literature, in the context of organizational response to environmental change.

Regulatory and technological changes have brought about considerable environmental uncertainty in the healthcare industry. Hospitals have responded by engaging in strategic alliances, to maintain access to financial and other key resources. The last two decades have witnessed a growth in the number of mergers, acquisitions and joint venture arrangements in the healthcare industry (Harrison 2006). Although, mergers and acquisitions have now become a common means of dealing with competition, other strategies such as diversification, increasing products, services and technological range (Currie 2000), and establishing joint ventures are becoming more prevalent in hospitals. These strategies provide greater flexibility and are more temporary in nature (Tsang 2000). These JVs allow hospitals to adapt to the environment and enhance their chances of survival and growth, by soliciting physician loyalty.



This study furthers the understanding of hospitals' adaptation to market, regulatory and financial pressures. As very little evidence is present on such joint venture arrangements, the results of this study lays the foundation for further research on strategies to tackle environmental uncertainties as well as benefits of strategic alliances with ASCs. The contribution of this study pertains to two main areas: theoretical development and application, and empirical evidence for hospitals decision making process. The purpose of this study is to strengthen the applicability of resource dependency theory and neo-institutional theory to the study of joint venture arrangements. Findings of this study will also provide managers of hospitals, with better insights in the decision making process, while considering strategic alliances under uncertain environmental conditions.

The Health Reform Legislation, specifically accountable care organizations (ACOs) has introduced yet another regulatory change in the healthcare environment. Market analysts speculate that ACOs would create an environment that would foster consolidation activity between hospitals and physicians (Neuterra Healthcare 2010). With increasing environmental uncertainty due to market competition and changing regulatory requirements, the findings of this study would also help hospitals make an informed decision towards considering joint venture arrangements with ASCs.

### Purpose of the Study

Given the environmental uncertainty and regulatory pressure surrounding the healthcare industry, hospitals are finding strategies to ensure greater access

to resources and improve their chances of survival. In such a scenario, we see a growing trend in joint venture (JV) arrangements between hospitals and other providers. The study examines the factors associated with hospital JV arrangements with ASCs for the period 2005-2007.

The three main expansion strategies that hospitals consider to strengthen their chances of survival are mergers, acquisitions and joint venture arrangements. In this study, JVs are examined as they have an advantage over both mergers and acquisitions. JVs provide greater flexibility (retaining their identity) and are relatively more temporary (set for a pre-determined duration of time) compared to mergers. JV arrangements let hospitals and ASCs retain their individual organizational identities and just introduce a channel of interdependency to supplement each provider's resources, unlike in an acquisition. Hospitals continuously seek to improve their access to financial resources. The financial literature provides comprehensive documentation on joint venture arrangements.

A well accepted definition of a joint venture arrangement is "a legal agreement between two entities towards the combination of their resources to accomplish a specific purpose" (Pelfrey and Theisen 1989; Ginter et al. 2004; Harrison 2006). This definition is well accepted within both the financial as well as healthcare industry.

## Research Questions

Currently, the studies analyzing joint venture arrangements of hospitals with ASCs are descriptive and qualitative in nature and lack a theoretical and empirically based analysis. Therefore, this study aims to empirically evaluate the key market, regulatory, organizational, operational and financial factors that are associated with hospital-ASC joint venture arrangements as viewed through the framework of resource dependency theory supplemented with neo-institutional theory. The literature is also silent with respect to hospital-ASC joint venture arrangements after the introduction of the safe harbors in the Stark Law. This study, therefore, will add to the understanding of such joint venture arrangements under the regulatory change during the time period of this study is between 2005 and 2007. This study also provides the theoretical and empirical foundation for studying hospital joint venture arrangements with ASCs.

More specifically, the study provides insights and answers to the following questions:

- 1) Are market conditions (such as unemployment rate and per capita income) associated with hospital's entry into joint ventures with ASCs?
- 2) Are regulatory constraints such as Certificate of Need (CON) laws and ownership status associated with a hospital's decision to joint venture with ASCs?
- 3) Is the size of a hospital and its affiliation to a multi-hospital system related to hospital's decision to joint venture with ASCs?

- 4) Is the operational performance of hospitals (e.g., occupancy rate) related to their decision to joint venture with ASCs?
- 5) Does the financial performance of hospitals (e.g., cash flow margin, days cash on hand, operating expense per adjusted discharge, and long term debt to total capital) drive their decision to joint venture with ASCs?

#### Theoretical Premise

A combined perspective of resource dependency theory and neo-institutional theory is used to examine the main research question in this study. Both these theories are based on an organization level of analysis. They are based on a natural model - open systems theory. An open system theory basically means that organizations (hospitals) engage in exchange relationships with the environment. Hence, there is both a dependency on the environment as well as an influence of the environment on the hospitals. Natural systems theory takes into account the human component of hospitals and their pro-active role in organizational response.

Based on resource dependency theory, an organization's environment is the source of scarce and valued resources necessary for survival (Alexander and Morrissey 1989; Scott 2003). Organizations must interact with the environment to obtain resources as they are not capable of generating all of their needed resources. These resources could be monetary, physical, informational or even related to social legitimacy. The level of resource scarcity will influence an organization's decision to forego autonomy and form strategic alliances.

Therefore, this theory is used to study the factors that are associated with hospitals' entry into JV arrangements with Ambulatory Surgery Centers.

An organization is subjected to other pressures (cognitive, regulatory and normative) in a competitive market. These pressures can be explained by neo-institutional theory. Neo-Institutional theory is based on Institutional theory. Institutional theory distinguishes between institutional and technical environments. An institutional perspective of organizations was developed by Meyer and Rowan in 1977. This was further developed into a neo-institutional approach by DiMaggio and Powell from 1983. According to this perspective, cognitive, regulative, and normative interactions are the three pillars of institutional environments. These pillars demonstrate levels of interactions between organizational environments and organizations (Scott 2003).

Neo-institutional theory complemented with resource dependency theory states that joint venture arrangements are more likely in more competitive environments. Hence, a multi-theoretical approach provides a better framework to examine the association of the factors with hospitals' entry into JV arrangements with ASCs.

### Methodology

This study uses a cross sectional design to examine hospitals that entered into a joint venture arrangement with ASCs in 2006 and 2007. The comparison group is a random sample of hospitals that did not enter into a joint venture with ASCs during the same time period. The unit of analysis for this study is non-

federal, general medical and surgical hospitals in the U.S. This study includes a pooled cross-sectional model using 2006 and 2007 data. This study empirically tests various hypotheses related to the central research question, i.e., examining the market, regulatory, organizational, operational and financial factors associated with hospital joint venture arrangements with ASCs using resource dependency theory and neo-institutional theory framework.

The data for this study are drawn from five main sources. The American Hospital Association Annual Survey (AHA) provides organizational data including whether a hospital is in a joint venture with an ASC. The Area Resource File (ARF) provides information on market structure, demographics and other measures of the hospital environment. The CMS (Center for Medicare and Medicaid Services) minimum dataset provides information on hospital financials. The data on CON are obtained from the National Legislative Assembly Website. Lastly, the data for case-mix index are obtained from the CM case-mix files.

Descriptive and multivariate data analysis is performed in this study. Descriptive analysis includes descriptive statistics of various independent variables, univariate test of significance for each independent variable in isolation and correlation analysis for potential multicollinearity issues among independent variables. Multivariate analysis includes logistic regression to test the association between hospitals that joint venture compared to those that do not joint venture with ASCs with the various markets, regulatory, organizational, operational and financial factors.

## Summary of Remaining Chapters

Chapter 2 presents an exhaustive review of literature on joint venture arrangements and other strategic alliances such as mergers and acquisitions. Also reviewed in this chapter are the regulatory concerns as applies to the changing healthcare environment and the reimbursement system as this is critical to the decision of joint venturing, for hospitals. In addition, the review also presents pertinent literature on market, regulatory, organizational, operational and financial factors related to Hospital JV arrangements with physicians owned entities.

Chapter 3 presents the theoretical framework and conceptual model for the study. The theoretical perspectives that form the foundation for this study are resource dependency theory and neo-institutional theory. The framework, based on the combined insights of these two theories, helps develop the hypotheses for this study, and guides the directionality of the hypotheses.

Chapter 4 elaborates on the methodology used in testing the hypotheses in this study. It presents the data sources, the time period for the study, and the data elements i.e., the variables used in this study. The analytical procedures (descriptive and multivariate) to analyze and answer the research questions in this study are also explained.

Chapter 5 presents the findings of the study. The relationships between the independent variables and the dependent variable are discussed in detail in

this chapter. It presents the findings of both descriptive as well as multivariate procedures.

Chapter 6 discusses the results of the study, their relevance and implications. In addition to interpreting the results obtained in Chapter 5, this chapter elaborates on the theoretical and empirical implications of these findings. Lastly, the chapter discusses the findings and their significance in light of the current healthcare market and suggests further areas of research.



## CHAPTER 2: LITERATURE REVIEW

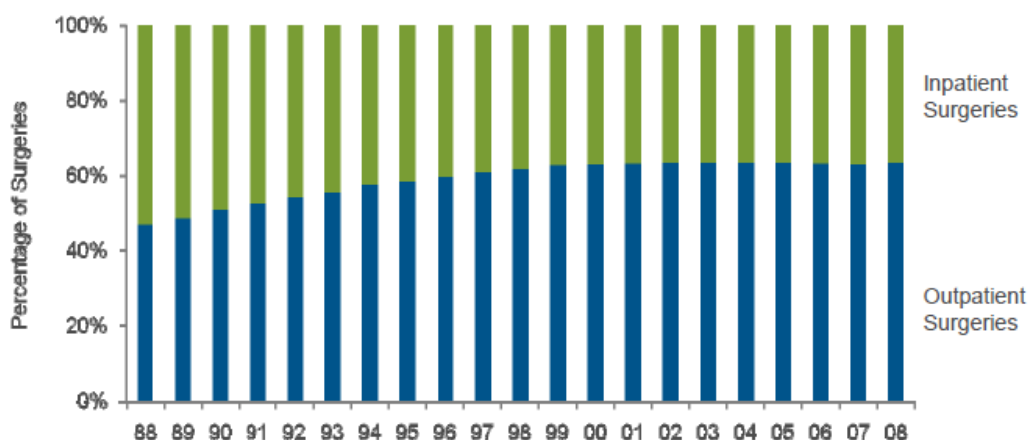
Hospitals operate in a dynamic and highly competitive healthcare environment. Issues such as attracting and retaining physicians, declining reimbursements, changing regulations governing provider (hospitals and ASCs) organizations, competition and rapidly changing market conditions add to the environmental uncertainty. Hospitals are increasingly considering various strategic alliances (i.e., acquisitions, mergers, joint venture arrangements) that could help overcome the operational, financial and human resource limitations resulting from the complex healthcare environment.

This chapter presents pertinent literature on the growth of outpatient surgeries vis-à-vis inpatient surgeries, history of ambulatory surgery centers (ASCs), ASC characteristics and the impact of ASCs on hospitals. Relevant literature on integration strategies considered by hospitals (i.e., acquisitions, mergers and joint ventures) are also presented. The chapter also presents literature on the similarities and differences between these three strategies. As the focus of this study is on hospital joint venture arrangements with ASCs, the most common types of joint venture arrangements between these two entities are also presented. This section is followed by a discussion of the laws pertinent to hospital-physician relationships and the regulatory environment for such

relationships. Hospitals and physicians collaborate in order to draw leverage from one another. These motivations are discussed briefly in this chapter. The last section of this chapter presents literature on hospitals attempting to turn the 'threat of competition to strategic advantage' by engaging in joint venture arrangements with ASCs.

### Growth in Outpatient Surgeries vis-à-vis Inpatient Surgeries

Healthcare spending in the United States reached \$2.5 trillion in 2009, despite a decline in the gross domestic product ("GDP") from the previous year (CMS 2010; VMG Intellimarker 2010). A large percentage of this expenditure is attributed to surgical services provided to the patients. Examining surgical services usage is becoming increasingly important as growth in healthcare spending is fast outpacing GDP growth. Figure 1 presents the percentage share of inpatient surgeries vis-à-vis outpatient surgeries performed between 1988 and 2008.



Source: AHA 2010 Chartbook: Trends Affecting Hospitals and Health Systems, Chapter 3.

Figure 1: Percentage Share of Inpatient versus Outpatient Surgeries, 1988-2008.

Outpatient surgeries as a percentage of total surgeries have increased significantly between 1988 and 2008. This increase is primarily attributed to ‘technological and surgical procedure innovation’, which has expanded the types of procedures suitable for an outpatient setting (Bian and Morrissey 2006). Another factor that has been linked to this increase is changes in reimbursement arrangements (National Health Statistics Report 2009). Medical advances included innovations in Anesthesia which allowed for fewer after effects, and improved analgesics for pain relief. These advances made surgical procedures simpler and less risky (National Health Statistics Report 2009). Simultaneously, changes in Medicare program such as adopting prospective payment system based on diagnostic-related grouping created strong incentives for hospitals to shift simpler surgeries to outpatient settings (National Health Statistics Report 2009). Thus, over time, it is observed that outpatient surgeries have increased and inpatient surgical volume has considerably decreased (Figure 1).

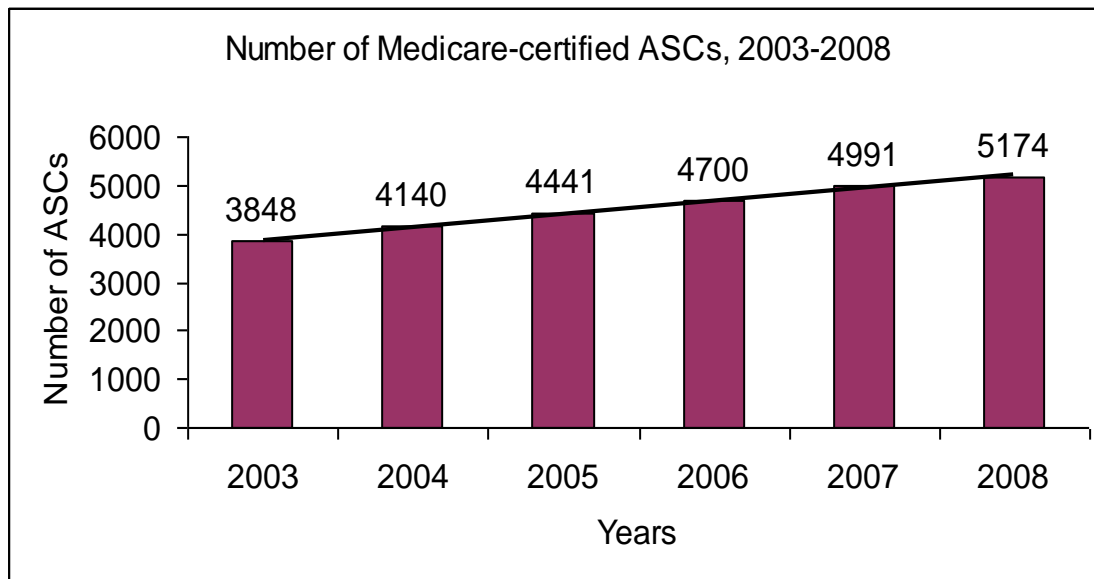
The Journal of the American Medical Association (“JAMA”) first explored the idea of performing surgeries on an outpatient basis in 1966. In this exploration, it was suggested by JAMA that a program of Anesthesia for outpatient surgery could be conducted without compromising patient safety. This resulted in an exploration of alternatives to mitigate the high costs associated with inpatient surgical procedures by the health insurance industry. Simultaneously, the United States National Advisory Commission on health facilities also began experimenting with lowering healthcare costs (VMG

Intellimarker 2010). This resulted in the rise of Ambulatory Surgery Centers (ASCs).

#### History of Ambulatory Surgery Centers (ASCs)

ASCs are defined as 'distinct entities that exclusively furnish outpatient surgical services not requiring an overnight stay' (MedPac 2004). The first ASC opened in 1970 followed by a second facility within one year. The American Medical Association ("AMA") endorsed ASCs in 1971, under general and local anesthesia, for selected procedures and patients. According to the Ambulatory Surgical Association, within five years i.e., by 1976, there were 67 ASCs in the country. Bian and Morrissey (2006) have ascribed the growth of ASCs to the advancement in surgical technologies. In 1982, Medicare program approved payment for 200 procedures performed in ASCs (MedPac 2004). Since then, Medicare has included many more procedures for reimbursement.

In the 1990's, hospitals witnessed increased competition in the provider market from physicians who opened their own ASCs, to provide specialty services (Berenson et al. 2007). By early 2000's, most of the ASCs were Medicare-certified. As a result of Medicare's approval and increased demand for outpatient services by physician users and patients, the number of Medicare licensed ASCs grew considerably. By mid 2000's, the healthcare market observed a dramatic increase in the number of ASCs. From 2000 to 2006, the number of ASCs nationally grew by 55 percent, from 3,028 to 4,707 (MedPac 2007; Casalino et al. 2008). Figure 2 depicts the growing number of Medicare-



Source: MedPac Report, March 2010, Section 2C.

Figure 2: Growth in the number of Medicare-certified ASCs, 2003-2008

certified ASCs over time. The number of Medicare-certified ASCs grew to 4991 in 2007 from 2006, an increase of 6.2%. From 2007 to 2008, the growth rate decreased to 3.7% (compared to annual average rate of 6.7% from 2003 to 2007). This decreased rate was attributed to the downturn in the U.S. economy and revisions in ASC payment system (MedPac 2010).

Observing the growth trend of ASCs in conjunction with changing Medicare reimbursements helps understand the emergence of ASCs as competitors to hospitals. Understanding this association is extremely important for this study. The dynamically changing market structures reveal that hospitals respond to changes in their environment. Hospitals responded to these changes in market dynamics by refining their strategic approach and considering alliances

with ASCs. Failing to restructure in tandem with the market could threaten hospitals' survival.

The next section elaborates on some key performance indicators of ASCs. These include information on: volume, financial, staffing, and facility data. These indicators draw a brief synopsis of ASC performance and are listed below:

### *Volume*

Volume indicators include number of beneficiaries served, services per fee-for-service (FFS) beneficiary offered, total cases performed per ASC and the case volume mix. The number of beneficiaries served in ASCs increased by an average of 5.7% per year, from 2003 through 2007 (MedPac 2010). During this time period, the volume of services per fee-for-service (FFS) beneficiary increased by 10.2%. The volume growth increased slightly, to 10.5% in 2008 (MedPac 2010). VMG Health (2009) study reported that the total cases performed per ASC increased 2.8% from a median of 3,952 reported in 2007 to 4,173 in 2009. Gastroenterology, orthopedics, ophthalmology and pain management together comprised over 75% of the case volume mix.

### *Financial*

Since Center for Medicare and Medicaid Services (CMS) has not mandated ASCs to submit cost data, a national estimate on the cost, operational expense and financial capital is unavailable. Despite a recommendation by the Commission for submission of cost data, the concession for not submitting data was granted on the premise that ASCs are typically small facilities and have

limited resources for supplying data. Available financial information on ASCs is presented below.

Net revenue indicators include Medicare payments, net revenue per ASC and net revenue per case. There has been a steady increase in Medicare payments to ASCs from 2003 to 2008. Medicare payments increased from \$2.2 billion in 2003 to \$3.1 billion in 2008 (MedPac 2010). This growth is expected to continue as a result of newer services being covered by Medicare from 2008. According to VMG Health (2009), the median net revenue per ASC was \$6.4 million in 2009. This represented an increase of 6.8% from \$5.6 million, reported in 2007. Also, the median net revenue per case ranged from \$790 in gastroenterology to \$2,453 in orthopedics in 2009. These specialties are the highest revenue generating specialties amongst ASCs. According to MedPac 2010 report, ASCs operating in Pennsylvania had a 1.9% increase in their operating margins, going from 24.1% in 2007 to 26% in 2008.

VMG Health in its 2009 Intellimarker study presents some pertinent financial statistics, analyzed from a nationally representative sample of ASCs. According to this report, the total operating expense per case increased 14%, from a median of \$995 reported in 2007 to \$1,294 in 2009. In 2009, working capital, as a percentage of net revenue, was 13.5%. Percentage of management fees vis-à-vis net revenue, were approximately 5.1%. There was a 9.3% decrease in the median net accounts receivable days outstanding, from 45.0

days in 2007 to 37.0 days in 2009. In 2009, the median total debt was approximately \$945,000 per ASC.

### *Staffing*

Healthcare providers are facing considerable challenges with regard to attracting and retaining physicians and nurses as well as rising labor costs (Byrd and McCue 2003). Labor expenses typically constitute the largest portion of expenses, in healthcare organizations. A study by GAO in 2006 on ASCs reported that the share of labor costs of the total operating costs averaged 50% (GAO 2006; MedPac 2009). Hospitals and ASCs continuously strive to retain physicians and reduce costs.

The latest staffing statistics for ASCs indicated that ASCs were slightly successful towards this objective. Total staff hours (median) per case decreased to 11.6 in 2009 from 14.1 reported in 2007 (VMG Health 2009). A reduction was also seen in full time equivalent employees (“FTEs”) per ASC. The median FTEs per ASC decreased to 20.4 in 2009 from 27.4 in 2007 (VMG Health 2009). Although, the median staff hourly salaries and wages increased to \$25.28 in 2009 from \$22.45 reported in 2007, an increase of 6.1%, the overall operating costs attributable to labor costs were still favorable (due to a decrease in FTEs).

### *Facility*

Examining facility capacity and volume statistics is essential to understand ASCs. MedPac 2010 report on ASCs presents that though the mean number of operating rooms per ASC increased a little from 2.5 to 2.6, the median remained



constant at 2. This indicates a similar growth rate in the number of operating rooms, as in the number of ASCs. The 2009 VMG Health study that analyzed ASCs reported that the median square footage was 12,781, per ASC and the median rental rate was \$26 per square foot as reported in 2009. They also reported that the total operating expense (median) per square foot increased to \$ 411 in 2009 from \$317 in 2007, an increase of 14%.

The growth of ASCs (as presented above) increases competition for the hospitals. Reviewing pertinent literature on the impact of ASCs on hospitals is essential to understand the reasoning behind hospitals' increasing interest in joint venture arrangements with ASCs.

#### Impact of ASCs on Hospitals

Prior to the 1990's, hospitals and physicians considered their roles distinct and focused on their separate roles (Benoff and Afbale 2001). However, with increasing competition due to technological innovations in the 1990's, the lines distinguishing the roles of hospitals and ASCs began to blur. ASCs threaten hospital survival in many ways: competing for labor, access, competing for patients, cream-skimming patients, and thereby having a direct impact on the financial performance of hospitals. Thus, it is imperative to review the literature on the impact of ASCs on hospitals, in a given market.

#### *Competition for Labor*

Hospitals foresee a shortage of physicians, especially surgeons (Satiani and Vaccaro 2010). They recognize the significance of revenues generated by

ambulatory surgical procedures and feel threatened when specialists open their own surgical centers to provide these services. In addition to creating a shortage of physicians in hospitals, ASCs also draw away skilled / specialized nurses and technicians, extremely valuable to hospitals. Scarcity of access to clinical labor is emerging to be a significant problem for hospitals, as more and more physicians open their own ASCs.

### *Competition for Patients*

ASC proponents claim that patients are more satisfied when treated in ASCs than in hospitals (Taparia 2010). Patients' preference for ASCs is attributed to lower waiting times, easier access to the centers (in comparison to hospitals), and less stressful experience while navigating facilities (Bershad 2005; Taparia 2010). In ASCs, patients are not medically admitted. This significantly decreases the chances of contracting hospital acquired infections, further increasing patient satisfaction (Bershad 2005).

### *Cream-skimming Healthier Patients*

There has been considerable debate over ASCs 'cream-skimming' or 'cherry picking' healthier patients and leaving the burden of providing care for higher acuity patients / uninsured patients to the hospitals. The claim that ASCs enjoy unfair cost advantages by treating less severely ill has been mentioned several times in the literature (Casalino et al 2003; Devers et al 2003; Iglehart 2005; Bershad 2005). ASCs have been reported to draw away healthier, less-cost intensive procedures and insured patients from hospitals. Casalino et al

(2003) study concluded that although far from conclusive, the preliminary evidence does suggest that these claims could have some merit.

The burden of treating high acuity Medicaid/uninsured patients and providing cost intensive procedures falls on hospitals, due to cream-skimming of healthier patients by ASCs. This jeopardizes hospitals financial performance. This could result in hospitals having to compromise their ability to maintain their emergency departments, intensive care units, burn units and other emergent high-cost and intensive care capabilities (Devers et al 2003; Bershad 2005). From a societal perspective, this is not a good indication because these services, although expensive to offer, are necessary for patients.

The criteria laid out by the Medicare Advisory Commission in 2008 for services eligible for payment under Medicare ASC payment system, seemed to be in favor of ASCs, with regard to ‘cream-skimming’ low acuity patients. The criteria included that surgery on patients should not “exceed 90 minutes of surgical time or 4 hours of recovery time” and should not result in “excessive blood loss, or generally emergent or life-threatening nature” (MedPac 2009). Most high acuity cases do not fall under this bracket and hence can be treated only in hospitals.

### *Financial Impact*

On one hand where ASCs seem to offer physicians convenient and financially lucrative practice opportunities (MedPac 2010), they do appear to be adversely affecting hospitals by hurting their operating margins. By taking away

revenue-producing areas such as outpatient surgeries from hospitals, ASCs have a direct impact on hospital financials. Hospitals typically distribute their overhead costs to all of their operations. A decrease in outpatient surgeries is disadvantageous as there are lesser operations for distribution of overheads (Bershad 2005). This leads to overburdening of other services with a higher proportion of overhead costs, resulting in lowering the overall operating margins.

In an era of increasing competition, hospitals cannot avoid taking proactive measures to collaborate with ASCs. Hospitals are responding to pressures from payers (e.g., Insurance companies), customer groups (e.g., physician groups, patients), and the government to provide a continuous comprehensive system of care by looking towards integration strategies to increase their collaboration with physician owners of ASCs.

#### Integration Strategies: Acquisitions, Mergers and Joint Ventures

##### *Similarities and Differences*

Acquisitions, mergers and joint ventures are integration strategies pursued by hospitals in order to ensure survival and success in the market. However, each of these alliances has its advantages and disadvantages.

From the perspective of organizations responding to resource threats, all three are similar. They all help increase access to resources (financial, operational and human resource). All three help organizations respond to the market. All three strategies lead to a more consolidated market. However, on further examination, differences between these strategies are evident. This

section presents some of the key ways in which these three strategies differ. The choice of a hospital to opt for one of the three would depend on the motive (i.e., market share, profitability, collaboration) driving the decision to consider integration strategies.

. Integrated healthcare delivery systems (such as acquisitions, mergers and joint ventures) form as a result of business combinations between existing hospitals, physician groups, ambulatory providers, long-term care providers, or other non-acute providers, and third party payers. Integrated delivery systems bring together activities/functions/services previously provided by separate, independent entities. Integrated healthcare networks aim to attain synergies and economies of scale that include: more efficient use of personnel, medical supplies, plant and equipment, and other overhead costs (laundry, medical records, accounting, etc.). They also aim for broader geographic coverage of patient populations; and the ability to offer new services and products. Mergers, acquisitions, and joint venture arrangements allow organizations to enter new markets, such as the outpatient surgery niche industry, quickly.

#### *Acquisitions and Mergers*

In venture capital literature, an acquisition is usually defined as the purchase of one organization by another organization; or the process through which one company takes over the controlling interest of another company. Healthcare and hospital industry defines an acquisition as, “an arrangement where one hospital is purchased by another hospital or multi-hospital system”

(Shapiro and Balbirer 2000; Harrison 2002; Harrison et al. 2003). In acquisitions, the acquiring hospital that buys out the smaller provider organization retains its identity.

Financial and healthcare literatures define a merger as “a combination of two or more entities through pooling of interests into a single legal entity” (Bazzoli 1995; Bazzoli and Andes 1995; Connor et al. 1997; Downes and Goodman 1999). This is a well accepted definition in both the business as well as service industry. In a merger, individual entities entering the merger lose their individual identities and form a new operating entity, governed by a pre-drawn legal agreement.

The primary goal of most acquisitions is to maximize profits (Harrison 2002). A hospital decides to acquire another facility in order to supplement its profits. A hospital or a multi-hospital system acquires another facility when the net present value of the facility's income stream is higher than its sale price (Harrison 2002). Acquisitions also require considerable capital outlay for financing the purchase. Thus it more often occurs in stronger markets with higher profit margins.

A merger decision is often driven towards the goal of increasing market share. Considerations such as similarity in mission of the merging organizations, resulting reputation, improved cost efficiency and change in market share are some of key factors that weigh in the decision of a merger (Harrison 2002). A merger does not require a capital outlay as it is primarily formed by a pooling of

interests. Thus, mergers are preferred over acquisitions in weak markets characterized by low profits.

Mergers provide many other benefits in addition to increasing market share. They help achieve higher volumes of specialized services, cover broader geographic area and provide unrealized economies of scale resulting in cost savings. They also help gain access to capital and efficiently use excess capacity through pooling of resources (Connor et al. 1997; Harrison et al. 2003).

In the hospital industry, many mergers have resulted in an increase in reimbursement rates. Mergers typically lead to increased market share of the merging organizations. Krishnan (2001) study found that greater market share resulted in a 10% increase in DRG reimbursement rates for hospitals, post merger. Other studies have also shown that markets with higher concentration result (higher Herfindahl-Hirschman Index) in an increase in reimbursement rates (Dranove and Ludwick 1999; Keller et al 1999). Another reason for increased DRG reimbursement rates is higher intensity services (used by more chronically ill patients) that are offered by consolidated facilities post merger or acquisition (Harrison et al 2003). According to the Krishnan (2001) study, post consolidation, DRG reimbursement rates grew 15.6% in comparison to pre-consolidation.

Healthcare Financial Management (1996) reported that between 1994 and 1996, almost 2 in 5 of the country's 5,200 nonfederal hospitals were involved in either mergers or acquisitions. These deals were primarily driven by the goal to provide cost-effective and efficient care. However, with increasing competition in

the market, the goals of the participating entities changed to pursuing market share and profit maximization.

In recent times, there has been considerable decline in acquisitions and mergers, in the healthcare industry. The healthcare acquisition report (2010) developed by Levin Associates presents that between 2005 and 2009, the number of deals (acquisitions and mergers) were reduced from 523 to 371. Deal volume decreased 21% from 2008 to 2009. In 2009, none of the mergers and acquisitions (M&A) in healthcare exceeded \$570 million in price (Levin Associates 2010). It is evident that hospitals are being cautious in pursuing acquisitions and mergers.

### *Joint Ventures*

A joint venture is defined as, “the combination of resources of two or more organizations for a specific purpose” (Ginter 2004; Harrison 2006). Both acquisitions and mergers, entail major restructuring of involved entities and loss of identity of all/some of the organizations entering into the arrangement. And this restructuring and loss of individual legal identity is more permanent in nature. On the other hand, joint venture arrangements are more temporary (for a pre-specified amount of time) and allow the participating organizations to retain their individual corporate identities during the interim period. Joint venture is a form of collaboration amongst healthcare entities in which control is shared between investors.



A number of factors need to be analyzed prior to, during and post joint venture decision. Some of the general factors are: objective, scope and terms, roles, responsibilities and obligations, consequences of insolvency, default or termination, and the management structure. Business registration, principle activities, venture location, details of the participating entities, factors such as confidentiality, dispute resolution, and conflict of interest are some of the key legal requirements that need to be considered. From a financial perspective, details such as percentage of interest, proportion of capital contribution (if any), assets, equity, set-up costs, operational costs and apportionment of profits and losses, need to be carefully examined.

In summary, there are many similarities and dissimilarities between acquisitions, mergers and joint ventures. Table 2 encapsulates these significant points.

The main variable of interest in this study is hospital entry in joint venture arrangements with ASCs. A detailed review of the various types of joint ventures, most common in healthcare would help gain a better understanding of these arrangements. The following section provides a concise of the various types of joint ventures and their key characteristics.

#### Types of Joint Ventures in Health Care Industry

While joint ventures are common in the healthcare industry, their structure can vary considerably. There are various forms of joint venture arrangements and the selection of the most suitable form is extremely crucial for success.

Table 2: Acquisitions, Mergers and Joint Ventures

	<b>Acquisition</b>	<b>Merger</b>	<b>Joint Venture</b>
<b>Primary Goal</b>	Profit-maximization	Increase market share	Pooling of resources for specific mutual goal
<b>Capital Outlay</b>	Mostly high	Lower than acquisition but higher than JV	Mostly low
<b>Timeline</b>	Single point of time	Single point of time	Over a pre-defined period of time
<b>Flexibility</b>	Permanent	Does not provide much flexibility for the merged organizations	More flexible: defined period of time and separate corporate entities
<b>Control</b>	Acquiring organization has ownership control	Neither. The new entity formed needs to draw up new control structure.	Joint control by all participating entities
<b>Human Resource</b>	Acquiring organization personnel enjoy greater stability	Unpredictable for personnel involved.	Physician relation building tool
<b>Market Characteristic</b>	Strong Markets, Higher Profit Margin	Competitive markets	Influenced by presence/absence of physician groups

Some of the most important forms of joint venture arrangements in healthcare are: jointly owned corporations or groups of corporations, partnership, Limited liability company (LLC), and contractual- (non equity) arrangements. These are briefly explained below.

*Jointly Owned Corporations / Groups of  
Corporations /Subsidiary Corporations*

These ventures are jointly owned corporations, a medium to hold the assets of the joint venture (Pelfrey and Theisen 1989). Since a corporation is

being formed, this type of venture can require substantial outside investor-backed financing. Requiring a formal incorporation also translates into large start-up costs.

### *Partnership*

Typically, these ventures are less expensive to develop and operate than forming corporations. These can be formal (written) or informal (oral) between participating entities, based on the state legal requirements in which they are situated. These arrangements are not subject to federal taxations (Pelfrey and Theisen 1989). Defined period of time and availability of financing are two important considerations while forming these ventures.

### *Limited Liability Company (LLC)*

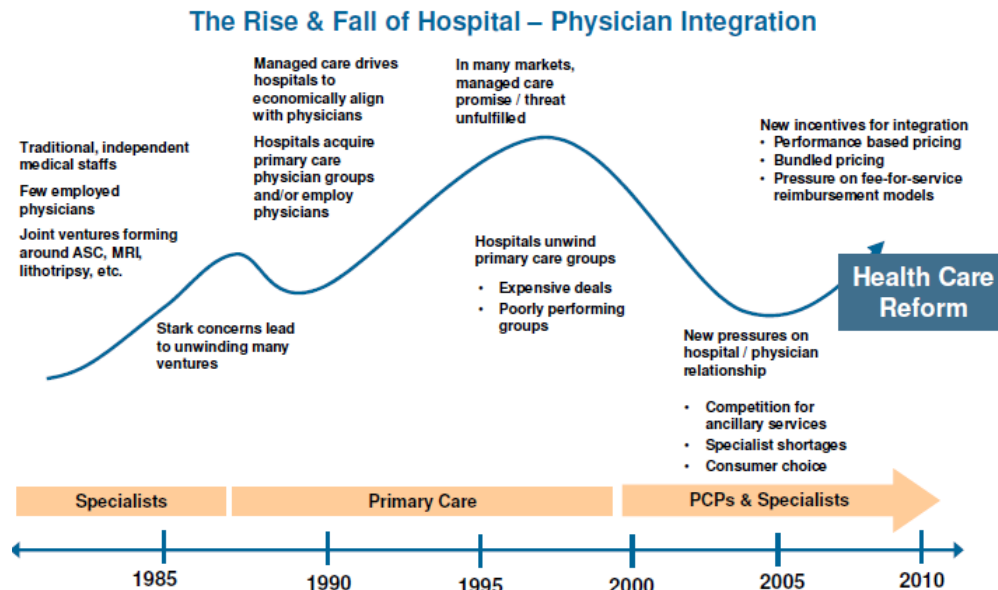
Business law defines a limited liability company as an ownership structure in which the operational activities follow the pattern of a partnership arrangement but the limited liability shield is similar to that of a corporation (American Bar Association; Nolo 2010). In this type of venture, owners' personal assets are safeguarded through the option of limited liability. Most joint venture arrangements between hospitals and physicians are examples of LLC. Such ventures financially benefit both hospitals and physicians as the income directly passes to the owners. The income generated is not subject to double taxation (earnings taxed to both the corporation as well as individual investors). In case of non-profit hospitals, this is more lucrative as the share of income from this venture is tax exempt, adding to financial profitability (Lifton and Bryant Jr. 2006).

### *Contractual- (non equity) arrangements*

These ventures can either be a co-ownership model or simply a contract between the parties. In this type of arrangement, the parties retain all their own assets and agree to the terms and scope of the arrangement. They also have their separate rights and obligations defined. Most outsourcing arrangements are examples of these types of ventures. These are unincorporated alliances based on simple legal contracts. These contracts clarify cooperation issues among partners. The biggest advantage of this type of arrangement is its ease of formation (Pelfrey and Theisen 1989).

As mentioned earlier, the changes in healthcare environment propelled hospitals and physicians towards integration strategies. The last 25 years have witnessed changes in these relationships and trends. There were many factors responsible for the changes in hospital-physician integrations. The rise and fall of these integration structures have generated an interest amongst researchers and analysts to study the nature of these relationships and to predict the future of such integration strategies. BDC Advisors, in their 2010 presentation of healthcare market analysis focusing on trends in hospital-physician integration depicted the change in hospital-physician relationships spanning over a period of 25 years. This is graphically represented in Figure 3.

Some of the factors that are also driving hospital-physician integrations are performance based pricing, bundled pricing, and pressure on fee-for-service reimbursement models (Figure 3). Performance based pricing is an arrangement



Source: BDC Advisors L.L.C presentation on 'Trends in Physician-Hospital Joint Integration' June 2010

Figure 3: Changes in Hospital-Physician Integration Over Time

where healthcare providers are paid based on their performance i.e., quality of service. Bundled pricing refers to a system of payment initiated by Medicare where hospitals and physicians receive a single, negotiated fee for each operation which is then split amongst them. Fee-for-service reimbursement arrangements (where services are paid for separately) are under pressure in the changing payment system by Medicare. All these together create uncertainty for hospitals to operate. In order to overcome the challenges posed by these uncertainties, hospitals and physicians are increasingly considering integration strategies (BDC Advisors 2010). Health Reform is another regulatory change that has provides further incentives for hospital-physician integration. Anticipated

impact of this regulatory change is further discussed later in the chapter under the 'regulatory environment' section.

As previously discussed, acquisitions and merger deals in healthcare have decreased. Thus, the rising trend in hospital-physician integrations after 2005, as seen in Figure 3, is primarily attributed to joint venture arrangements.

Joint venture arrangements in healthcare market raise regulatory concerns that are unique, unlike in other industries. The Office of Inspector General for the Department of Health and Human Services (OIG), which is the primary federal governing body for fraud and abuse regulations, has attributed this uniqueness to the distinct role of parties involved in healthcare. As physicians take on the role of decision makers for the patients, opportunities for overutilization of services increases, and financial/ ethical conflict of interest concerns arise (CAP 2007). Hospital joint ventures in current regulatory environment can be extremely challenging. Therefore, examining the laws affecting hospital-physician relationships in order to address concerns such as potential for antitrust violations is crucial.

#### Regulatory Environment Pertinent to Hospital-Physician Relationships

Historically the number of joint venture arrangements between hospitals and ASCs had been increasing. However, in mid to late 80's, recognizing the potential for financial conflict of interest, state and federal lawmakers enacted laws (known as Stark laws) which restricted formation of physician owned entities

and shut many hospital-physician joint ventures that were formed prior to mid 80's (Hetzel and Tomey 2005). As a result of Stark laws, there was a general agreement in the industry that joint ventures were doomed to financial peril (Hetzel and Tomey 2005).

However, in early 2000s, the cycle seemed to have reversed again. Hospital industry blamed the legal structure for “stifling productive alignment between hospitals and physicians” (AHA 2007). In response, federal and state regulatory agencies analyzed the scenario and incorporated exceptions to the laws that allowed for a revival of hospital-physician joint venture arrangements (Jones 2004). These exceptions include ambulatory surgery centers that offer specialty surgical services (Hetzel and Tomey 2005). Federal and state laws pertinent to hospital-physician joint ventures, especially hospital-ASC joint ventures, are presented below.

The Office of Inspector General (OIG) issued a particular fraud alert for joint ventures which they considered suspects in 1989. In this alert, OIG addressed the characteristics of joint ventures that were suspect. OIG stated that ‘suspect joint ventures’ were characterized by selection of only ‘high patient-base’ physicians as investors by hospitals, in order to ensure continuance of referrals (Jones 2004).

According to the MedPac 2008 report, laws seem to be unclear with respect to alignment strategies between hospitals and physicians. MedPac Commission in their 2005 report called for reforms in the laws, to allow greater

collaboration among providers, thereby, reducing costs and increasing efficiency. The justification provided was that joint collaboration between hospitals and physicians in ASCs would result in efficient scheduling and usage of operating rooms. Also, the collaboration would involve joint negotiating with suppliers and managed care companies for better prices, which under the current federal law are 'restricted to few permissible activities' (MedPac 2008). When OIG raised concerns in a special 1999 bulletin, regarding limited services being provided to Medicare patients due to such arrangements (under the Civil Monetary Penalty Statute); it threatened the viability of joint venture arrangements.

The Federal anti-kickback statute does not allow the offer, payment, or exchange of monetary/other value to "induce the referral of patients for services paid for by federal health programs" (MedPac 2008). However, ASCs on account of being small investments are covered by the safe harbor provision of the law (Jones 2004).

Another law that affects joint venture relationships between hospitals and physicians is the Stark law. The law prohibits physicians from referring patients to entities in which they have a financial stake, with some exceptions. The exceptions include ASCs, dialysis centers, hospices, end-stage renal disease facilities and cardiac catheterization laboratories. It allows for greater flexibility for hospitals to structure and pursue physician arrangements (Melvin and Polacheck 2001). According to Harrison (2006), this law allows for increased opportunities for hospital-ASC joint ventures.



Although antitrust laws raise some concerns for hospitals to joint venture with ASCs, in a financially challenging and competitive market, hospitals are continuing to joint venture with ASCs, albeit cautiously. Attention to regulatory compliance during development, structuring and implementation of the joint ventures can help hospitals reap the associated benefits without legally jeopardizing their success.

IRS also poses a regulatory constraint on hospital joint venture arrangements with ASCs. Most of the nation's not-for-profit hospitals are exempt from federal income taxes (AHA 2011). These hospitals are required to abide by certain restrictions in the Internal Revenue Code, failure of which can result in loss of tax exempt status. Since, most ASCs are for-profit centers (MedPac 2004), not-for-profit hospitals entering into joint venture arrangements with for-profit ASCs could potentially lose their tax exempt status.

The Health Reform Legislation has introduced yet another regulatory change in the healthcare market. Hospitals and ASCs would both be impacted as healthcare service needs of 32 million additional Americans would have to be met. Early industry speculations suggest that this change would cause providers (hospitals and ASCs) to develop capacity and result in ASCs being considered as 'cost-saving contributors of system capacity' (ASC Advocacy Committee 2010). Reports also suggest that this reform would lead to an increase in surgical volume and the number of physicians joining ASCs would provide opportunities to improve hospital-physician relationships (Paige 2010), and create an

environment that would foster consolidation activity between hospitals and physicians (Neuterra Healthcare 2010). Overall, although challenging in terms of simultaneously decreasing reimbursements and increasing pressure on centers to be more efficient and effective, analysts are leaning towards the belief that this would spur the growth of ASCs and provide opportunities for joint ventures between hospitals and ASCs (Neuterra Healthcare 2010). With increasing environmental uncertainty due to market competition and changing regulatory requirements, the findings of this study would also help hospitals make an informed decision towards considering joint venture arrangements with ASCs.

In addition to the above mentioned federal laws, there are some state regulations such as certificate of need laws (CON) that might impact such joint venture arrangements. According to the National Council of State Legislatures, thirty six states currently maintain some form of CON laws. These laws aim at controlling healthcare costs by restricting acquisition, expansion and creation of newer facilities. In this study, one of the hypotheses also tests whether being located in a state having CON would influence a hospitals decision to joint venture with an ASC.

Table 3 summarizes the laws that are relevant to hospital-physician collaborations. Joint ventures help improve efficiency and reduce costs subject to hospitals and ASCs compliance with the regulatory requirements.

Table 3: Laws Pertinent to Hospital-Physician Collaborations

<b>Law</b>	<b>Brief Description</b>
Civil money penalty statute (Section 1128A of the Social Security Act)	Prohibits hospital payments to physicians to reduce or limit services to Medicare inpatients, regardless of the medical necessity of the services. A hospital would be in violation of this statute if, for example, it rewarded physicians for reducing the number of days in the intensive care unit or the drugs their patients use.
Federal anti-kickback statute (42 U.S.C. 1320a-7b)	Prohibits the offer, payment, or receipt of anything of value to induce the referral of patients for services paid for by federal health programs.
Ethics in Patient Referrals Act (The Stark Law) (42 U.S.C. 1395nn)	Prohibits physicians from referring Medicare or Medicaid patients for certain services to entities with which they have a financial relationship, unless the arrangement fits within an exception. Exceptions include certain compensation arrangements and surgical services provided by ASCs.
Antitrust laws (various federal and state statutes)	May apply to hospitals and physicians that are independent entities but that wish to jointly negotiate contracts with health insurance payers. Antitrust laws are enforced by the Federal Trade Commission, Department of Justice, state attorneys general, and – potentially – private litigants.
IRS rules	Not-for-profit organizations should abide to restrictions of Internal Revenue Code. The restriction includes payment restrictions by hospitals to physicians in order to prevent tax-exempt institutions assets from being used for non charitable purposes.
Health Reform Legislation	Mandates providing care for millions of uninsured individuals. This includes free colonoscopy screening for all. Impact yet to be seen.
Certificate of Need Laws	Laws governing acquisition, expansion and creation of healthcare facilities in order to restrain rising healthcare costs. These laws differ across states and are enforced by state authorities.

Source: MedPac Report Chapter 3, June 2008; National Council for State Legislature 2010; AHA Report titled '5 Regulatory Barriers to Clinical Integration' 2010.

Review of the dynamic market structure and regulatory environment show that all healthcare providers (including hospitals and ASCs) are affected by these changes. Hospitals and ASCs are increasingly entering into collaborative

arrangements to ensure survival. The motivations behind these collaborative arrangements are reviewed in the forthcoming sections.

#### Hospital-ASC Joint Ventures – Hospitals Perspective

Industry analysts report that joint ventures (JV) are pursued primarily by hospitals in order to attract and retain physicians/physician groups and integrate them into the hospital system (HealthCare Partners 2010). Hospitals consider JVs as a physician relationship tool. They view JV as a strategic alternative to help align physicians' interests to their own, in order to draw related benefits. For example, by having an arrangement with an ASC, a hospital could reduce the burden on its operating rooms (OR) by directing its outpatient surgical patients to the ASC. This would not only help reduce operating costs for the hospital OR but also ensure availability of the OR for more number of inpatient and emergency surgeries (HealthCare Partners 2010).

If managed well, joint venture arrangements also help hospitals increase their inpatient and outpatient volume while simultaneously reducing costs. Through careful management of joint ventures, hospitals could promote themselves as being 'patient-centric', by providing appropriate care in the right setting. This could result in the development of a positive image amongst stakeholders. With regard to patients, patient satisfaction at an associated ASC could help attract patients to the hospital for other health concerns. With regard to physicians, hospitals would seem supportive of the 'superior experience of

delivering care' (HealthCare Partners 2010). Having joint venture arrangements with key physician groups would also help hospitals gain leverage while negotiating contracts with managed care organizations.

A joint venture arrangement with an ASC could also help improve hospitals service line. Hospitals could benefit from the technical expertise of ASCs in specialized services and enhance their ambulatory care strategies. And most important, hospitals would benefit as partners from the additional revenue generated in ASCs and ancillary services.

#### Hospital-ASC Joint Ventures – ASC/Physician Perspective

Physicians prefer ASCs over hospitals for varied reasons. One of the key reasons is operational efficiency (i.e., faster turnover time of patients/procedures; convenient and reliable scheduling). ASCs are not affected by disruptions from emergency surgeries. In addition to convenient scheduling, ASCs also offer physicians the security of working repeatedly with the same team, on a daily basis. Physicians believe that these lead to better outcomes and higher satisfaction (shorter waiting times, patient experience from admission to discharge – all in one day, and no overnight stay resulting in lower nosocomial infection rates).

Satiani and Vaccaro (2010) note that surgical specialties are typically known to be less satisfied with hospitals compared to other specialties. The dissatisfaction is attributed to concerns regarding patient care, ease of practice, and relations with hospital management. Thus, shared control becomes a very

important factor in consideration of any joint ventures. Physicians would prefer to have control over the entire clinical care process, and direct influence on the care team. Typically, the decision making process is faster in ASCs than hospitals, in part due to lack of various committee structures. Industry analysts report that physicians appreciate a faster decision making process (HealthCare Partners 2010). In addition to these practice and control reasons, physicians could also use the opportunity to supplement their income and offset part of the reductions in professional fees.

Although owning ASCs seems to be intuitively preferable, physicians are mindful of the advantages a hospital provides. For example, hospitals have greater leverage when negotiating with managed care organizations and suppliers. A joint venture with a hospital could help physicians draw benefits from this higher power. In addition, having a collaborative relationship with a hospital could help increase referrals to the ASC. Also, a joint venture could definitely help ASCs by providing greater access to capital.

#### Response of Hospitals: Competition to Collaboration - Joint Ventures

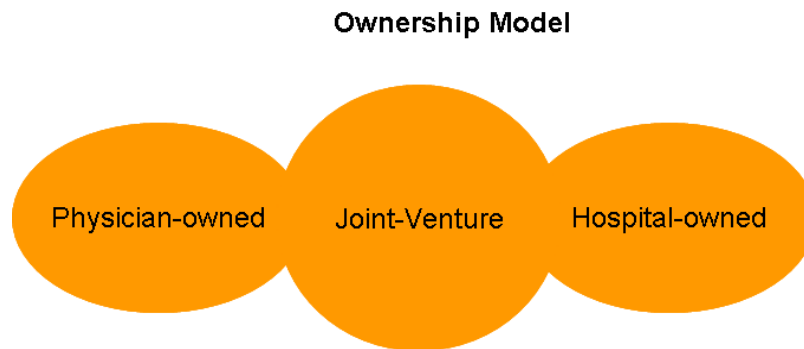
Based on the literature reviewed in this chapter, joint ventures seem to be a good strategic choice for hospitals responding to increasing competition and resource (physicians, patients and monetary resources) threats posed by ASCs. Joint ventures (JV) allow for increased integration between hospitals and

'physicians owning ASCs'. It allows both entities to enjoy a mutually beneficial financial and strategic partnership (Harrison 2006; Satiani and Vaccaro 2010).

Hospitals would prefer forming joint ventures than acquiring these centers because they typically involve pooling of interests as opposed to a substantial capital outlay. Under current circumstances, hospitals would not want to entertain the alternative of employing physicians, which they previously did during the 1980s and the early 1990s. High acquisition costs, providing salary and benefits, costs associated with making the electronic medical record compatible with the hospitals, are some of the reasons why hospitals are hesitant to get back into the employer role (Satiani and Vaccaro 2010).

Observing the increasing number of joint venture arrangements between hospitals and ASCs does indicate that JV's are emerging as the preferred choice. Researchers and analysts report that the strategic integration model (e.g., joint venture arrangement) that would best suit hospitals goal will depend on the hospitals financial and operational performance, relationship with key physician groups, market position, available alternatives, cultural considerations in terms of mission, and other key factors (Casalino et al. 2003; Keegan and Bruce 2009; VMG Intellimarker 2010). Figure 4 depicts that the preferred ownership model is shifting towards joint-ventures rather than freestanding facilities.

Joint ventures between hospitals and ASCs would allow both parties to share risks and rewards of their operations, pool their resources in providing



Source: Healthcare Partners presentation on Hospital-ASC Ownership 2010

Figure 4: Ownership model

services, combine complementary technological knowledge and supplement financial resources.

Joint venture arrangements enable both groups to participate and have control over the management of the venture. Hospital-ASC joint ventures are becoming increasingly popular as both groups exercise control over the venture and no single group has the unilateral ability to make all decisions, regardless of the percentage of ownership, share of earnings or size. Analysts report that in current healthcare environment, hospitals of all types, regardless of their mission are interested in ASC joint ventures (Powell Goldstein LLP 2006)

Joint ventures are becoming increasingly common in the healthcare industry as hospitals are trying to consolidate multiple functions (Gapenski 2003). In case of hospital-ASC joint ventures, this also provides hospitals the opportunity to enjoy the benefits of consolidation without violating regulations or antitrust laws. Hospital-ASC joint ventures enable the healthcare industry to



cover wider geographic markets, attain economies of scope, enhance new-product/service development and achieve greater efficiencies (Curtis 2001).

Hospital-ASC joint ventures have also been viewed as a vehicle to attract physicians in order to develop a structure supporting innovations, better management and efficient operations (Snow 1998). These arrangements also benefit by moving the focus from inpatient care and hospitalization to the entire care process, for fewer dollars and improved profits (Harrison 2006). These seem advantageous to the hospitals, physicians/physician groups owning the ASCs as well as the key stakeholders i.e., patients.

There are many key factors influencing joint venture arrangements and ensuring their success. Similarity in mission, trust, focus on continuum of care, efficient management of resources, continuous technological upgrade, development and implementation of clinical treatment protocols and integration of information systems between hospitals and ASCs are some important considerations that can help build a successful venture between a hospital and an ASC (Miller and Hill 2004; Harrison 2006; Burns and Muller 2008). A well developed and implemented joint venture can help improve access to care for patients, increase speed and efficiency from consolidating their medical records and enrich their experience by providing a seamless continuum of care.

Hospitals could benefit largely by considering joint ventures with ASCs. It could provide hospitals with opportunity to supplement their declining revenues (Harrison 2006). From an operational viewpoint, these ventures could provide an

opportunity for hospitals to streamline their care processes, gain access to new and improved technologies and most importantly develop better physician relationships. Literature suggests that patient mix is an important factor towards profitability of joint ventures (Harrison 2006). Joint ventures could lead to better financial performance, for which focus needs to be on more profitable DRGs. This requires patient mix to be managed well and organizational efficiency to be monitored (Harrison 2006). Joint ventures also provide hospitals with the opportunity to explore new technologies such as electronic medical records, on-line patient scheduling, and electronic billing processes (Harrison 2006). Although hospital-ASC joint ventures can help improve relationships between hospitals and physicians, it can only be favorable if the arrangement is based on complementary goals (mission), and open communication.

As presented in this chapter, researchers and analysts have noted various factors that influence or motivate joint venture arrangements between hospitals and ASCs. However, the exhaustive review also indicates that there are very few empirical studies that have explored factors related to hospital-ASC joint ventures. Responding to this need, building on this review and the theoretical premise presented in the next chapter, the study empirically examines the various factors that affect a hospital's decision to joint venture with ASC.

## Summary of Chapter 2

A review of relevant literature related to Hospital-ASC joint venture arrangements was presented in this chapter. The key sections in this chapter

were: growth of outpatient surgeries vis-à-vis inpatient surgeries, history of ambulatory surgery centers (ASCs), ASC characteristics, impact of ASCs on hospitals, similarities and differences between various integration strategies (i.e., acquisitions, mergers and joint ventures), most common types of joint venture arrangements between hospitals and ASCs, laws pertinent to hospital-physician relationships, motivations of hospitals as well as physician owners of ASCs to collaborate jointly, and hospitals use of joint ventures as a means of collaborative tool with ASCs. This chapter also reviewed empirical research that helped develop this study.

Examining the growth of outpatient surgeries vis-à-vis inpatient surgeries and the history of ASCs supported this study by highlighting the threat of competition posed by ASCs to hospitals. The literature showed that technological innovations and changes in the market resulted in formation of ASCs, which in turn resulted in increasing competition for hospital industry. It also helped understand that hospitals' survival is dependent on constant restructuring in tandem with complex healthcare environment.

Literature suggested that changes in managed care environment, Medicare reimbursements and safe harbors in federal regulations resulted in the growth of ASCs. These ASCs continue to draw profitable outpatient surgery services away from hospitals and pose a threat to hospitals survival. In response to the declining outpatient surgical volume, hospitals started considering joint venture arrangements with ASCs. This section presented the impact of

organizational, operational and financial factors on hospital survival. This study empirically analyzes these factors and examines their roles in hospitals decision to joint venture with ASCs. Thus these two sections directly support the study objective.

The section presenting literature on the differences between acquisitions, mergers and joint ventures was extremely pertinent to this study. The study is able to better address issues related to market and strategic choice amongst integration strategies by understanding the similarities and differences between these three strategies. The section also elaborated on advantages and disadvantages of each of these three strategies.

Literature on different types of healthcare joint venture arrangements provided a clearer understanding of the term 'joint venture', the main variable in the study. Understanding the various types of joint ventures helped the study in two ways: 1) Defining the term 'joint venture' and 2) Understanding the legal facets and regulatory environment that surround these joint venture arrangements.

Literature on the regulatory environment in which hospitals operate indicated that federal and state regulations affect a hospitals decision to joint venture. Certificate of need laws are especially crucial in assessing the strategic decisions of hospitals. This is extremely relevant to this study as regulatory factors are one of the most important independent constructs that this study examines.

The literature on the trends in hospital-physician relationships, and examining motivators driving hospitals as well as physicians, indicated that hospitals are increasingly involved in joint venture arrangements with ASCs. As hospitals operate in a highly competitive market, the decision to joint venture does include market factors such as market concentration measured by Herfindahl-Hirschman Index and other related market factors. Hospital-ASC joint venture arrangements are also related to organizational factors such as size and affiliation to a system, as well as operational factors such as the number of outpatient surgical operations and occupancy rate. Since financial incentives are one of the key considerations, hospitals decision to joint venture is also related to financial factors such as cash flow margin and operating expense. Thus, it supports the aim of this study.

The major concern that arises after this review of literature is that there is no empirical multivariate study that assesses the relationship between market, regulatory, organizational, operational and financial factors with the hospitals decision to joint venture with ASCs. This study will contribute to the existing literature by providing empirical insights into the factors affecting hospitals decision to joint venture with ASCs.

The next chapter, Chapter 3 presents the theoretical framework and conceptual model for this study. The two theoretical perspectives used to form the basis for this study are resource dependency theory and neo-institutional theory. The framework, based on the combined insights of these two theories,

helps develop the hypotheses for this study, and guides the directionality of the hypotheses.

### CHAPTER 3: MULTI-THEORETICAL PERSPECTIVE

A combined perspective of resource dependency theory (RDT) and neo-institutional theory (NIT) is used to examine the main research questions in this study. Both theories focus on an organization level of analysis. They are based on a natural model - open systems theory. An open system theory suggests that organizations (hospitals) engage in exchange relationships with the environment. Hence there is dependence on the environment to acquire resources. Natural open systems theory realizes that there is a human component to hospitals, and attempts to take this factor into account. The natural systems perspective adds components of interpersonal relationships and characteristics to the rational systems perspective, making it somewhat more comprehensive in assessing how hospitals really work.

Resource dependency theory emphasizes the importance of an uncertain environment, resource scarcity and competition. On the other hand, Neo-institutional theory lays emphasis on mimetic responses by organizations to legitimize themselves to stakeholders under regulatory pressure. An integrated approach of the two theories to investigate hospital joint ventures with ASCs could potentially yield valuable insights. The above approach could also help to test the strengths of these theories individually as well as determine their

complementarities. By utilizing the integrated approach, the present study also responds to the call by D'Aunno and Zuckerman (1987), who asked that future research combine different theoretical perspectives in order to contribute meaningfully to the literature.

### Resource Dependency Theory

Resource dependency theory posits that an organization's environment is the source of scarce and valued resources necessary for survival (Alexander and Morrissey 1989; Scott 2003). Organizations must interact with the environment to obtain resources because an organization is not capable of generating all of its needed resources. These resources can be either monetary or physical, in the form of information or even one of gaining social legitimacy.

This study assesses the underlying reasons for hospitals to enter into joint venture with ASCs. Hospitals want to acquire greater access to resources (patients, physicians, financial resources) within their geographical market area. According to resource dependency theory, the level of resource scarcity will influence an organization to yield some of its autonomy or take other measures to acquire the scarce resources through different bridging strategies. These may include vertical and horizontal integration such as joint ventures, mergers and acquisitions. This study evaluates whether hospitals and ASCs are giving up their autonomy to enter into joint ventures with each other in order to exchange key resources, i.e., patients and specialists. Thus, resource dependence theory is



quite appropriate to study the indicators (both external and internal) that characterize joint venture arrangements between hospitals and ASCs.

There have been many studies that have applied resource dependency theory to the study of joint venture arrangements from as early as the 1990's. It has been used to understand the strategic motivations for international alliance formation (Glaister and Buckley 1996). Resource dependency theory has also been applied to discuss the control and implementation of joint venture relationships. This study focused on the strategic interdependence between the joint venture and each parent organization as well as the environmental uncertainty faced by the joint venture (Kumar and Seth 1998).

The resource based view has been used as the theoretical premise to answer a number of questions. These are: a) examining the extent to which and the means through which the collaborative process lead to reapportionment of skills between partners in international alliances (Hamel 1991); b) examining why firms form strategic alliances in the semiconductor industry (Eisenhardt and Schoonhoven 1996); and c) formulating a model to translate the strengths of a strategic alliance to knowledge that can improve a firm's performance (Simonin 1997). Other research questions addressed also include: a) examining the extent to which technological change affects a firm's relationship with alliance partners (Afuah 2000); b) discussing creation of firm linkages through collaboration in the chemical industry (Ahuja 2000); c) determining whether firms learn to create value alliances in the manufacturing sector (Anand and Khanna 2000); d)

discerning the effect of resource complementarity, status similarity, and social capital on alliance formation potential in the banking industry (Chung et al. 2000); e) investigating the outcomes and duration of strategic alliances among competing firms in the automotive, aerospace and telecommunications / electronics industries (Dussauge et al. 2000); and f) researching partner-selection criteria important to firms from emerging and developed markets (Hitt et al. 2000).

It is notable from the literature that most resource dependency theory applications to examine joint venture arrangements have been in studies investigating global alliances or the technology and manufacturing industries, and not in the healthcare industry. Thus, there is a gap in literature concerning resource dependency theory application to the study of hospital and physician joint venture arrangements. This study is aimed at lessening this gap.

Another key tenet of the resource dependency theory which is especially applicable to this study is its view on 'organizational dependency'. As per resource dependency theory, organizational dependency does not necessarily result in problems (D'Aunno and Zuckerman 1987). Problems arise when the environment is unstable, resources become scarce, external demands change, and/or conflicting or multiple demands arise externally from the environment. The healthcare environment is undergoing a lot of change with respect to regulatory and technological changes.

Pfeffer and Salancik (1978) have elaborated on three factors that describe the level of environmental uncertainty, viz. resource munificence, resource stability and resource complexity. Munificence refers to the availability of resources or resource substitutions. Stability refers to the consistency of resources in the environment and complexity refers to the complexity of relationships an organization encounters to obtain resources. The current healthcare environment is complex and poses constraints on resource munificence and stability. Hospitals are operating in a complex environment where they are forced to compete for limited resources (i.e., patients, revenue and physicians). With physicians owning their own ASCs, hospitals face the danger of losing their resources (physicians and patients) which threatens their very survivability.

The resources that are relevant to understanding the complexity of hospital joint ventures are organizational, operational and financial under market and regulatory conditions. Just like under any other arrangement (be it JVs, acquisitions, mergers or contract management, hospitals are seeking an affiliation (i.e., joint ventures with physicians) to secure necessary resources.

Resources for hospitals include patients, physicians, capital and financial resources, and favorable regulations. (Alexander and Morrissey 1989; McCue et al. 2007). Market, organizational, operational and financial factors together constitute the resource pool for an organization. The abundance or scarcity of the above mentioned resource pool elicits a response strategy from organizations in

a market (Pfeffer and Nowak 1976; Pfeffer and Salancik 1978). Thus, in highly competitive markets having limited specialists and more hospitals, this study would expect a higher likelihood of hospitals entering into joint venture arrangements with ASCs.

### Neo-Institutional Theory

In addition to the factors discussed above, there are also other underlying pressures that a hospital would feel in a competitive market. These pressures can be explained using neo-institutional theory. D'Aunno and Zuckerman (1987) stressed the importance of integrating theoretical frameworks to fully understand a context/scenario as opposed to using a single theory that only partially explains a viewpoint. In this study, resource dependency theory and neo-institutional theory are integrated to provide the framework for studying hospital joint venture arrangements with ASCs. There have been studies that have utilized these two theories together (Zinn et al. 1998; Barringer and Milkovich 1998; Sherer and Lee 2002). However, none of these studies that have used these two theories complementarily have examined hospital-physician joint venture arrangements.

Neo-institutional theory is also an “open system” theory and is based on Institutional theory. The institutional perspective of organizations was originally developed by Meyer and Rowan (1977) and was further refined to develop a neo-institutional approach by DiMaggio and Powell (1983). According to this perspective, cognitive, regulative, and normative pressures constitute the

institutional environment. These pressures demonstrate levels of interactions between environments and organizations (Scott 2003).

### *Cognitive Pressure*

Cognitive pressure refers to the pressure felt by organizations (such as hospitals) when they observe other similar organizations (hospitals) being successful in the same market by following a new strategy (such as joint venturing). This is an extremely common condition in hospitals operating in a competitive healthcare market. Organizations tend to copy the behaviors and structures of the most successful organizations in their sectors, because these successful organizations are viewed as legitimate by stakeholders in the market. This behavioral response is referred to as a “mimetic” mechanism as organizations would like to be in tandem with culturally supported and recognizable structures and behaviors (D’Aunno and Zuckerman 1987).

When hospitals observe other hospitals entering into joint ventures with ASCs in their market, they would tend to mimic their rivals’ behavior and enter into such an arrangement themselves. This would occur because of their belief that the other hospitals that have entered into such arrangements are legitimate, thereby gaining greater access to resources (physicians and patients) and obtaining a competitive edge over other hospitals such as themselves. Hospitals in competitive markets would not want other hospitals to gain a competitive edge over them. Thus, this is an additional market factor that would influence a hospital’s decision whether to or not to joint venture with an ASC.

### *Regulatory Pressure*

Regulatory pressures such as legal requirements also have an effect on organizations. Legal requirements are designed to force organizational conformity as a condition for support and approval. Compliance leads to legal acceptance and non-compliance leads to punishment (DiMaggio and Powell 1983; Scott 2003). One such regulatory pressure hospitals face is the process of acquiring a Certificate of Need (CON). Essentially the CON regulations are aimed at limiting healthcare expenditure by restraining health care facility costs. CON provides for coordinated planning in the construction and expansion of new hospital services or facilities.

Presence of CON regulations greatly impacts expansion strategies for hospitals in various market areas. In environments such as these, presence of fewer ASCs is expected as these regulations constrain the construction of new service facilities and hence affect the level of competition. Presence of fewer ASCs indicates less competition in comparison to markets where there are no CON regulations. Neo-institutional theory complemented with resource dependency theory state that joint venture arrangements are more likely in more competitive environments.

Other regulatory pressures that hospitals face are the Internal Revenue Service (IRS) regulations and their mission. Not-for-profit (NFP) hospitals are subject to different tax regulations than for-profit hospitals. The basic distinction

between the two is that NFPs are expected to reinvest their profits back into the hospital and provide more charity care consistent with their NFP status.

Most ASCs (90%) are for-profit entities (MedPac 2004). A joint venture with a for-profit ASC can raise concerns regarding a non-profit hospital maintaining its tax-exempt status. The IRS can revoke the tax-exempt status of a NFP hospital if it deems that the hospital is behaving no different than a for-profit hospital and is not guided by the mission of providing charitable care. This can act as a regulatory barrier for NFPs to develop joint ventures with tax-paying, for-profit ASCs. NFPs may not want to enter into a joint venture because they do not want to lose their tax-exempt status.

Neo-institutional theory suggests that violating the expectations may call a hospital's legitimacy into question (D'Aunno and Zuckerman 1987). Hence, building on this theory, an NFP hospital might not enter into a joint venture with a for-profit ASC.

#### Joint Venture Arrangements between Hospitals and ASCs

Prior literature suggests that both external environmental factors and internal factors unique to hospitals influence physician-hospital alignment via joint venture arrangements with ASCs (Lake et al. 2003; Berenson et al. 2007; Casalino et al. 2008). These factors also constitute the boundaries that constrain the strategic actions that can be pursued by a hospital in response to a changing uncertain environment.

External environmental factors relate to different market conditions and regulatory factors where hospitals and physicians compete. Hospitals have formed joint venture arrangements with physicians to own and operate ASCs in markets with fewer competing hospitals that do not employ large numbers of physicians (Berenson et al. 2007; Casalino et al. 2008). Hospitals have also formed these ASC joint venture arrangements with physicians in markets where they are losing service line revenues to competing free-standing ASCs.

Thus, a joint venture strategy allows hospitals to avoid losing an entire revenue base of the service line by having a share in the revenues. As a result of this arrangement, hospitals expect to retain a portion of the revenues they might have otherwise lost and to increase physician referrals of patients requiring inpatient hospital services (Casalino et al. 2008).

Among other external environmental reasons, regulatory factors could be driving the pace of joint venturing arrangements with physicians. IRS regulation on tax-exempt status ownership of non-profit hospitals may act as a barrier for non-profit hospitals to develop such arrangements with tax-paying for-profit ASCs (Berenson et al. 2007). Non-profit hospitals could potentially lose their non-profit tax status if they joint venture with ASCs which are mostly for-profit entities. The mission of for-profit hospitals, which are tax paying entities, is aligned with the corporate tax paying entity status of physician owned ASCs and hence are less constrained by IRS regulations.



Another regulatory barrier is the certificate of need (CON) regulations in some states which regulates the building of ASCs. ASCs are found to be prevalent in markets without certificate of need regulations or with relaxed certificate of need regulations (Devers et al. 2003; Casalino et al. 2008).

Stark III is another regulatory concern, the main purpose of which is to curtail the monetary influence on healthcare decisions thus protecting patients and federal healthcare programs from fraud and abuse (OIG 1999). After the introduction of safe harbors in the Stark III in 1999 which includes ASCs (OIG 1999), avenues have opened up for hospitals to consider strategies such as joint venturing arrangements with physician owned ASCs in order to supplement their financial resources.

The recent revision of Stark III could very well have spurred the growth of the JV arrangement. The revision has modified the previous exceptions to Stark Laws of general prohibition on referrals and has thus revived the trend of hospital-physician ventures (Jones 2004). Hospital-physician joint venture arrangements have been increasing after these safe harbors were introduced (Jones 2004).

In addition to these external environmental factors, internal factors related to the management and mission of the hospitals may also be underlying motives for the physician-hospital alignment via joint venture arrangements with ASCs. These include the mix of services and procedures (such as gastroenterology,

ophthalmology and orthopedics) offered by hospitals which may influence hospitals' decision to joint venture with ASCs.

Also, in the case of those services that compete directly with some specialized services provided by ASCs, hospitals' could be influenced to shift the same from inpatient settings to outpatient settings to better align with physicians via joint venture arrangements (Devers et al. 2003). The ability of hospitals to market their services in order to gain access to new markets and patients also influence their decision to joint venture with ASCs (Devers et al. 2003). In addition, this shift of delivering surgeries and procedures from an inpatient hospital setting to ambulatory settings may help hospitals lower their cost of care (Bian and Morrissey 2006).

Hospital management can also contribute to the operation of ASCs in marketing and branding of services, scheduling patient flow and controlling staffing levels, which can be viewed by hospitals as a selling point to physicians with joint venture arrangements (Berenson et al. 2006; Berenson et al. 2007).

Finally, the availability of financial resources of hospitals may be another underlying motive for such joint venturing arrangements. Hospitals that possess the capital resources from generating positive cash flow, maintaining high levels of liquidity and accessing external debt and equity capital are attractive to ASCs. The latter need capital to purchase medical equipment and information systems (EMR) as well as to build, expand and /or renovate ambulatory centers resulting in greater market presence (Lake et al. 2003; Berenson et al. 2007; Taylor 2009).

### Conceptual Model

The conceptual model for this analysis is built on the premise of the integrated framework of resource dependency theory and neo-institutional theory. Thus, a joint venture with an ASC can be viewed as a function of all the various factors that may affect the process to occur. Mathematically, a model can be represented as follows:

$$\mathbf{JV = f (MKT, REG, ORG, OPR, FIN, CONT)} \quad \textbf{(Equation 1)}$$

Where:

JV = those hospitals that joint venture with ASCs compared to those that did not

MKT = hospital market factors

REG = regulatory factors

ORG = hospital organizational factors

OPR = hospital operating factors

FIN = hospital financial factors

CONT = control factors

Depicted in Figure 5 is a graphical representation of the model in Equation 1. With regard to exploratory variables, under the main constructs of market, regulatory, organizational, operational and financial factors, individual variables are listed and their proposed directionality based on the theoretical framework are shown.

The study also controls for complexity of service provided by the hospitals, size of the market, the mission of a hospital and the time during which the

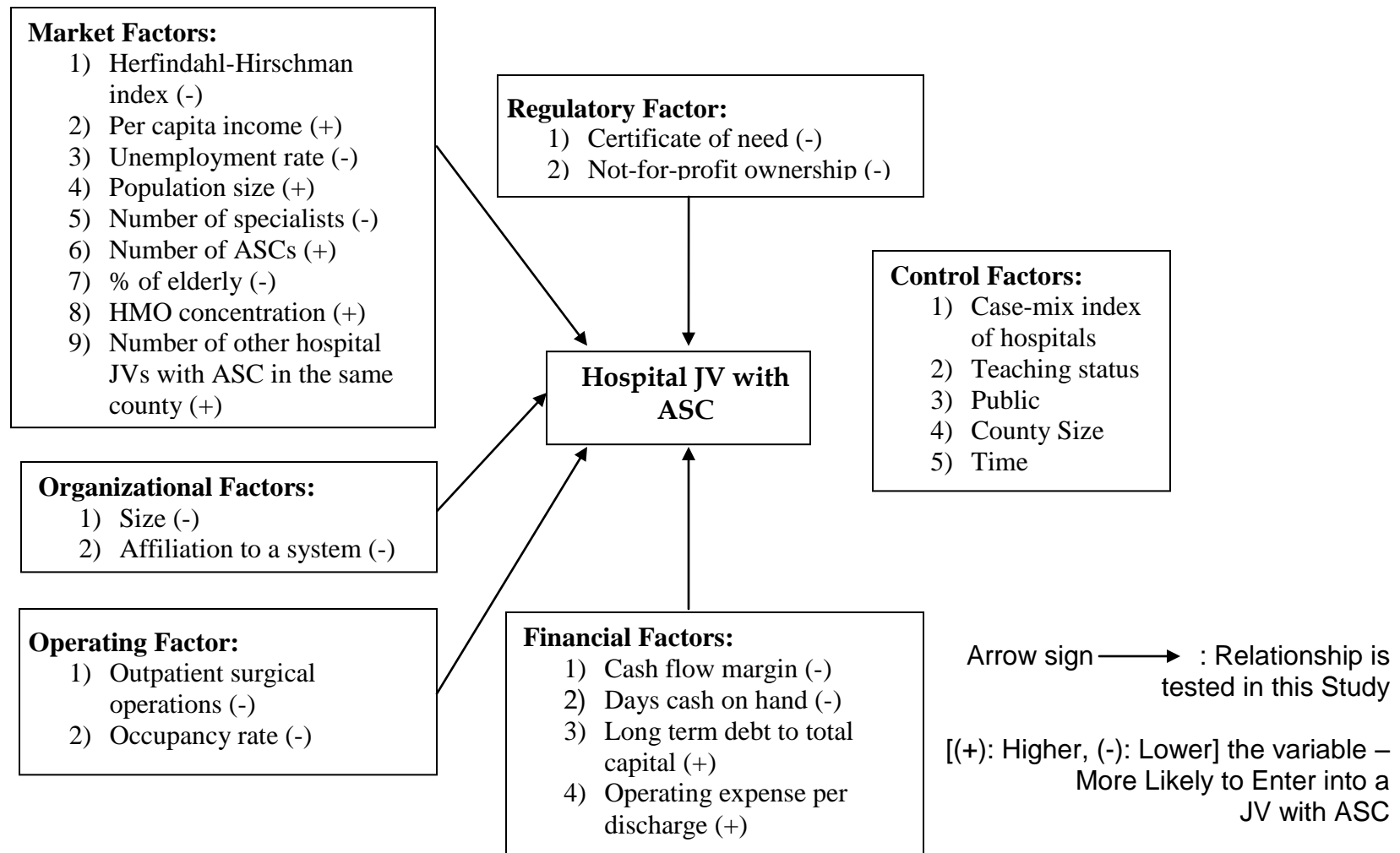


Figure 5: Conceptual Model: Relationship of Market Factors, Regulatory Factors, Organizational Factors, Operational Factor and Financial Factors to Hospital Joint Venture Arrangements with Ambulatory Surgery Centers.

hospital entered in a joint venture arrangement with ASC. This study tests the association of these factors to the main variable of interest (dependent variable) i.e., a hospital joint venturing with an ASC using logistic regression.

### Hypotheses

In this study, six hypotheses are tested to analyze the association of market, regulatory, organizational, operational and financial factors to hospital joint venture arrangements with ASCs.

Resource dependency theory conceptualizes an organization (hospital) as a collection of productive resources bounded by an administrative framework. This theory is based on the premise that organizations rationally adapt to changes in the environment to ensure their survival. The survival of a hospital is threatened if their relationship with key resource providing constituents (example specialist groups) is diminishing.

Resource Dependence theory also postulates that organizations depend on their resource environments but strive to acquire control over resources in order to minimize their dependence on these resources. Joint venture arrangements provide access to key resources (patients, physicians and financial) as well as a level of control to hospitals and are therefore viewed as a viable strategy to implement.

A key construct of resource dependency theory is competition. Scarce resources and the need to share them with others results in a competitive environment. This perspective posits that in highly competitive markets,

cooperative exchange relationships between organizations are formed to secure and stabilize resource flows (Scott 2003). In highly competitive environments, organizations share a limited resource pool and survival depends on how resources are allocated across competitors (Pfeffer and Salancik 1978; Ulrich and Barney 1984). Thus, the first hypothesis is as follows:

**H<sub>1a</sub>:** Keeping regulatory, organizational, operational and financial factors constant, hospitals located in highly competitive outpatient surgery markets (low Herfindahl-Hirschman Index and more number of ASCs) are more likely to enter into joint venture arrangements with ASCs than other hospitals.

Resource dependency theory suggests that organizations would opt for different strategies under uncertain environmental conditions. This can minimize negative effects of external environments and dependencies, thus increasing the likelihood of organizational survival. One such strategy is forming strategic alliances (Sheppard 1995; Currie 2000). The theory suggests that a joint venture is a form of strategic alliance that a hospital would consider to help secure resources (example patients). Therefore, organizations form interdependent relationships to secure resources in unfavorable market conditions such as lack of demand for services and inability to pay for services.

Based on prior literature, the community's financial ability to pay for healthcare services can be measured by using per-capita income, unemployment rate, and lower percentage of people aged over 65 as proxy measures (McCue

et al. 2000; Harrison 2002; Harrison et al. 2003). Also, total population is a measure of market demand for health care services (McCue 2000; Harrison et al. 2003).

ASCs are traditionally owned by physicians (MedPac 2004). In order to meet the demand in the environment, hospitals are dependent on physicians to provide surgical services. Hence, supply of services depends on physicians. If physicians own ASCs within the same market, then the hospitals' supply of services would depend on strategic arrangements with the ASCs. This will reduce environmental uncertainty and enhance access to patients for hospitals based on the interdependence tenet of resource dependency theory and would provide greater power to hospitals. Therefore, the following hypothesis can be presented:

**H<sub>1b</sub>:** Keeping regulatory, organizational, operational and financial factors constant, hospitals located in markets with higher demand (e.g., larger populations) and higher ability to pay (e.g., lower percentage of elderly, low unemployment rate and higher per capita income) are more likely to enter into joint venture arrangements with ASCs than other hospitals.

The number of specialists available in a market is a crucial indicator of supply in the market. The 2004 MedPac report indicates that ASCs are mostly single specialty and owned by physicians/physician groups. If groups of physicians together open an ASC in direct competition to a hospital and the

market does not have many more specialists practicing in those specialties, it could competitively handicap a hospital to provide those services.

A greater number of specialists in the market indicates a larger supply of specialists in the market, which in turn, would lower the market power of specialists/specialist groups and reduce the environmental uncertainty for the hospital. The ASC literature shows that most of the ASCs are single one or two specialty centers and the most common procedures/ surgeries performed in ASCs relate to ophthalmology, gastroenterology or orthopedics specialty (MedPac 2004; Bian and Morrissey 2006). These are the top three specialty services offered by ASCs.

Physician specialists are viewed as key resources in the market since they refer patients to hospitals. Given a fewer number of these key physician specialists in the market; one would expect hospitals to consider a joint arrangement with them in order to secure the service offerings. Since hospitals perceive competition from specialists owning ASCs as the biggest threat (Lake et al. 2003), the following can be hypothesized:

**H<sub>1c</sub>:** Keeping regulatory, organizational, operational and financial factors constant, hospitals located in markets with fewer numbers of key specialists (gastroenterology, ophthalmology and orthopedics) in the market are more likely to enter into joint venture arrangements with ASCs than other hospitals.



One of the underlying motives for hospitals to joint venture is to strengthen their ability to negotiate higher rates with health plans (Lake et al. 2003). The literature suggests that hospitals and physicians have stronger negotiating leverage with health plans if they are aligned together (Casalino et al. 2008). Previous studies have used HMO penetration as a proxy measure for managed care concentration in a market (Bian and Morrissey 2007). Thus, based on literature evidence and the response of organizations to a competitive uncertain environment, it can be hypothesized that:

**H<sub>1d</sub>:** Keeping regulatory, organizational, operational and financial factors constant, hospitals located in markets with a higher HMO penetration are more likely to enter into joint venture arrangements with ASCs than other hospitals.

One of the key tenets of neo-institutional theory is mimetic isomorphism. Mimetic processes do not rely on concrete evidence that the newly adopted joint venturing strategy will bear profitable results. Instead they focus on the normative acceptance of such strategies by the stakeholders (McCue 2000). Hospitals will tend to mimic the strategy adopted by other hospitals who appear to be early adopters of presumed successful strategies (Walston et al. 2001). If more hospitals in a market are entering into joint venture arrangements with ASCs, other hospitals will also tend to do the same considering these hospitals to be successful.

The literature also suggests that the likelihood of the adoption of a strategy is related to the previous number of similar adoptions in geographic proximity, also referred to as 'bandwagon pressures' that originate from institutional forces (Katz and Shapiro 1985; Abrahamson and Rosenkoph 1993; Walston et al. 2001). A greater number of existing joint ventures between hospitals and ASCs in a market would put more institutional pressure on other hospitals. Mimetic behavior has been attributed to the fear that competitors may gain a competitive advantage through adoption (Abrahamson and Rosenkoph 1993; Westphal and Zajac 1998; Walston et al. 2001) of such a strategy. This leads us to the next hypothesis which is as follows:

**H<sub>2</sub>:** Keeping regulatory, organizational, operational and financial factors constant, hospitals located in markets with higher number of hospitals joint venturing with ASCs are more likely to enter into joint venture arrangements with ASCs than other hospitals.

Regulatory pressure is one of the three pillars of institutional environments (DiMaggio and Powell 1983). Regulations (such as laws, rules, and sanctions) require organizations to behave in a compliant way. Certificate of Need (CON) is a regulatory process that healthcare organizations need to adhere to. Currently, more than 34 states have regulations requiring CON. The supporters of these regulations make an argument that healthcare is not a "typical" economic good

and market forces do not play out the same way in healthcare as they do for other goods (NCSL 2009).

Furthermore, most healthcare services (like diagnostic tests such as x-ray) are ordered by physicians for patients and patients themselves do not shop for these services contrary to other commodities. Thus, it follows that hospitals and healthcare services are insensitive to market effects on price, and should require a regulatory approach in the interest of the public (NCSL 2009).

In environments such as stated above, presence of fewer ASCs is expected due to the presence of CON being an entry barrier. Presence of fewer ASCs shows that those environments are less competitive than others where there are more numbers of ASCs, which increases the level of competition.

Applying the reasoning of resource dependency theory to less competitive markets, hospitals would prefer to maintain autonomy and remove interdependency. Thus, the response of hospitals based on the regulatory pressure as posited by neo-institutional theory and supplemented by resource dependency theory suggests the following hypothesis:

**H<sub>3a</sub>:** Keeping market, organizational, operational and financial factors constant, hospitals located in states without CON program are more likely to enter into joint venture arrangements with ASCs than other hospitals.

The joint venture literature suggests that one of the key attributes considered by organizations prior to joint venturing is similarity in culture and

mission (Pelfrey and Theisen 1989; Alexander and Morrissey 1989; Snail and Robinson 1998; Mark et al. 1998; Blaszyk and Hill-Mischel 2007). As most of the Ambulatory Surgery Centers are for-profit (MedPac 2004), NFP hospitals fear the loss of legitimacy and tax exempt status while considering joint venture arrangements with them. This is due to the regulatory pressure applied by the IRS on NFP entities that question joint venturing with other for-profit entities that do not have the same charitable mission (Horwitz 2007). Thus, it is expected that for-profit hospitals would be more likely to engage in such arrangements than their NFP counterparts.

**H<sub>3b</sub>:** Keeping market, organizational, operational and financial factors constant, for-profit hospitals are more likely to enter into joint venture arrangements with ASCs than non-profit hospitals.

Resource dependency theory postulates that organizations depend on their resource environments but also strive to acquire control over resources in order to minimize their dependence on these resources. Therefore, hospitals will try to be as independent as possible. Large hospitals have more resources, which allow them to adapt their internal structures more rapidly to match environmental demands (Greening and Gray 1994; Harrison 2006). Therefore, large hospitals survive better in uncertain environments and have less incentive to enter into any agreement with an external entity.

Also, hospitals affiliated with a multi-hospital system have access to additional system resources. This enables them to have greater power to internally restructure and reorganize prior to considering external linkages such as joint venture arrangements. Conversely, if hospitals are not affiliated to a system, they do not have access to additional resources and hence would have to consider external linkage strategies. This leads us to test the fifth hypothesis in dual fashion which is as follows:

**H<sub>4a</sub>:** Keeping market, regulatory, operational and financial factors constant, smaller hospitals, (i.e., fewer hospital beds) are more likely to enter into joint venture arrangements with ASCs than other hospitals.

**H<sub>4b</sub>:** Keeping market, regulatory, operational and financial factors constant, free-standing hospitals are more likely to enter into joint venture arrangements with ASCs than other hospitals.

Hospitals that are already in a joint venture arrangement have a higher occupancy rate (Harrison 2006). Harrison's study also argues that hospital-physician joint venture arrangements should improve efficiency. Since patient volume is directly proportional to efficiency (Harrison 2006), it implies that lower patient volumes are indicators of inefficiency in hospitals. Thus a hospital having a lower occupancy rate will seek joint ventures with ASCs in order to become more efficient and improve their occupancy.

The literature also suggests that ASCs lower the cost of surgical care (in comparison to hospitals) due to efficiency achieved from repeatedly performing a narrow set of procedures over time (Herzlinger 2004) and that these ASCs draw profitable surgeries and procedures away from the hospitals (Winter 2003), thereby becoming a competitive threat to hospitals.

ASCs are also mostly single specialty (MedPac 2004) and are not equipped to perform the procedures for patients with co-morbid conditions who may require other specialty services as well during the surgeries. Therefore, hospitals have not experienced a decline in the number of inpatient surgeries because they perform surgery on high risk co-morbidity cases. In addition, the literature shows that ASCs are substitutes to outpatient surgery performed in hospitals (Bian and Morrissey 2006). Thus the following can be hypothesized:

**H<sub>5a</sub>:** Keeping market, regulatory, organizational and financial factors constant, hospitals with a lower occupancy rate are more likely to enter into joint venture arrangements with ASCs than other hospitals.

**H<sub>5b</sub>:** Keeping market, regulatory, organizational and financial factors constant, hospitals with fewer outpatient surgeries are more likely to enter into joint venture arrangements with ASCs than other hospitals.

Organizational change is likely in situations when hospitals are not generating the financial resources necessary for their survival (Bazzoli and

Cleverly 1994). Cash flow is considered to be a key resource to assess financial survivability of an organization (McCue 2007; McCue et al. 2007). The literature suggests that a higher level of cash or liquidity helps hospitals finance their operations and helps fund the replacement of their plant and equipment (McCue et al. 2000; Kim and McCue 2008). Lower cash flow margins and days' cash on hand are indicators of poor financial performance of hospitals.

It follows that hospitals enter into joint ventures in order to improve their financial performance (Oliver 1990; Harrison 2006; Blaszyk and Hill-Mischel 2007). Based on the theoretical premise of resource dependency theory, hospitals would try to find ways to acquire access to financial resources, specifically helping to generate cash flow and higher levels of liquidity which would in turn support their operations. Therefore, the theoretical premise and previous literature predict the following:

**H<sub>6a</sub>:** Keeping market, regulatory, organizational and operational factors constant, hospitals with poor financial performance (e.g., lower cash flow margin and days cash on hand) are more likely to enter into joint venture arrangements with ASCs than other hospitals.

The financial literature also suggests that hospital's survival is critically dependent on access to capital (Harrison 2002, Harrison et al. 2003). Based on the tenets of resource dependency theory, hospital managers are proactive in nature and will find ways to increase their resource domain in any possible

manner while facing environmental change. A higher debt position indicates limited debt capacity of a hospital. The literature also suggests that hospitals that lack capital and have limited cash flow are unable to upgrade their technology and eventually lose patients and face further decline in their financial resources (Kirchheimer 2001; Harrison et al. 2003).

With innovations in healthcare technology occurring at a rapid pace, if hospitals lack financial resources to upgrade through capital reserves, their survival would be threatened. ASCs are emerging in the market as single specialty state-of-the-art facilities. Joint venture arrangements with ASCs can give hospitals instant access to facilities which they otherwise might not be able to invest and access through their own capital reserves, which leads to the study's final hypotheses:

**H<sub>6b</sub>:** Keeping market, regulatory, organizational and operational factors constant, hospitals with limited debt capacity are more likely to enter into joint venture arrangements with ASCs than other hospitals.

### Summary of Chapter 3

This chapter reviewed and presented the theoretical premise and empirical literature on hospital joint venture arrangements with ASCs. The key tenets of the two theories (resource dependency theory and neo-institutional theory), which form the basis for this study, were examined in this chapter. The conceptual model presented in this chapter also graphically represented the



research questions of the study. The study drew upon two natural model-open system theories that guided the formulation of the six hypotheses to be tested.

The three precepts of resource dependency theory that were elaborated upon were environment uncertainty, resource scarcity and competition. Based on this theory, the following assumptions in the study were made. An organization's environment is the source of scarce and valued resources necessary for its survival. Thus, organizations must interact with the environment to obtain resources because they are not capable of generating all of their needed resources. The level of resource scarcity will influence an organization to give up autonomy or take measures to acquire those resources through different bridging strategies (vertical and horizontal integration) such as joint ventures, mergers and acquisitions etc.

The other theory the study used to form the various hypotheses was neo-institutional theory. The hypotheses related to the response of hospitals in regulated markets with higher number of hospital-ASC joint ventures were formed based on this theory. Drawing on this theory, this chapter examined the cognitive and regulative pressures felt by the hospital and the need of the hospital to remain legitimate.

The theory discussed above led to the understanding that organizations tend to copy the behaviors and structures of the most successful organizations in their sectors, because these successful organizations are viewed as legitimate by stakeholders in the market. This mimetic behavior occurs because

organizations like to be in tandem with culturally supported and recognizable structures and behaviors.

Another application examined in this chapter that was based on neo-institutional theory was the effect of regulatory pressures on hospitals response. Organizations like to conform to regulations as they seek regulatory support and approval, and want to avoid penalties faced due to non-compliance. As compliance leads to legal acceptance and non-compliance leads to punishment (DiMaggio and Powell 1983; Scott 2003), mimetic responses of organizations to legitimize themselves for their stakeholders is better understood.

The financial literature also provided insights for hospital response scenarios to changing environmental conditions. A hospital's survival is critically dependent on access to capital. Based on the theoretical premise, it was suggested that hospital managers are proactive in nature and will find ways to increase their resource domain in any possible manner while facing environmental change. A higher debt position indicates limited debt capacity of a hospital. With innovations in healthcare technology occurring at a rapid pace, if hospitals lack financial resources to upgrade through capital reserves, their survival will be threatened. Joint venture arrangements with ASCs would give hospitals instant access to resources to ensure survival.

This chapter presented the following hypotheses to address the relationship between hospitals' decision to joint venture with ASC and their market, regulatory, organizational, operational and financial characteristics.

- H<sub>1a</sub>:** Keeping regulatory, organizational, operational and financial factors constant, hospitals located in highly competitive outpatient surgery markets (low Herfindahl-Hirschman Index and more number of ASCs) are more likely to enter into joint venture arrangements with ASCs than other hospitals.
- H<sub>1b</sub>:** Keeping regulatory, organizational, operational and financial factors constant, hospitals located in markets with higher demand (e.g., larger populations) and higher ability to pay (e.g., lower percentage of elderly, low unemployment rate and higher per capita income) are more likely to enter into joint venture arrangements with ASCs than other hospitals.
- H<sub>1c</sub>:** Keeping regulatory, organizational, operational and financial factors constant, hospitals located in markets with fewer numbers of key specialists (gastroenterology, ophthalmology and orthopedics) in the market are more likely to enter into joint venture arrangements with ASCs than other hospitals.
- H<sub>1d</sub>:** Keeping regulatory, organizational, operational and financial factors constant, hospitals located in markets with a higher HMO penetration are more likely to enter into joint venture arrangements with ASCs than other hospitals.
- H<sub>2</sub>:** Keeping regulatory, organizational, operational and financial factors constant, hospitals located in markets with higher

number of hospitals joint venturing with ASCs are more likely to enter into joint venture arrangements with ASCs than other hospitals.

**H<sub>3a</sub>:** Keeping market, organizational, operational and financial factors constant, hospitals located in states without CON program are more likely to enter into joint venture arrangements with ASCs than other hospitals.

**H<sub>3b</sub>:** Keeping market, organizational, operational and financial factors constant, for-profit hospitals are more likely to enter into joint venture arrangements with ASCs than non-profit hospitals.

**H<sub>4a</sub>:** Keeping market, regulatory, operational and financial factors constant, smaller hospitals are more likely to enter into joint venture arrangements with ASCs than other hospitals.

**H<sub>4b</sub>:** Keeping market, regulatory, operational and financial factors constant, free-standing hospitals are more likely to enter into joint venture arrangements with ASCs than other hospitals.

**H<sub>5a</sub>:** Keeping market, regulatory, organizational and financial factors constant, hospitals with a lower occupancy rate are more likely to enter into joint venture arrangements with ASCs than other hospitals.

- H<sub>5b</sub>:** Keeping market, regulatory, organizational and financial factors constant, hospitals with fewer outpatient surgeries are more likely to enter into joint venture arrangements with ASCs than other hospitals.
- H<sub>6a</sub>:** Keeping market, regulatory, organizational and operational factors constant, hospitals with poor financial performance (e.g., lower cash flow margin and days cash on hand) are more likely to enter into joint venture arrangements with ASCs than other hospitals.
- H<sub>6b</sub>:** Keeping market, regulatory, organizational and operational factors constant, hospitals with limited debt capacity are more likely to enter into joint venture arrangements with ASCs than other hospitals.

The next chapter presents the methodology for the study, the research design, the data description including the dependent and independent variables, and the analysis description used to test the study hypotheses. Chapter 5 presents the results of the analysis. Chapter 6 discusses the findings and presents their implications. The concluding chapter also states and elaborates on the limitations of the present study.

## CHAPTER 4: METHODOLOGY

This chapter presents the research design, data sources and data used in the study. In addition, measurements of dependent and independent variables are discussed in this chapter. Sources of data for each variable are also presented. Finally, this chapter also describes the statistical procedures for model estimation and method used to test the proposed hypotheses.

### Research Design

This study used a cross sectional design to examine hospitals that entered in a joint venture arrangement with ASCs in 2006 and 2007, which reflects the latest available data. This study analyzed the relationship between hospitals decision to joint venture with ASCs and related factors (according to the literature and theoretical premise).

### *Study Population Inclusion/Exclusion Criteria*

The unit of analysis in this study is the hospital. Nonfederal acute care hospitals in the United States in 2005, 2006 and 2007 constitute the study population. Federal government hospitals (i.e., Veterans Administration and Department of Defense) are excluded from the study population. Also, specialty hospitals such as psychiatric hospitals are excluded from this study. Remaining

hospitals formed the study population. Hospitals are examined instead of multi-hospital systems because previous studies have shown that single hospitals serve a single geographic market and are exposed to local market conditions and competition (McCue et al. 2007). This study aimed to assess the underlying reasons that drive a hospital's decision to joint venture with an ASC in a given market. Considering single hospitals instead of systems allowed for more accurate assessment because hospital's presence is limited to a particular market whereas a systems' presence could span many markets.

Within the study population, hospitals that entered into a joint venture arrangement with ASCs constituted the study group. Hospitals that did not have a joint venture arrangement with ASCs in 2005 but entered into such an arrangement in 2006 formed the 2006 sample cases. Similarly, hospitals that did not have a joint venture arrangement with ASCs in 2006 but entered into such an arrangement in 2007 formed the 2007 sample cases. For each of these two samples, comparison groups of randomly selected hospitals were constituted. Hospitals that did not enter into joint venture arrangements in 2006 or 2007 (the same time period as study sample) formed the comparison study population for this research.

### *Analysis Design*

The analysis of this study was conducted in three parts: analysis of 2006 new hospital-ASC joint ventures, analysis of 2007 new hospital-ASC joint ventures and analysis of the combined pool of all new hospital-ASC joint

ventures during 2006 and 2007. The analysis designs for all three parts are presented in the following sections.

The first part of the analysis was a cross-sectional study of the 2006 cases. In this analysis, logistic regression was used to determine the market, regulatory, organizational, operational and financial factors related to hospitals decision to joint venture with ASCs. In order to assess the causal association of these factors to the joint venture decision, all the independent variables were lagged one year. The following expression was used to test the causal relationship:

$$\mathbf{JV_{2006} = f (MKT_{2005}, REG_{2005}, ORG_{2005}, OPR_{2005}, FIN_{2005}, CONT_{2005})}$$

In this part of the analysis, the following definitions applied: joint ventures (JV<sub>2006</sub>) were defined as hospitals that entered into joint venture arrangements with ASCs in the year 2006. The market (MKT) factors were: Herfindahl-Hirschman index (HHI), per capita income, unemployment rate, population size, number of specialists in the market, percentage of elderly, HMO concentration and the number of other hospital joint ventures with ASCs in the same market. The regulatory (REG) factors were: certificate of need and ownership status (for-profit, not-for-profit). The organizational (ORG) factors were: organizational size and affiliation to a system. Operational (OPR) factors included: number of outpatient surgical surgeries and occupancy rate. Financial (FIN) factors included were: cash flow margin, cash on hand, long term debt to total capital, and operating expense per discharge.



The number of hospitals that entered into joint ventures in 2006 as reported by American Hospital Association was 97. Various factors of these facilities were analyzed to understand the driving forces behind hospitals decision to joint venture with ASCs. Inferences for significance and directionality of effect were drawn from the coefficients of the explanatory variables on the hospitals' decision to joint venture with ASCs. The comparison sample (sample of hospitals that did not enter into joint ventures with ASCs in 2006) provided a baseline for this interpretation. The statistical analysis addressed all the hypotheses proposed in Chapter 3. The results of the analysis are presented in Chapter 5.

The second part of the analysis was a cross-sectional study of the 2007 cases. Similar to the first part, this analysis also used logistic regression to determine the market, regulatory, organizational, operational and financial factors related to hospitals decision to joint venture with ASCs. In order to assess the causal association of these factors to the joint venture decision, all the independent variables were lagged one year. The following expression was used to test the causal relationship:

$$\mathbf{JV_{2007} = f (MKT_{2006}, REG_{2006}, ORG_{2006}, OPR_{2006}, FIN_{2006}, CONT_{2006})}$$

In this part of the analysis, the following definitions applied: joint ventures ( $JV_{2007}$ ) were defined as hospitals that entered into joint venture arrangements with ASCs in the year 2007. The market (MKT) factors were: Herfindahl-Hirschman index (HHI), per capita income, unemployment rate, population size,

number of specialists in the market, percentage of elderly, HMO concentration and the number of other hospital joint ventures with ASCs in the same market. The regulatory (REG) factors were: certificate of need and ownership status (for-profit, not-for-profit). The organizational (ORG) factors were: organizational size and affiliation to a system. Operational (OPR) factors included: number of outpatient surgical surgeries and occupancy rate. Financial (FIN) factors included were: cash flow margin, cash on hand, long term debt to total capital, and operating expense per discharge.

The number of hospitals that entered into joint ventures in 2007 as reported by American Hospital Association was 73. The above mentioned factors of these facilities were analyzed to understand the driving forces behind hospitals' decision to joint venture with ASCs. Inferences for significance and directionality of effect were drawn from the coefficients of the explanatory variables on the hospitals' decision to joint venture with ASCs. The comparison sample (sample of hospitals that did not enter into joint ventures with ASCs in 2007) provided a baseline for this interpretation. As before, the statistical tests addressed all the hypotheses proposed in Chapter 3. The results of this analysis are also presented in Chapter 5.

The last part of the analysis was a cross-sectional study of the pooled sample of 2006 and 2007 cases. Similar to previous two parts, in this analysis also, logistic regression was used to determine the market, regulatory, organizational, operational and financial factors related to hospitals decision to

joint venture with ASCs. In order to assess the causal association of these factors to the joint venture decision, all the independent variables were lagged one year from their dependent variable year respectively. The following expression was used to test the causal relationship:

$$\mathbf{JV_{2006\&2007} = f (MKT_{2005\&2006}, REG_{2005\&2006}, ORG_{2005\&2006}, OPR_{2005\&2006}, FIN_{2005\&2006}, CONT_{2005\&2006})}$$

As before, in this part of the analysis, the following definitions applied: joint ventures ( $JV_{2006\&2007}$ ) were defined as hospitals that entered into joint venture arrangements with ASCs in the years 2006 and 2007. The market (MKT) factors were: Herfindahl-Hirschman index (HHI), per capita income, unemployment rate, population size, number of specialists in the market, percentage of elderly, HMO concentration and the number of other hospital joint ventures with ASCs in the same market. The regulatory (REG) factors were: certificate of need and ownership status (for-profit, not-for-profit). The organizational (ORG) factors were: organizational size and affiliation to a system. Operational (OPR) factors included: number of outpatient surgical surgeries and occupancy rate. Financial (FIN) factors included were: cash flow margin, cash on hand, long term debt to total capital, and operating expense per discharge.

The number of hospitals that entered into joint ventures in 2006 and 2007 as reported by American Hospital Association was 170. Various factors of these facilities were analyzed to understand the driving forces behind hospitals' decision to joint venture with ASCs. Inferences for significance and directionality

of effect were drawn from the coefficients of the explanatory variables on the hospitals' decision to joint venture with ASCs. The comparison sample (sample of hospitals that did not enter into joint ventures with ASCs in 2006 and 2007) provided a baseline for this interpretation. As in the previous two parts, the statistical analysis addressed all the hypotheses proposed in Chapter 3. The results of this analysis, in addition to the previous two parts, are presented in Chapter 5.

### Data Sources and Sampling Process

The data for this study was drawn from five main sources. Depending on the type of study variable, the five sources from which the variables were drawn are: the American Hospitals Association Annual Survey of Hospitals (AHA), the Area Resource Files (ARF), the Center for Medicare and Medicaid Services (CMS) minimum cost dataset, previously known as HCFA minimum cost data files (HCFA), the National Council for State Legislatures website (NCSL) and CMS case-mix index (CM). Specifically, the data elements were from the following data sources:

AHA Annual Survey of Hospitals datasets: 2005, 2006 and 2007

Area Resource Files (ARF) datasets: 2005 and 2006

HCFA minimum cost datasets: 2005 and 2006

NCSL file on state CON laws: 2008 (Assuming CON laws with regard to

ASCs remained unchanged during the period 2005-2007).

CMS case-mix index (CM): 2005 and 2006.

American Hospital Association Annual Survey of hospitals (AHA) provides extensive organizational data including whether a hospital is in a joint venture with an ASC. The main dependent variable (hospital-ASC JV) of the study was identified with the help of this dataset. AHA datasets are a national survey of detailed information on all US hospitals. Data from all hospitals are collected annually. In the healthcare literature, there have been many studies that have extensively used AHA data to study the impact of organizational factors of hospitals in various empirical studies (Alexander and Morrissey 1988; Alexander and Morrissey 1989; McCue 1991; Harrison 2002) and joint venture studies (Harrison 2006). This study used the 2005, 2006 and 2007 datasets of the AHA survey. The dependent variables (JVs) were drawn from 2006 and 2007 dataset and the corresponding independent variables (i.e., ownership status, hospital size, affiliation to a system, total outpatient surgical visits, and occupancy rate) were drawn from 2005 and 2006 datasets respectively.

Area Resource File (ARF) provides extensive county level information on market characteristics, demographics, economic activity, resource scarcity and other measures of the hospital environment. The Bureau of Health Professions from the US department of Health and Human Services compiles the data. Data from these files have been extensively used in numerous other studies that examined market characteristics (McCue 1991; Burns et al 2000; McCue 2000; McCue et al 2000; Harrison 2002). Many studies examining hospital-physician integration strategies such as acquisitions, mergers and joint ventures, have also

used this data (Alexander and Morrissey 1988; Alexander and Morrissey 1989; Harrison 2002; Harrison 2006). In this study, we used 2005 and 2006 files from this data repository. Some key independent variables extracted from this dataset for this study were: MSA size, HMO penetration, percentage of elderly, number of specialists, population size, unemployment rate in the county and per capita income.

The CMS (Center for Medicare and Medicaid Services) minimum dataset provides information on hospital financials. For hospitals that receive Medicare reimbursements, it is mandatory to submit financial information annually to CMS. These minimum cost datasets are the most comprehensive data sets available for US hospitals that serve Medicare patients. This study uses the 2005 and 2006 datasets, for all hospitals that had a service code 10 representing non-federal acute care hospitals. The independent variables of interest formed from the data elements drawn from these datasets for this study were: cash flow margin, cash on hand, long-term debt to total capital, and operating expense per discharge. Since these data files provide comprehensive information on financial performance, hospital utilization and operational efficiency, and are comparable across all the hospitals in the industry, they have been repeatedly used in hospital studies (Bazzoli and Cleverly 1994; Clement et al. 1997; McCue 2000; McCue et al. 2000; Harrison 2002).

The data on CON was obtained from the National Council for State Legislature (NCSL) Website. NCSL is a bipartisan organization that provides

research and technical assistance to the legislators and staffs of all 50 states, its commonwealth and territories of the US. NCSL was formed in order to promote policy innovation and communication among state legislatures, improve their quality and effectiveness and also ensure that they are a strong, unified representation in the federal system. In this study, one key independent variable was Certificate of Need laws. It was included as a binary variable (presence or absence of these laws in different states) derived from NCSL source. Review of literature has indicated that these laws could be an important indicator of the number of facilities in a market (Casalino et al. 2003, Bian and Morrissey 2006; Bian and Morrissey 2007) and thus, can affect the competition in the health care market.

Lastly, the data for case-mix index (CMI) is obtained from the CM case-mix files for 2005 and 2006. The CMI depicts the mean diagnosis-related group (DRG) relative weight for a hospital. CMS calculates it by summing the DRG weights for all Medicare discharges and dividing by the number of discharges. Thus, it is a measure of the average acuity of illness of patients treated by a healthcare organization. In order to understand a hospital's decision to engage in a joint venture arrangements with an ASC, it is necessary to correctly assess the hospital's patient base vis-à-vis other hospitals. Thus, inclusion of CMI in the model was crucial to drawing insightful interpretations.

In order to avoid problems in estimation efficiency, instead of comparing the study sample to the remaining group of 5,500 non-federal acute care

hospitals, a random sample of non-federal acute care hospitals were chosen as comparison group that did not joint venture with ASCs. Using this choice sampling strategy, for each hospital in the study sample for the study year (hospitals entering into joint venture arrangements with ASCs), three hospitals that did not joint venture with ASCs from the same study period were chosen to constitute the comparison group. This sampling technique has been previously used in hospital-physician integration literature (Alexander and Morrissey 1988; Harrison 2002).

In 2006, 97 hospitals entered into joint venture arrangements with ASCs. For this part of the analysis, a random sample of 291 non-federal acute care hospitals that did not enter into joint venture arrangements constituted the comparison group. As 73 hospitals entered into joint venture arrangements in 2007, the 2007 comparison group of hospitals that did not enter into joint venture arrangements with ASCs based on a random choice sample of three times the number of hospitals in the study sample were 219. For the pooled study sample of 170 from the 2005 and 2006 study periods, the comparison group of hospitals that did not enter into joint venture arrangements with ASCs based on a random choice sample of three times the number of hospitals in the study sample amounted to 510.

The organizational, operational and financial factors in this study are analyzed at a hospital level. The market factors are analyzed at a county level and the regulatory factor is analyzed at a state level. The dependent variable is



the hospital's decision to enter/not enter into a joint venture arrangement in 2006 and in 2007. The independent variables for the cases are from the years prior to their decision of entering/not entering into a joint venture with ASCs. For example, independent variables for hospitals that entered into joint venture arrangements with ASCs in 2006 came from 2005 and for those that entered into joint venture arrangements in 2007 came from 2006.

#### Measurement of Dependent Variables

Harrison (2002) defined a dependent variable as a choice variable that an event will occur and independent variables as contributors to that choice. The focus of this study is to identify the various factors related to the decision of hospitals to joint venture with ASCs. In order to achieve this objective, independent variables were selected based on the review of literature and theoretical premise from previously mentioned data sources. The dependent variable in this study was the hospital's decision to joint venture with ASCs (binary: yes or no) and was obtained from the AHA database. The following section presents the underlying reasoning behind variable selection in this study.

There are many studies that have examined integration strategies such as mergers and acquisitions in the healthcare industry (Levitz and Brooke 1985; McCue and Furst 1986; Alexander and Morrissey 1988; Connor et al. 1997; Krishnan 2001; Yafchak 2000; Harrison 2002; Harrison et al. 2003), and joint venture arrangements (Pelfrey and Theisen 1989; Blair et al. 1990; Mitchell and Sunshine 1992; Harrison 2006; DiGiaino 2009). These studies explored many

issues pertaining to hospital-physician integrations including the relative benefits and risks associated with each of these strategies. These issues ranged from discussing the impact of market changes, economies of scale and scope, effect of strategies on organizational control, operational performance and financial implications. Based on these studies and the theoretical premise discussed in Chapter 3, the explanatory variables for this study were chosen. A brief description of the constructs, variables, measures and data sources are presented in Table 4.

Table 4: Constructs, Variables, Measures and Source

<b>Construct</b>	<b>Variable</b>	<b>Measure</b>	<b>Source</b>
<i><u>Dependent Variable</u></i>			
JV	Hospital JV with ASCs	1, if JV; 0 otherwise	AHA
<i><u>Independent Variables</u></i>			
MKT	Herfindahl-Hirschman index	Sum of squares of the market as a percentage of the hospitals operating in the county.	AHA
MKT	Per capita income	Per capita income in the county	ARF
MKT	Unemployment rate	Unemployment rate in the county	ARF
MKT	Population size	Log of county population per 100,000	ARF
MKT	ASC Specialists per 1000	Sum of specialists for ophthalmology, gastroenterology and orthopedics per 1000 in the county	ARF
MKT	Percentage of elderly	Population age 65 and above per total population in the county	ARF
MKT	HMO penetration	HMO penetration in the county	ARF
MKT	Number of hospitals in JV with an ASC	Total of hospitals with joint venture arrangement with ASC in the county in the prior year	AHA

<b>Construct</b>	<b>Variable</b>	<b>Measure</b>	<b>Source</b>
MKT	Number of ASCs	Number of ASCs in the county	ARF
REG	Certificate of need	1, if present in state; 0 otherwise	NCSL
REG	Ownership status	1, if hospital is for-profit; 0 otherwise	AHA
ORG	Size	Number of staffed beds	AHA
ORG	Affiliation to a system	1, if hospital is affiliated with a multi-hospital system; 0 otherwise	AHA
OPR	Total outpatient surgical visits	Total number of outpatient surgical visits	AHA
OPR	Occupancy rate	Total number of inpatient days divided by the beds in service.	AHA
FIN	Cash flow margin	(Net income + depreciation expense + interest expense)/(Net patient revenue + other income)	CMS
FIN	Days cash on hand	(Cash + short and long term investments)/[(Total operating expenses –depreciation)/365]	CMS
FIN	Long-term debt to total capital	Long-term debt /Total capital	CMS
FIN	Operating expense per adjusted discharge	Operating expenses/ Adjusted discharge	CMS
CONT	Case-Mix index	Medicare case-mix index	CM
CONT	Teaching status	1, if hospital is affiliated to Council of Teaching Hospitals; 0 otherwise	AHA
CONT	Public	1, if hospital is public; 0 otherwise	CMS
CONT	Large county	1, if hospital is located in county greater than 1 million; 0 otherwise	ARF
CONT	Time	1, if in 2007; 0 if in 2006	AHA

## Notes:

AHA = American Hospital Association Files;  
 CMS = Center of Medicare and Medicaid Minimum Data Set;  
 ARF = Area Resource File;  
 NCSL = National Conference of State Legislatures;  
 CM = HCFA (Health Care Financing Administration Files) Case-Mix Files

### Measurement of Independent Variables

Independent variables are explanatory variables that contribute towards prediction of the response or the dependent variable. All independent variables are lagged by a year in order to account for potential lagged market responses and reverse causality. The independent variables of this study are classified under six main factors: market, regulatory, organizational, operational, financial, and control factors. As previously mentioned, Table 4 describes how each of these variables is measured as well as the sources for the data.

#### *Market Factors*

The market construct examines the demand for healthcare services and supply of services in the environment. Factors related to this construct are measured at the county level. Previous studies have validated the use of county to define market areas (Alexander and Morrissey 1988; Harrison 2002; Harrison et al 2003). Factors constituting the market construct that were examined in this study included Herfindahl-Hirschman Index, per capita income, unemployment rate, population size, number of specialists, number of ASCs, % of elderly, HMO concentration and number of other hospital joint ventures with ASCs in the same county.

Herfindahl-Hirschman index (HHI) is a measure of market concentration and is calculated by squaring the market share (measures as a percentage of the providers operating in the market) of each provider in the market. Higher HHI indicates more concentrated markets. This index has been extensively used in

healthcare literature (Alexander and Morrissey 1988; Clement et al. 1997; Krishnan 2001; Harrison 2002). As this index allows estimation of local hospital market concentration, it helps estimate the influence a hospital has over its environment. For example, a hospital having a small market share and operating in a highly concentrated market has little control over its environment. Healthcare literature suggests that hospital-physician integration strategies are more common in markets with low concentration (Connor et al. 1997; Burns et al. 2000; Harrison 2002; Harrison et al. 2003). As reviewed in Chapter 2, hospital-physician integration strategies such as joint venture arrangements creating substantial increase in market share (measured by HHI) could result in violations of the federal and state regulations and raise anti-trust concerns (Harrison 2002).

Per capita income measures the economic soundness of the community. If the per capita income of residents in a county is high, it reflects that individuals staying in the county have well paying jobs and are economically sound. It follows that individuals capable of paying would demand more hospital services resulting in increased profitability for hospitals. Greater ability to pay, lower uncompensated care and increased health insurance coverage has a positive impact on hospital profitability. However, to provide healthcare services, hospitals need physicians. ASCs are traditionally owned by physicians (MedPac 2004). With increasing number of physicians/physician groups opening ASCs, it follows that in these markets, hospitals are more likely to enter into joint venture arrangements with ASCs.

Unemployment rate has also been used as a measure of a markets financial ability to pay for healthcare services (MCCue et al. 2000, Harrison 2002). Higher unemployment rate in a market reflects lower ability to purchase health insurance. This in turn results in lower demand and ability to pay for healthcare services. Higher the demand for services, higher is the likelihood that hospitals enter into joint venture arrangements with ASCs. Thus, lower unemployment rate increases the probability of hospitals deciding to joint venture with ASCs. Percentage of elderly is also indicative of paying capacity in the market. Higher percentage of elderly and decreasing Medicare reimbursement rates create financial distress for hospitals (Bazzoli 1995; Harrison 2002) and indicate less commercial patient pool for the hospital. Less commercial patient population indicates lesser demand and thus lesser likelihood of a joint venture between hospitals and ASCs in those counties.

Population size is a measure of market demand (McCue 2000; Harrison et al. 2003). Larger population size reflects higher demand for services and higher demand can be met by hospitals only if they have the human resources (physicians) to provide the services. Thus, larger population size pressures hospital to consider joint venture arrangements with ASCs in order to maintain collaborative relationship with key physicians in the market, failing which a hospital would face the threat of not being able to meet the demand.

The MedPac report indicates that the emergence and growth of ASCs is not similar across specialties. Studies have shown that the top three specialties

that have the most frequently performed procedures / surgeries are ophthalmology, gastroenterology and orthopedics in a national sample of 750 Medicare-certified ASCs (MedPac 2004; Bian and Morrissey 2007). The specialist index (a proxy indicator for physician supply in the context of competition) is calculated for this study by taking the total number of specialists available in the market for these three specialties per 1000 population. Since currently, there is no information available on procedure volumes or specific specialties of ASCs (Bian and Morrissey 2007); this proxy measure, in addition to the number of ASCs in a market, is assumed to be the best supply indicator for physicians in a market.

HMO penetration is a measure of managed care in a market. It is calculated by dividing the total HMO enrollment in the county by the total population (Bureau of Census 2005; Bureau of Census 2006). HMO penetration has been used extensively in hospital literature, to better represent market construct (Burns et al. 2000; Harrison 2002; Harrison et al. 2003).

Prior years' number of hospitals joint ventures with hospitals is taken as a measure for successful joint ventures within the market. Using a lagged variable as a measure to study the mimetic response of hospitals to institutional pressures (based on neo-institutional theory) has been well documented in the literature (Walston et al. 2001). Greater number of joint ventures in a market indicate greater acceptance of such strategies which help legitimize such arrangements in the eyes of the stakeholders.

### *Regulatory Factors*

The two regulatory factors that examine the regulatory construct in this study are the presence or absence of a CON program in states where these joint ventures are occurring and the ownership status of the hospitals entering into joint ventures with ASCs. Both factors together represent the impact of state and federal regulations on strategic decisions considered by hospitals.

As discussed in chapter 2, certificate of need laws (CON) are state mandated laws that allow/disallow expansion of facilities or procedures. 36 of the 50 states in US have some form of CON laws (NCSL). The presence of CON laws in a state makes it difficult for hospitals to consider expansion strategies such as joint venture arrangements with ASCs. In this study, CON is measured as a binary variable. The presence of CON laws in a state is denoted by the value 1 and absence by 0.

Ownership of hospitals entering into joint venture arrangements with ASCs also sometimes brings forth regulatory concerns. For-profit hospitals are subject to different tax laws than not-for-profit hospitals. Not-for-profit hospitals could lose their tax exempt status if they decided to joint venture with ASCs. In this study, ownership status is also measured as a binary variable. A value of 1 denoted for-profit status and 0 denoted not-for-profit status of hospitals.



### *Organizational Factors*

The organizational factors that measure the organizational construct in this study include size (measured by staffed beds), and affiliation to a system. The factors are measured at the individual hospital level.

Hospital size is an indicator of hospital capacity to provide services. Literature suggests that larger hospitals are better able to adapt to environmental uncertainty and are less likely to engage in external relationships to acquire more resources (Alexander and Morrissey 1989; Harrison 2002). According to resource dependency theory, hospitals would prefer autonomy to external linkages and loss of control in a stable market. However, in a competitive and uncertain environment, the theory suggests that hospitals would prefer to engage in external relationships rather than risk their survival. In this study, number of staffed beds has been used to measure hospital size. This measure has been used in earlier studies involving organizational factors (Alexander and Morrissey 1989; Clement et al. 1997; Harrison 2002; Harrison et al. 2003). This measure is also positively related to expenses, revenue and cash flow of hospitals (Clement et al. 1997). Larger hospitals (higher number of staffed beds) are better able to deal with environmental uncertainty (as per theory) and unfavorable financial performance than smaller hospitals. Thus, the study hypothesizes that smaller independent hospitals are more likely to joint venture with ASCs than other hospitals.

Another organizational factor that is extremely important in a limited resource competitive environment is affiliation of a hospital to a system. Affiliation to a system provides hospitals access to additional system resources. Also, it enables them to have greater power to internally restructure and reorganize prior to considering external relationships such as joint venture arrangements. This rationale is based on the premise of resource dependency theory (as explained earlier) as well as evidence from the literature. In this study, affiliation to a system was measured as a binary variable where a value of 1 depicted hospitals that were affiliated with a multi-hospital system and a value of 0 depicted hospitals that were not affiliated with a multi-hospital system.

#### *Operational Factors*

Operational performance reflects a hospitals ability to survive in a competitive market. Factors that measured operating performance construct in this study included total number of outpatient surgeries performed in hospitals and occupancy rate. These two operating factors were measured at the individual hospital level.

There have been studies that indicate that ASCs are a direct competition for hospital outpatient surgeries (Winter 2003, Bian and Morrissey 2006) as they draw profitable outpatient surgeries away from hospitals. This results in a decrease in revenue for hospitals. Literature and industry analysts suggest that hospitals consider joint venture arrangements with ASCs in order to retain a portion of the revenue instead of potentially losing the entire outpatient surgical

revenue to ASCs by doing nothing (Devers et al. 2003; Bernick 2005; Taparia 2010).

Another operational factor in this study is the hospital occupancy rate. This factor is measured by dividing the total number of inpatient days by the beds in service (Deloitte and Touche 1997; Yafchak 2000; Harrison 2002; Harrison et al. 2003). This factor assesses how well a hospital is able to secure resources (patients) from the market (McCue et al. 2007). Literature indicates that with increase in proportion of outpatient services vis-à-vis inpatient services, there is a decrease in hospital occupancy rate (Yafchak 2000; Harrison 2002). AHA 2010 chartbook shows that the ratio of hospital outpatient surgeries to inpatient surgeries has been steadily increasing. It follows that hospitals that have a low occupancy rate would have lesser influence over the market and would face a greater threat to their survival. Thus, based on resource dependency theory, hospitals with low occupancy rate would be more likely to consider joint venture arrangements with ASCs.

#### *Financial Factors*

Factors that measured the financial construct in this study included: cash flow margin, cash on hand, long term debt to total capital and operating expense per discharge. Joint venture literature suggests that financially poor performing hospitals would more likely want to enter into joint ventures than better performing hospitals. A study by Boettiger and Young (2004) elaborated on the benefits of joint venture arrangements. These included spreading the costs

across the joint venture entities and thus lowering upfront cash investments. Further, other benefits that were also elaborated included access to state-of-the-art technology, increased expertise in a service line (especially in the case of ASCs), better work environment, improved relationships with physicians and more simplified admissions for patients (Harrison 2006). Joint ventures are also considered the strategy of choice as they help mitigate operational and financial risks (Boettiger and Young 2004). However, the main reason behind hospital joint venture is still financial (reducing costs and increasing profitability).

McCue et al (2007) suggested that cash flow is better than accounting profits for financial valuation of an organization and is a key resource for assessing financial survivability. In this study, the cash flow margin was calculated using the formula:  $\text{Cash flow margin} = (\text{Net income} + \text{depreciation expense} + \text{interest expense}) \div (\text{net patient revenue} + \text{other income})$ . Low cash flow margin represents poor financial performance of a hospital. Based on resource dependency theory, hospitals viability would depend on its ability to acquire resources (financial) from its environment. As ASCs are increasingly drawing outpatient surgical revenue away from hospitals, hospitals would be more inclined towards developing an arrangement with ASCs. Thus, hospitals with lower cash flow margins would be more likely to consider joint venture arrangements with ASCs.

Another factor that influences capital access is cash on hand (McCue 1997; McCue et al 2007). Lower cash on hand indicates lesser access to capital

(McCue 1997) and poor financial performance. Literature suggests that hospitals enter into joint venture arrangements in order to improve their financial performance (Oliver 1990; Harrison 2006; Blaszyk and Hill-Mischel 2007). In this study, based on financial formulae, cash on hand was calculated as:

Cash on hand = (cash + short and long term investments) divided by [(total operating expenses – depreciation)/365]

Long term debt to total capital is another key factor in understanding financial performance of a hospital. A higher debt position indicates limited debt capacity of a hospital. This translates into limited ability to raise capital. This measure is calculated by dividing long term debt by total capital. Hospitals that lack capital and have limited cash flow are unable to upgrade their technology, eventually resulting in loss of patients and further decline in their financial resources (Kirchheimer 2001; Harrison et al 2003). Hospitals that lack financial resources are under risk of financial peril in an environment characterized by rapidly changing technology. ASCs have the advantage of being newer facilities and possessing latest technologies to deliver care. Thus, it follows that higher the long term debt to total capital, more likely it is for a hospital to consider joint venturing with ASCs.

Operating expense per discharge is defined by dividing operating expenses by adjusted discharges. This indicates operating expenses incurred from providing patient care services. Higher operating expense per discharge signals higher financial constraint for hospitals. Resource dependency theory

suggests that hospitals would proactively seek ways to increase their resource (financial) domain in any manner while facing resource (financial) scarcity.

Therefore, higher operating expense per discharge would be positively associated with hospitals decision to joint venture with ASCs.

### *Control Factors*

The study model of hospital joint ventures with ASCs also controls for hospitals' complexity of services, mission, size of the market and the time during which the hospitals entered in joint venture arrangements with ASCs. The variables to measure these include case-mix index (measures complexity of services), teaching status and public hospital status (measuring mission), large MSA (measuring size of the market) and time (indicating the year hospitals entered in JV arrangements with ASCs).

Based on the review of pertinent literature in Chapter 2 and hypotheses development in Chapter 3, Table 5 summarizes the hypothesized relationship between the independent variables and the dependent variables, in this study.

### *Analytical Methods*

This study used univariate (descriptive) as well as multivariate analysis to examine the effect of the market, regulatory, organizational, operational and financial factors on hospitals decision to enter in joint venture arrangements with ASCs. In addition to univariate analysis which examined individual variables, correlation analysis was also performed in order to identify potential multicollinearity issues. The multivariate analysis performed to assess

Table 5: Hypothesized Directionality between Dependent and Independent Variables in the Study Models

<b>Dependent Variable</b>	<b>Hospitals JV with ASCs</b>	
	<b>Target Hypothesis</b>	<b>Hypothesized Direction</b>
Herfindahl-Hirschman index	H1a	-
Per capita income	H1b	+
Unemployment rate	H1b	-
Population size	H1b	+
Percentage of elderly	H1b	-
ASC specialists per 1000	H1c	-
Number of ASCs	H1c	+
HMO penetration	H1d	+
Number of hospitals in JV with an ASC	H2	+
Certificate of need	H3a	-
Ownership status (Not-for-profit)	H3b	-
Size	H4a	-
Affiliation to a system	H4b	-
Occupancy rate	H5a	-
Total outpatient surgical visits	H5b	-
Cash flow margin	H6a	-
Cash on hand	H6a	-
Operating expense per discharge	H6a	+
Long-term debt to total capital	H6b	+

the relationship between the independent variables and the dependent variable was logistic regression.

#### *Univariate (Descriptive) Analysis*

Descriptive analysis included descriptive statistics (mean and standard deviation, frequency) of various independent variables, univariate test of significance for each independent variable in isolation and correlation analysis for potential multicollinearity issues among independent variables. It also helped assess the distribution of values for each variable and detect outliers.

### *Multivariate Analysis (Logistic Regression)*

Multivariate analysis was used to examine the relationship of various explanatory (independent) variables to the dependent variable (hospital JV with ASCs). By simultaneously analyzing the independent variables, it helped establish the directionality of each relationship (between independent and dependent variable). Isolating the estimated effect of the dependent variables after adjusting for the other independent and control variables in the model, helped determine if the variables had a positive, negative, neutral or statistically insignificant effect on hospitals decision to joint venture with ASCs.

Multivariate logistic regression was preferred over linear regression for this study. In case of the dependent variable being dichotomous, application of linear regression has many drawbacks. These limitations include production of bimodal distribution leading to unreliable coefficients and standard errors (Harrison 2002). Menard (1995) suggested that it is more prudent to use logistic regression than linear regression when the dependent variable is binary.

As the dependent variable in this study was a dichotomous variable, logistic regression analysis was used to test the association of independent variables with hospitals that joint ventured compared to those that did not joint venture with ASCs. This method is statistically more appropriate for the nature of the dependent variable and provides consistent and meaningful estimators.

Application of logistic regression in healthcare research has been well documented in previous studies (McCue and Furst 1986; Friedman and Shortell



1988; Alexander and Morrissey 1989; Clement et al. 1997; McCue et al. 2000; Krishnan 2001; Harrison 2006). McCue and Furst (1986) applied logistic regression to examine the association of financial performance and organization factors with hospital acquisitions. Friedman and Shortell (1988) applied logistic regression to examine the effect of organizational and market factors on the financial performance of hospitals, pre and post Medicare prospective payment system. Alexander and Morrissey (1989) applied logistic regression to estimate the influence of market and mission factors on hospital acquisition. Clement et al. (1997) applied logistic regression to examine the association of market factors on financial performance of hospital strategic alliances. McCue et al. (2000) applied logistic regression to examine the association of market, mission and financial characteristics with hospital cash reserves. Krishnan (2001) applied logistic to assess the relationship between market factors, regulatory environment and management effectiveness. Harrison (2006) applied logistic regression to examine the organizational and market characteristics, and profitability of hospitals that operated joint venture arrangements with other providers.

Logistic regression results provide the odds of a hospitals decision to joint venture with ASCs, considering the independent and control variables in the model. In this study, maximum likelihood estimation method has been used to test study hypotheses as the sample data is substantially large.

Chi-square test was also performed to test the statistical significance of the covariate estimate. A significant likelihood ratio ( $p < 0.1$ ) indicated that the

model could make better prediction based on the independent variables. Pseudo  $R^2$  provided the measure of the predictive power of the empirical model.

#### Summary of Chapter 4

Chapter 4 presented the methodology including research design, study population - inclusion/exclusion criteria, data sources, description of constructs, variables and measures, and analytical framework used in this study. Based on the review of literature and theoretical premise, this chapter also presented the hypothesized directionality of relationships between independent and dependent variables.

In this study, the data is analyzed in three parts: 2006 hospital-ASC joint ventures, 2007 hospital-ASC joint ventures and a pooled sample of 2006 and 2007 hospital-ASC joint ventures. For each hospital that joint ventured with an ASC, three hospitals that did not joint venture with ASCs were randomly chosen for comparison.

Descriptive statistics and logistic regression was performed to analyze the data in this study. Descriptive statistics helped examine the variables in isolation and logistic regression helped establish the relationship between each of the independent variables with the dependent variable (i.e., hospitals decision to joint venture with ASCs).

Chapter 5 presents the analysis results of the study. Chapter 6 discusses the conclusions that can be drawn from the study results, implications

of the study results, limitations of the study and potential areas for further research.

## CHAPTER 5: RESULTS

### Analyses

The results of the empirical analysis used to evaluate the hypotheses and research questions are presented in this chapter. The first section of the chapter presents the outlier analysis performed on the datasets. This section is followed by analyses (correlation, univariate, and multivariate analysis) of hospitals that joint ventured with ASCs and hospitals that did not joint venture with ASCs. These are presented with an analysis of each study period (2006, 2007 and the pooled model for 2006 and 2007).

In the section for descriptive statistics, various central tendency measures for the independent variables are presented. Mean and standard deviation for continuous independent variables are presented. Frequencies and percentages are presented for categorical independent variables. Significance levels for these are also presented. This is followed by a presentation and discussion of the multivariate analyses (logistic regression) that were used to test the hypotheses and research questions.

Outlier analyses performed for better understanding of variables and their distributions in the dataset are presented in this chapter. The section starts with the description of the method used to identify and manage outlier values. This is

followed by a listing of variables that had outlier values in each of the study period datasets.

Varying significance levels are reported for the independent variables in the models. Results with p-values of  $< 0.05$  and  $< 0.01$  levels are viewed as statistically significant at 95% and 99% respectively. Results with p-values between 0.05 and  $< 0.10$  levels are viewed as marginally significant. The statistical significance of the results is discussed. The chapter concludes with the results pertaining to the impact of various driving factors (i.e., market, regulatory, organizational, operational, and financial) on the hospitals' decision to joint venture with ASCs.

### *Outlier Analysis*

In any data analysis procedure, analyzing cases with outlier values is an essential step, as including (without analyzing) these cases could generate unreliable results. A value is considered an outlier if it is markedly different from other values in the sample. It is extremely important to identify potential outliers as they could be indicative of bad data or measurement error. In this study, observations had few outliers in some of the variables. The percentage of outliers for these variables was less than five percent. However, as the study used an analytical model that assumes a normal distribution for continuous variables, these outliers were further explored.

In all three of the models, 2006 model, 2007 model and the pooled model, variables which had outlier values were long term debt to total capital, size of the

hospital and number of outpatient surgeries performed by a hospital. All of these had fewer than 5% outlier values but when put in the model, resulted in a higher variation. The techniques to identify and deal with these outliers are explained below.

Outlier value analysis involved a three step procedure: identification of outliers, exploration of these outliers to determine the reasoning (measurement error, bad or unrealistic values and such, or unusually/low but correct value) for these values and application of an appropriate technique to deal with these outliers. When the variables that contained outlier values were plotted using stem and leaf diagrams and percentiles for each of the three variables, they revealed that although very few number of values seemed to drop away from most of the values for the same variable in the sample but they differed markedly causing an unreliable increase in the measure of spread (standard deviation). These values were thus winsorized at the 90<sup>th</sup> percentile to perform subsequent analyses.

Winsorization is a method of transformation of extreme values in the data to remove the heavy influence of outliers on the distribution (Reinard 2006). Winsorization helps in replacing the most extreme scores with the next available less extreme scores at a predetermined percentile value. A commonly used winsorization level is 90% (Fernandez et al 2002; Reinard 2006; Pedlow et al 2010). Ninety percent winsorization means setting all data below 5 percentile value to the 5<sup>th</sup> percentile value, and setting all data above 95<sup>th</sup> percentile value to the 95<sup>th</sup> percentile value. An alternative to winsorization is trimming outliers

(removing outliers instead of replacing values). However, the advantage of winsorizing is that it helps retain observations indicating there are sample members with large and small values, but lessens the impact of them to “likely” be large and small values (Reinard 2006). Using this procedure in this study, outliers were not deleted, but were not allowed to introduce large amounts of variability in the spread of the distribution.

This procedure was followed in all three models (2006, 2007 and pooled model) to detect and adjust for outliers. Thus, management of outliers resulted in satisfying the normality assumption for continuous variables as well as provided more realistic and reliable results.

### *Correlation Analysis*

Correlation is a measure of the linear association between two random variables. To test for multicollinearity, Pearson's correlation coefficients,  $r$ , were examined for combinations of independent continuous variables. Multicollinearity among independent variables in regression analyses weakens the predictive value of the analyses and results in parameters that are unreliable.

Pearson's correlation coefficients range from -1 to 1. The greater the absolute value of the coefficient, the stronger is the linear association. A positive coefficient implies that the association is positive; a negative value implies it is negative. Typically, a value of 0.8 or higher is considered very high and a value of 0.6 to 0.8 is considered high (Harrison 2002). Among the variables included in the empirical analysis, most had low correlations, suggesting no significant

collinearity problem. However, correlation analyses revealed some high correlations (higher than 0.6 - positive and negative) that were indicative of multicollinearity problems. Table 6 presents the observed high correlations between variables in the three models.

Table 6: Correlations between variables (0.6 or higher)

Variable 1	Variable 2	Correlation Coefficients		
		M1	M2	M3
Herfindahl Hirschman index	Population size	-0.821	-0.836	-0.810
Number of ASCs	HMO penetration	0.771	0.737	0.756
Operating expense per adjusted discharge	Case-mix index	0.618	0.622	0.619
ASC specialists per 1000	Number of ASCs	0.908	0.917	0.911
Number of outpatient surgeries	Hospital size	0.713	0.792	0.736

M1: 2006 Model

M2: 2007 Model

M3: Pooled Model (2006 and 2007)

On the basis of the above information, five variables: population size, HMO penetration, ASC specialists per 1000, case-mix index and number of outpatient surgeries were deleted from the analysis. These variables were dropped from all the three models (2006 model, 2007 model and the pooled 2006 and 2007 model).

Herfindahl Hirschman index is an important indicator of market competition in the model. Population size in part is controlled for in all the models by a control variable which is a binary variable that distinguished markets by large and small populations. Hence, population size was deleted from the



analysis. As the focus of the study is hospital joint ventures with ASCs, the number of ASCs in a county is crucial to ascertain the supply of physicians and competition in the county. Thus the variables HMO penetration and ASC specialists per 1000 that were highly correlated with this variable were dropped from the analysis. Operating expense per adjusted discharge is also one of the important financial indicators in the model which tests whether financial factors are associated with hospitals decision to joint venture with ASCs. Since case-mix is not needed to test any hypothesis directly in the study, it was dropped from the analysis as it was highly correlated with operating expenses per adjusted discharge. Hospital size is the only continuous organizational variable in the study that is needed to test Hypothesis 4. Also this variable can be useful in identifying outliers amongst other variables such as cash flow margin, day's cash on hand and others. Hence, the number of outpatient surgeries was dropped from the analysis.

### *Descriptive Analysis*

Three descriptive tests were performed to provide a better understanding of the variables individually. All the tests were performed using SPSS statistics version 16.

For continuous variables, an independent sample t-test was performed to test the difference in means of the variables of interest between two independent groups (hospitals that joint venture with ASCs and hospitals that do not). In order to determine the significance of the difference in means between the two groups

for the variables, the results of Levene's test for equality of variances was explored. Equal variance was not assumed if the significance for Levene's test was 0.05 or below (SPSS Tutorial 2010). Equal variance was assumed if the significance for Levene's test was above 0.05.

For the categorical variables, chi-square test and z test were performed. Chi-square test was useful in determining whether there was a significant difference between the two groups on the frequencies of the categorical variables and z test added additional information by providing the difference between the two groups, as given by the z value.

### *Multivariate Analysis*

Logistic regression was used to model the data and identify significant relationships between the independent variables and the dependent variable, 'hospitals' decision to enter into JVs with ASCs'. Detailed listing of the variables, beta coefficients, p-values, odds ratios and 90% confidence intervals for the odds ratios of the logistic regression model are presented in respective sections. The presentation of odds ratios' interpretation is consistent with previous studies (McCue 2000; LaValley 2008) that have interpreted odds ratios. For variables that present one percent change, the percent change represents one whole percent change. An example of this would be a change from 3 to 4 percent. The signs of the model coefficients are interpreted as follows, consistent with previous studies (McCue 2000; Ozgen and Ozcan 2002):

- When coefficients are positive, a higher value of the variable increases the likelihood of hospitals' decision to joint venture with ASCs.
- When coefficients are negative, a lower value of the variable increases the likelihood of hospitals' decision to joint venture with ASCs.

#### 2006 Hospital-ASC Joint Venture Study Period

##### *Descriptive Findings*

The 2006 study period sample included 97 hospitals that entered into joint venture arrangements with ASCs in 2006. However, four hospitals were eliminated as they had missing data. As a result, the 2006 study period included 93 hospitals in the study group. A comparison group of 279 hospitals was chosen using random selection.

Preliminary descriptive analysis produced means and standard deviation for all the continuous variables of interest. Assessment of these values was performed to check for unusual values of data or problems with the distribution of the data and adjustments were made accordingly. These univariate measures were reviewed for hospitals that joint ventured with ASCs and those that did not, and the results were then compared to the same measures obtained in data analyses of subsequent study periods.

Table 7 presents the descriptive statistics of continuous variables for the 2006 study period. From a market perspective, hospitals that joint ventured with ASCs operated in markets characterized by higher per capita income, higher competition, lower unemployment and a lower percentage of elderly population.

Table 7: Descriptive Statistics of Continuous Variables for the 2006 Study Period (n=372)

	<b><u>Hospitals JV with ASCs N=93</u></b>	<b><u>No JV Hospitals N=279</u></b>	<b><u>t-statistic</u></b>
<b><u>Variables</u></b>	<b><u>Mean (Std. Dev.)</u></b>	<b><u>Mean (Std. Dev.)</u></b>	
<b>Market</b>			
Herfindahl-Hirschman Index (HHI)	0.56 (0.31)	0.64 (0.34)	1.83*
Per capita income	\$33,988 (9,250)	\$30,702 (8,529)	-3.15***
Unemployment rate	4.91 (1.24)	5.37 (1.75)	2.74***
Percentage of elderly	12.28% (3.7)	13.55% (4.15)	2.62***
Number of hospitals in JV with ASCs	3 (2)	3 (3)	-0.08
Number of ASCs	10 (12)	13 (34)	1.25
<b>Organizational</b>			
Bed size	306 (212)	160 (131)	-6.26***
<b>Operational</b>			
Occupancy rate	0.67 (0.11)	0.59 (0.19)	-5.09***
<b>Financial</b>			
Cash flow margin	0.10 (0.12)	0.07 (0.12)	-1.72*
Cash on hand	86 (111)	64 (154)	-1.25
Long-term debt to total capital	0.33 (0.30)	0.38 (0.43)	1.08
Operating expense per discharge	\$9,042 (3,421)	\$8,142 (4,265)	-1.85*

\*\*\* significant at p=0.01

\*\* significant at p=0.05

\* significant at p=0.1

From an organizational perspective, hospitals that joint ventured with ASCs on average had more beds. From an operational perspective, hospitals that joint ventured with ASCs had a higher occupancy rate. From a financial perspective, hospitals that joint ventured with ASCs had slightly higher cash flow margin and higher operating expense per adjusted discharge.

A frequency analysis was performed for categorical values such as certificate of need laws, ownership and affiliation to a system. In addition to chi-square test, a z-test between two proportions was also performed. Certificate of need laws and ownership status fall under the umbrella of regulatory construct whereas affiliation to a system comes under organizational construct. The results of this analysis are presented in Table 8.

Table 8: Descriptive Statistics of Categorical Variables for 2006 Study Period (N=372)

		<b>Hospitals JV with ASCs N=93</b>		<b>No JV Hospitals N=279</b>		<b>Z- Value</b>
<u>Variables</u>		<u>Frequency</u>	<u>Percentage</u>	<u>Frequency</u>	<u>Percentage</u>	
<b>Regulatory</b>						
	Certificate of need	31	33.33%	115	41.22%	-1.35
	For-profit ownership	13	13.98%	73	26.16%	-2.41**
<b>Organizational</b>						
	System affiliated	60	64.52%	180	64.52%	0.00

\*\*\* significant at p=0.01

\*\* significant at p=0.05

\* significant at p=0.1

As noted from Table 8, not-for-profit hospitals constitute a higher percentage than for-profit hospitals amongst hospitals that joint venture with ASCs. In the 2006 study period, 13.98% of for-profit hospitals entered into joint venture arrangements with ASCs. It should be noted that for-profit hospitals are a significantly smaller proportion (19.93%) of the overall U.S. hospital population (AHA 2009).

### *Multivariate Findings*

The appropriate analytic technique when the dependent variable is dichotomous and the model involves a number of predictors is multivariate

logistic regression. Logistic regression was used to model the data and identify significant relationships between the independent variables and the dependent variable, 'hospitals' decision to enter into JVs with ASCs'. A detailed listing of the variables, beta coefficients, p-values, odds ratios and 90 % confidence intervals for the odds ratios of the logistic regression model are presented in Table 9.

Table 9: Logistic Regression Results of Hospital-ASC Joint Ventures for 2006 Study Period (N=372)

<u>Variables</u>	<u>Beta Coefficient</u>	<u>p-Value</u>	<u>Odds Ratio</u>	<u>90% CI for Odds Ratio</u>
<b>Market</b>				
Herfindahl-Hirschman Index	-0.581	0.302	0.559	(0.222,1.411)
Per capita income	0.000	0.526	1.000	(1.000,1.000)
Unemployment rate	-0.247	0.017**	0.781	(0.659,0.926)
Percentage of elderly	-9.787	0.013**	0.000	(0.000,0.036)
Number of hospitals in JV with ASCs	0.021	0.726	1.022	(0.924,1.129)
Number of ASCs	-0.022	0.035**	0.979	(0.962,0.995)
<b>Regulatory</b>				
Certificate of need	0.549	0.061*	1.731	(1.069,2.802)
For-profit ownership	0.518	0.203	1.679	(0.860,3.280)
<b>Organizational</b>				
Bed size	0.006	0.000** *	1.006	(1.004,1.008)
Affiliation to a system	0.115	0.707	1.122	(0.678,1.859)
<b>Operational</b>				
Occupancy rate	0.488	0.610	1.629	(0.337,7.875)
<b>Financial</b>				
Cash flow margin	0.782	0.563	2.187	(0.236,20.254)
Days cash on hand	0.000	0.871	1.000	(0.998,1.002)
Long-term debt to total capital	-0.030	0.941	0.971	(0.501, 1.881)
Operating expense per adjusted discharge	0.000	0.221	1.000	(1.000,1.000)

\*\*\* significant at p=0.01

\*\* significant at p=0.05

\* significant at p=0.1

Percentage Correct Prediction = 78.5

-2 Log likelihood = 337.084

Nagelkerke R-square = 0.508

Hosmer and Lemeshow Test: Chi-square = 8.001; Sig = 0.433

As noted in Table 9, three of the five market factors, unemployment rate, percentage of elderly and number of ASCs in the market, are associated with hospitals' decision to JV with ASCs. All the three variables: unemployment rate, percentage of elderly and number of ASCs, were significant at .05 level.

The negative coefficient for unemployment rate indicates that hospitals operating in markets with lower unemployment rate are more likely to joint venture with ASCs. The odds ratio for unemployment rate indicates that the relative odds of a hospital joint venturing with ASCs decrease 21.9% with every 1% increase in the unemployment rate. The negative coefficient of percentage of elderly population indicates that hospitals operating in markets with lower population of individuals over 65 are more likely to joint venture with ASCs. The odds ratio for percentage of elderly indicates that the relative risk of hospitals not having a joint venture with ASC is very high with every 1% increase in percentage of elderly.

The negative coefficient of the number of ASCs indicates that hospitals operating in markets with fewer ASCs are more likely to joint venture with ASCs. The odds ratio indicates that the relative odds of a hospital joint venturing with ASCs decreases 2.1% with a one unit increase in the number of ASCs in the county.

One of the two regulatory factors, presence of certificate of need laws was found to have a marginal significant association with hospitals that JV with ASCs. A positive coefficient of certificate of need indicates that hospitals located in

states having certificate of need are more likely to joint venture with ASCs. Results indicate that the odds of a hospital entering into joint venture arrangements with ASCs in a state with certificate of need laws are 1.7 times greater than in states without certificate of need laws.

One of the two organizational factors, hospital size was found to be significantly associated hospitals' decision to JV with ASCs. Bed size of the hospital was found to be significant at .01 level. A positive coefficient of bed size indicates that larger bed size hospitals are more likely to joint venture with ASCs. The odds ratio indicates that for every 10 bed increase in the bed-size of a hospital, the odds of it joint venturing with an ASC would increase by 6%.

The percentage correct prediction of 78.5 indicates a reasonably high predictive power for the 2006 study period logistic regression model. A Nagelkerke R-square value of 0.508 additionally reassures that this empirical model has reasonably high predictive power. In logistic regression, Hosmer and Lemeshow goodness-of-fit is a post-hoc test performed to evaluate the fit of a specific model (Hosmer and Lemeshow 2000). The null hypothesis in this test is that the weighted combination of predictors is related to outcome log-odds in linear fashion. A non-significant chi-square indicates a good fit of data with linear model. Since Hosmer and Lemeshow goodness-of-fit test is designed specifically for a binary response variable, it is considered more reliable than R-square value while interpreting model strength in logistic regression. This test was also conducted in this study. The results of the Hosmer and Lemeshow



goodness-of-fit test with Chi-square value 8.001 and significance value 0.433 indicates that the model fit was good in this study period.

In summary, hospitals operating in markets with lower unemployment and percentage of elderly population, and having fewer numbers of ASCs are more likely to enter into joint venture arrangements with ASCs. These hospitals also have more beds and are located in states governed by certificate of need laws. These results are compared to the results of the other two study periods later in the chapter.

#### 2007 Hospital-ASC Joint Venture Study Period

##### *Descriptive Findings*

The 2007 study period sample included 73 hospitals that entered into joint venture arrangements with ASCs in 2007. However, 1 hospital was eliminated as it had missing data. As a result, the 2007 study period included 72 hospitals in the study group. A comparison group of 216 hospitals was chosen using random selection.

Preliminary descriptive analysis produced means and standard deviation for all the continuous variables of interest. Assessment of these values was performed to check for unusual values of data or problems with the distribution of the data and was dealt with accordingly. These univariate measures were reviewed for hospitals that joint ventured with ASCs and those that did not, and the results were then compared to the same measures obtained in data analysis of other study periods.

Table 10 presents the descriptive statistics of continuous variables for the 2007 study period. From a market perspective, hospitals that joint ventured with ASCs operated in counties with a higher per capita income and a lower percentage of elderly population. From an organizational perspective, hospitals that joint ventured with ASCs were larger facilities in terms of bed size. From a financial perspective, hospitals that joint ventured with ASCs had higher cash flow margin and higher days cash on hand.

Table 10: Descriptive Statistics of Continuous Variables for the 2007 Study Period (n=288)

	<b>Hospitals JV with ASCs N=72</b>	<b>No JV Hospitals N=216</b>	<b>t-statistic</b>
<u>Variables</u>	<u>Mean (Std. Dev.)</u>	<u>Mean (Std. Dev.)</u>	
<b>Market</b>			
Herfindahl-Hirschman Index (HHI)	0.62 (0.32)	0.58 (0.33)	-0.80
Per capita income	\$36,254 (8,952)	\$33,777 (11,508)	-1.67*
Unemployment rate	4.64 (1.47)	4.87 (1.62)	1.05
Percentage of elderly	12.24% (2.6)	13.94% (3.97)	4.16***
Number of hospitals in JV with ASCs	4 (3)	4 (3)	-0.02
Number of ASCs	10 (23)	13 (33)	0.69
<b>Organizational</b>			
Bed size	254 (148)	184 (165)	-3.20***
<b>Operational</b>			
Occupancy rate	0.61 (0.13)	0.59 (0.18)	-0.72
<b>Financial</b>			
Cash flow margin	0.11 (0.09)	0.09 (0.1)	-2.05**
Days cash on hand	87 (116)	60 (85)	-1.79*
Long-term debt to total capital	0.38 (0.45)	0.35 (0.36)	-0.71
Operating expense per discharge	\$8,855 (2,310)	\$8,855 (5,227)	0.00

\*\*\* significant at p=0.01

\*\* significant at p=0.05

\* significant at p=0.1

A frequency analysis was performed for categorical values such as certificate of need laws, ownership and affiliation to a system. In addition to chi-square test, a z-test between two proportions was also performed. Certificate of need laws and ownership status fall under the umbrella of regulatory construct whereas affiliation to a system comes under organizational construct. The results of this analysis are presented in Table 11.

Table 11: Descriptive Statistics of Categorical Variables for 2007 Study Period (N=288)

		<b>Hospitals JV with ASCs N=72</b>		<b>No JV Hospitals N=216</b>		<b>Z- Value</b>
<u>Variables</u>		<u>Frequency</u>	<u>Percentage</u>	<u>Frequency</u>	<u>Percentage</u>	
<b>Regulatory</b>						
	Certificate of need	35	48.61%	84	38.89%	1.45
	For-profit ownership	7	9.72%	40	18.52%	-1.75*
<b>Organizational</b>						
	System affiliation	48	66.67%	134	62.04%	0.71

\*\*\* significant at p=0.01

\*\* significant at p=0.05

\* significant at p=0.1

Ownership status of hospitals was found to be marginally significant between the two groups (hospitals that joint ventured and those that did not). Not-for-profit hospitals constitute a higher percentage than for-profit hospitals amongst hospitals that joint venture with ASCs. In the 2007 study period, 9.72% of for-profit hospitals entered into joint venture arrangements with ASCs. However, as noted earlier, for-profit hospitals are a significantly smaller proportion (19.93%) of the overall U.S. hospital population (AHA 2009).

### *Multivariate Findings*

As previously mentioned, the appropriate analytic technique when the dependent variable is dichotomous and the model involves a number of predictors is multivariate logistic regression. Logistic regression was used to model the data and identify significant relationships between the independent variables and the dependent variable, 'hospitals' decision to enter into JVs with ASCs'. A detailed listing of the variables, beta coefficients, p-values, odds ratios and 90% confidence intervals for the odds ratios of the logistic regression model are presented in Table 12.

As noted in Table 12, two of the five market factors, Herfindahl-Hirschman Index and percentage of elderly, are associated with hospitals' decision to JV with ASCs. The Herfindahl-Hirschman Index was marginally significant at 0.10 level and the percentage of elderly was significant at .01 level. A positive coefficient of Herfindahl-Hirschman Index (HHI) indicates that hospitals operating in more concentrated markets are more likely to joint venture with ASCs. The odds ratio indicates that the likelihood of hospitals joint venturing with ASCs increases more than 3 times with a one unit (e.g., from 0.2 to 0.3) increase in market concentration. The negative coefficient of percentage of elderly population indicates that hospitals operating in markets with lower population of individuals over 65 are more likely to joint venture with ASCs. The odds ratio for percentage of elderly indicates that the risk of hospitals not having a joint venture with ASC is very high with every 1% increase in percentage of elderly.

Table 12: Logistic Regression Results of Hospital-ASC Joint Ventures for 2007 Study Period (N=288)

<u>Variables</u>	<u>Beta Coefficient</u>	<u>p-Value</u>	<u>Odds Ratio</u>	<u>90% CI for Odds Ratio</u>
<b>Market</b>				
Herfindahl-Hirschman Index	1.171	0.071*	3.226	(1.109,9.381)
Per capita income	0.000	0.550	1.000	(1.000,1.000)
Unemployment rate	-0.13	0.228	0.878	(0.736,1.049)
Percentage of elderly	-18.394	.001***	0.000	(0.000,0.000)
Number of hospitals in JV with ASCs	0.029	0.611	1.029	(0.938,1.130)
Number of ASCs	-0.002	0.740	0.998	(0.985,1.010)
<b>Regulatory</b>				
Certificate of need	-0.404	0.201	0.668	(0.397,1.123)
For-profit ownership	0.599	0.210	1.820	(0.830,3.993)
<b>Organizational</b>				
Size	0.004	0.001** *	1.004	(1.002,1.006)
Affiliation to a system	-0.300	0.371	0.741	(0.426,1.287)
<b>Operational</b>				
Occupancy rate	-1.964	0.091*	0.14	(0.021,0.950)
<b>Financial</b>				
Cash flow margin	1.498	0.423	4.474	(0.207,96.747)
Cash on hand	0.002	0.179	1.002	(0.999,1.005)
Long-term debt to total capital	0.640	0.129	1.897	(0.948,3.798)
Operating expense per adjusted discharge	0.000	0.238	1.000	(1.000,1.000)

\*\*\* significant at p=0.01

\*\* significant at p=0.05

\* significant at p=0.1

Percentage Correct = 76.0

-2 Log likelihood = 281.922

Nagelkerke R-square = 0.446

Hosmer and Lemeshow Test:

Chi-square = 10.971; Sig = 0.203

One of the two organizational factors, hospital size was found to be significantly associated hospitals' decision to JV with ASCs. The size of the hospital was found to be significant at .01 level. A positive coefficient of bed size indicates that larger bed size hospitals are more likely to joint venture with ASCs.

The odds ratio indicates that for every 10 bed increase in the bed-size of a hospital, the odds of it joint venturing with an ASC would increase by 4%.

The operational factor- occupancy rate was found to be significantly associated hospitals' decision to JV with ASCs. Occupancy rate was found to be marginally significant at .10 level. A negative coefficient of occupancy rate indicates that hospitals with lower occupancy rate are more likely to joint venture with ASCs. The odds ratio indicates that the relative odds of a hospital joint venturing with ASCs decrease 86% with every 1% (e.g., from 3 to 4) increase in the occupancy rate.

The percentage correct prediction of 76.0 indicates a reasonably high predictive power for the 2007 study period logistic regression model. A Nagelkerke R-square value of 0.446 additionally reassures that this empirical model has reasonably high predictive power. The results of the Hosmer and Lemeshow goodness-of-fit test with Chi-square value 10.971 and significance value 0.203 indicates that the model fit was good in this study period.

In summary, larger hospitals (in terms of bed size) operating in more concentrated markets with a lower percentage of elderly population, and having lower occupancy rate are more likely to enter into joint venture arrangements with ASCs. These results are compared to the results of the other two study periods later in the chapter.

## Pooled Model of 2006 and 2007 Hospital-ASC Joint Venture Study

### *Descriptive Findings*

The 2006 and 2007 pooled sample included 165 hospitals that entered into joint venture arrangements with ASCs in 2006 and 2007. A comparison group of 495 hospitals was chosen using random selection. Preliminary descriptive analysis produced means and standard deviation for all the continuous variables of interest. Assessment of these values was performed to check for unusual values of data or problems with the distribution of the data. These univariate measures were reviewed for hospitals that joint ventured with ASCs and those that did not, and the results were then compared to the same measures obtained in data analysis of prior study periods.

Table 13 presents the descriptive statistics of continuous variables for the 2006 and 2007 pooled model. From a market perspective, hospitals that joint ventured with ASCs operated in markets characterized by a higher per capita income, lower unemployment rate and lower percentage of elderly population. From an organizational perspective, hospitals that joint ventured with ASCs were larger facilities in terms of bed size. From an operational perspective, hospitals that joint ventured with ASCs had a higher occupancy rate. And from a financial perspective, hospitals that joint ventured with ASCs on average had a higher cash flow margin and more days cash on hand.

A frequency analysis was performed for categorical values: certificate of need laws, ownership and affiliation to a system. In addition to chi-square test, a

Table 13: Descriptive Statistics of Continuous Variables for the 2006 and 2007 Pooled Model (n=660)

	Hospitals JV with ASCs N=165	No JV Hospitals N=495	t- statistic
Variables	Mean (Std. Dev)	Mean (Std. Dev.)	
<b>Market</b>			
Herfindahl-Hirschman Index (HHI)	0.59 (0.32)	0.61 (0.33)	0.86
Per capita income	\$34,977(9,163)	\$32,044 (10,045)	-3.32***
Unemployment rate	4.80 (1.35)	5.15 (1.71)	2.42**
Percentage of elderly	12.26% (3.26)	13.72% (4.07)	4.66***
Number of hospitals in JV with ASCs	4 (3)	4 (3)	-0.07
Number of ASCs	10 (17)	13 (33)	1.44
<b>Organizational</b>			
Size	283 (188)	170 (147)	-7.03**
<b>Operational</b>			
Occupancy rate	0.64 (0.13)	0.59 (0.18)	-4.15***
<b>Financial</b>			
Cash flow margin	0.10 (0.11)	0.08 (0.11)	-2.59***
Days cash on hand	86 (113)	63 (128)	-2.13**
Long-term debt to total capital	0.36 (0.37)	0.36 (0.4)	0.24
Operating expense per discharge	\$8,960 (2,981)	\$8,453 (4,718)	-1.61

\*\*\* significant at p=0.01

\*\* significant at p=0.05

\* significant at p=0.1

z-test between two proportions was also performed. Certificate of need laws and ownership status fall under the umbrella of regulatory construct whereas affiliation to a system comes under organizational construct. The results of this analysis are presented in Table 14.

As noted from Table 14, not-for-profit hospitals constitute a higher percentage than for-profit hospitals amongst hospitals that joint venture with



Table 14: Descriptive Statistics of Categorical Variables for 2006 and 2007 Study Period (N=660)

		<b>Hospitals JV with ASCs N=165</b>		<b>No JV Hospitals N=495</b>		<b>Z-Value</b>
<u>Variables</u>		<u>Frequency</u>	<u>Percentage</u>	<u>Frequency</u>	<u>Percentage</u>	
<b>Regulatory</b>						
	Certificate of need	66	40%	199	40.2%	-0.05
	For-profit ownership	20	12.12%	113	22.83%	-2.97***
<b>Organizational</b>						
	System affiliation	108	65.45%	314	63.43%	0.47

\*\*\* significant at p=0.01

\*\* significant at p=0.05

\* significant at p=0.1

ASCs. In the 2006 and 2007 pooled study model, 12.12% of for-profit hospitals entered into joint venture arrangements with ASCs.

### *Multivariate Findings*

As previously mentioned, the appropriate analytic technique when the dependent variable is dichotomous and the model involves a number of predictors is multivariate logistic regression. Logistic regression was used to model the data and identify significant relationships between the independent variables and the dependent variable, 'hospitals' decision to enter into JVs with ASCs'. Detailed listing of the variables, beta coefficients, p-values, odds ratios and 90% confidence intervals for the odds ratios of the logistic regression model are presented in Table 15.

As noted in Table 15, three of the five market factors, unemployment rate, the percentage of elderly and the number of ASCs, are associated with hospitals' decision to JV with ASCs. Unemployment rate was significant at 0.05 level,

Table 15: Logistic Regression Results of Hospital-ASC Joint Ventures for 2006 and 2007 Pooled Model (N=660)

Variables	Beta Coefficient	p-Value	Odds Ratio	90% CI for Odds Ratio
<b>Market</b>				
Herfindahl-Hirschman Index	0.257	0.523	1.294	(0.667,2.510)
Per capita income	0.000	0.522	1.000	(1.000,1.000)
Unemployment rate	-0.176	0.013**	0.838	(0.746, 0.942)
Percentage of elderly	-11.435	0.000***	0.000	(0.000,0.002)
Number of hospitals in JV with ASCs	0.018	0.658	1.018	(0.953,1.088)
Number of ASCs	-0.011	0.06*	0.989	(0.979,0.999)
<b>Regulatory</b>				
Certificate of need	0.051	0.804	1.052	(0.752,1.472)
For-profit ownership	0.501	0.091*	1.650	(1.013,2.688)
<b>Organizational</b>				
Bed size	0.005	0.000***	1.005	(1.004,1.006)
Affiliation to a system	-0.070	0.749	0.933	(0.652,1.334)
<b>Operational</b>				
Occupancy rate	-0.306	0.666	0.736	(0.229,2.362)
<b>Financial</b>				
Cash flow margin	1.524	0.152	4.589	(0.796,26.444)
Days cash on hand	0.000	0.649	1.000	(0.999,1.002)
Long-term debt to total capital	0.280	0.307	1.323	(0.843,2.075)
Operating expense per adjusted discharge	0.000	0.057*	1.000	(1.000,1.000)
<b>Time</b>	0.064	0.755	1.066	(0.762,1.491)

\*\*\* significant at p=0.01

\*\* significant at p=0.05

\* significant at p=0.1

Percentage Correct = 76.7

-2 Log likelihood = 646.078

Nagelkerke R-square = 0.446

Hosmer and Lemeshow Test:

Chi-square = 11.375; Sig = 0.181

percentage of elderly was highly significant at 0.01 level and number of ASCs

was marginally significant at 0.10 level. The negative coefficient of

unemployment rate indicates that hospitals operating in markets with lower

unemployment rate are more likely to joint venture with ASCs. The odds ratio

indicates that the relative odds of a hospital joint venturing with ASCs decrease 16.2% with 1% increase in the unemployment rate. The negative coefficient of percentage of elderly population indicates that hospitals operating in markets with lower population of individuals over 65 are more likely to joint venture with ASCs. The odds ratio for percentage of elderly indicates that the risk of hospitals not having a joint venture with ASC is very high with every 1% (e.g., from 3 to 4) increase in percentage of elderly. The negative coefficient of number of ASCs indicates that hospitals operating in markets with fewer ASCs are more likely to joint venture with ASCs. The odds ratio indicates that the relative odds of a hospital joint venturing with ASCs decreases 1.1% with a unit increase in the number of ASCs in the county.

One of the two regulatory factors, ownership status was found to be significantly associated hospitals' decision to JV with ASCs. Ownership status was marginally significant at 0.10 level. A positive coefficient of ownership status indicates that for-profit hospitals are more likely to joint venture with ASCs. Results indicate that the odds of a for-profit hospital entering into joint venture arrangements with ASCs are 1.65 times greater than not-for-profit hospitals.

One of the two organizational factors, hospital size was found to be significantly associated hospitals' decision to JV with ASCs. Size of the hospital was found to be highly significant at 0.01 level. A positive coefficient of bed size indicates that larger bed size hospitals are more likely to joint venture with ASCs.

The odds ratio indicates that for every 10 bed increase in the bed-size of a hospital, the odds of it joint venturing with an ASC would increase by 5%.

One of the four financial factors, operating expense per adjusted discharge was found to be significantly associated hospitals' decision to JV with ASCs. Operating expense per adjusted discharge was marginally significant at 0.10 level. A positive coefficient of operating expense per adjusted discharge indicates that hospitals with higher operating expense per adjusted discharge are more likely to joint venture with ASCs. However, the odds ratio indicates that there would be very little change (almost 0) in the odds of a hospital joint venturing with ASCs with a unit increase in operating expense per adjusted discharge.

The percentage correct prediction of 76.7 indicates a reasonably high predictive power for the 2006 and 2007 pooled logistic regression model. A Nagelkerke R-square value of .446 additionally reassures that this empirical model has reasonably high predictive power. The results of the Hosmer and Lemeshow goodness-of-fit test with Chi-square value 11.375 and significance value 0.181 indicates that the model fit was good for this pooled sample.

A time variable was added as a control variable in this model as the pooled sample has data from two different years. However, this variable was found to be not significant. In summary, the pooled model results suggest hospitals operating in markets with lower unemployment rate, lower percentage of elderly population and fewer numbers of ASCs, and having for-profit

ownership status, greater number of staffed beds, and higher operating expense per adjusted discharge are more likely to enter into joint venture arrangements with ASCs.

### Summary of Findings of the Three Analytical Models

The following table summarizes the expected hypothesized direction as compared to the actual observed direction of the association of the independent variables with the dependent variable, hospitals' decision to JV with ASCs. This comparison is discussed in detail in Chapter 6. Table 16 presents the hypothesized directions and actual observed directions of relationships of independent variables with the dependent variables.

The directionality of the relationship between the independent variables and the dependent variable is presented using '+' and '-' signs. The '+' sign indicates: higher/greater/presence/an increase in an independent variable, the more likely it is for the hospital to enter into joint venture with ASC. Similarly, a '-' sign indicates: lower/smaller/absence/a decrease in an independent variable, the more likely it is for the hospital to enter into joint venture with ASC.

The following statistically significant relationships within the variables for the JV model are shown in Table 16. As expected, the market factor of unemployment rate was negatively associated with hospitals' decision of joint venturing with ASCs. Also as expected, the market factors of percentage of elderly was negatively associated with hospital-ASC JVs. Unexpectedly number of ASCs was negatively associated with hospital-ASC JVs.

Table 16: Hypothesized Directions and Concluded Directions of Relationships of Independent Variables with Dependent Variables in the Hospital-ASC JV Model

<u>Variable</u>	<u>Dependent Variable</u>	<u>Expected Direction</u>	<u>M1</u>	<u>M2</u>	<u>M3</u>	<u>Concluded Direction</u>
<b>Market</b>						
Herfindahl-Hirschman Index	JV with ASC	-	-	+	+	+
Per capita income	JV with ASC	+	+	+	+	
Unemployment rate	JV with ASC	-	-.**	-	-.**	-
Percentage of elderly	JV with ASC	-	-.**	-.***	-.***	-
Number of hospitals in JV with ASCs	JV with ASC	+	+	+	+	
Number of ASCs	JV with ASC	+	-.**	-	-.*	-
<b>Regulatory</b>						
Certificate of need	JV with ASC	-	+	-	+	+
For-profit ownership	JV with ASC	+	+	+	+	+
<b>Organizational</b>						
Size	JV with ASC	-	+.***	+.***	+.***	+
Affiliation to a system	JV with ASC	-	+	-	-	
<b>Operational</b>						
Occupancy rate	JV with ASC	-	+	-.*	-	-
<b>Financial</b>						
Cash flow margin	JV with ASC	-	+	+	+	
Cash on hand	JV with ASC	-	+	+	+	
Long-term debt to total capital	JV with ASC	+	-	+	+	
Operating expense per adjusted discharge	JV with ASC	+	+	+	+	+

\*\*\* Significant at p = .01

\*\* Significant at p = .05

\* Significant at p = .1

M1: 2006 Model

M2: 2007 Model

M3: 2006 and 2007 Pooled Model

Also, as expected, the regulatory variable of for-profit ownership was positively associated with hospital-ASC JVs. The certificate of need variable was found to be marginally significant in 2006 model and was unexpectedly, positively associated with hospital-ASC JVs. However, in the 2007 model, the directionality changed towards hypothesized direction, but the variable certificate of need was found to be insignificant.

Unexpectedly, the organizational variable- bed size was positively associated with hospital-ASC JV. In all three models, this variable was highly significant at 0.01 level.

As expected, the operational variable- occupancy rate was found to be negatively associated with hospital-ASC JVs in the 2007 and the pooled model. This variable was marginally significant in the 2007 model at 0.10 level.

Also, as expected, the financial variable- operating expense per adjusted discharge was positively associated with hospital-ASC JVs. This variable, although consistent with the hypothesized direction, was marginally significant (at 0.10 level) in only the pooled model.

The models presented here also controlled for population in a county (large population), teaching status of a hospital as well as their public status. The results presented in this chapter are further examined, discussed and presented in Chapter 6.

### Summary of Chapter 5

Chapter 5 presented the results of the analysis of all three models. They included the descriptive and multivariate findings for the 2006, 2007, and a pooled model. The relationships of the variables with hospitals' decision to joint venture with ASCs were also presented.

Chapter 6 summarizes the study findings and interprets them. This is followed by a presentation of the implications of the study findings for all three key audiences: researchers, health care managers and policy makers. Limitations of the study and areas for future research are also identified in Chapter 6.



## CHAPTER 6: DISCUSSION AND CONCLUSION

This chapter presents a summary and explanation of significant findings related to hospitals' decision to joint venture with ASCs. Responses to the research questions as well as the limitations of this study are also presented. Implications for researchers, hospital and ASC managers, and policy makers are outlined. Finally, the chapter concludes with suggestions for areas of future research.

The purpose of this study was to explore the relationships of various market, regulatory, organizational, operational, and financial factors with hospitals' decision to joint venture with ASCs. The hypothesized relationships were based on a combined framework of resource dependency theory and neo-institutional theory. The literature suggests that changing technology, increased demand for services, growing number of ASCs and regulatory changes have generated greater competitive pressures on hospitals. These competitive pressures increase the environmental uncertainty and have prompted hospitals to consider strategic alliances such as joint venture arrangements.

The market construct, which reflected the demand and supply of hospital services at the county level, included the following variables: Herfindahl-

Hirschman index, per capita income, unemployment rate, percentage of elderly (age 65 and older), number of hospitals in joint ventures with ASCs, and number of ASCs.

The regulatory construct included variables: certificate of need and ownership status. Certificate of need laws are mandated at state level and ownership status is governed by the IRS.

The organizational construct was measured at the individual hospital level and included the following variables: size and system affiliation. The operational construct, also measured at the individual hospital level, was assessed with the help of the occupancy rate variable. The financial construct, also measured at the individual hospital level included the following variables: cash flow margin, days cash on hand, long term debt to total capital and operating expense per adjusted discharge.

### Discussion of Hypotheses and Research Questions

The following section addresses the research questions and hypotheses based on the hypothesized joint venture model.

#### *Research Question 1: Market*

- ***Are hospitals that operate in favorable market conditions (e.g., low unemployment rate, and high per capita income) more likely to enter into joint ventures with ASCs?***

The following hypotheses restate this research question in detail. Hypotheses H<sub>1a</sub> through H<sub>1d</sub> restate the above research question based on resource dependency theory and Hypothesis H<sub>2</sub> restates research question 1 based on neo-institutional theory.

**H<sub>1a</sub>:** Keeping regulatory, organizational, operational and financial factors constant, hospitals located in highly competitive outpatient surgery markets (low Herfindahl-Hirschman Index and large number of ASCs) are more likely to enter into joint venture arrangements with ASCs than other hospitals.

Unexpectedly, in the 2007 model, Herfindahl-Hirschman index was found to be marginally significant (at 0.10 level) and had a positive association with hospital-ASC JV arrangements indicating that these ventures are more likely in less competitive markets. Also, the number of ASCs in the market was found to be negatively associated with hospital-ASC JVs in 2006 and the pooled model.

From the combined results of Herfindahl-Hirschman index and number of ASCs, the study results indicate that hospitals located in less competitive outpatient surgery markets are more likely to enter into joint venture arrangements with ASCs than other hospitals. In highly competitive outpatient surgical markets, resource dependency theory suggests that a hospital's survival would depend on how resources are allocated across competitors (Ulrich and Barney 1984) and hospitals would form alliances (such as JV) to increase the likelihood of their survival (Currie 2000). However, the results here indicate that

these JVs are occurring in less competitive markets. An attempt to mitigate the threat of ASC monopoly and protect patient volume of their hospital service lines could be the underlying reasons for the occurrence of hospital-ASC JVs in less-competitive markets.

**H<sub>1b</sub>:** Keeping regulatory, organizational, operational and financial factors constant, hospitals located in markets with higher demand (i.e., large population) and higher ability to pay (e.g., low unemployment rate, low percentage of elderly and higher per capita income) are more likely to enter into joint venture arrangements with ASCs than other hospitals.

The significant results of the analyses found that the unemployment rate (a proxy measure for community's financial ability to pay) and low percentage of elderly were negatively associated with hospital-ASC JVs. As hypothesized, the first finding indicates that hospital-ASC joint ventures occur in markets where the ability to pay for healthcare services, as measured by low unemployment rate, is higher. The second finding suggests that hospital-ASC joint ventures occur in markets with a lower demand from the elderly in the market, which may support the first finding. Markets with low percentage of elderly may also imply that hospital-ASC joint ventures are occurring in markets with a higher percentage of the population insured by commercial payers. Findings of a recent study (Gabel et al 2008) examining association of physician ownership with referral patterns suggests that well-insured commercially insured patients are increasingly being

referred to ASCs whereas low paying patients covered by Medicare and Medicaid are more often referred to hospital outpatient departments. This could also be because co-morbid conditions affect surgical outcomes in elderly patients (Williams et al 2008) and present more complex cases with co-morbidities. Thus, they might need to be referred to hospital outpatient departments. Thus ASCs benefit financially from providing services for higher paying commercially insured patients. In order to increase their financial solvency, hospitals would be more likely to joint venture with ASCs to gain a part of the revenue which would be otherwise lost to them.

Also, there have been many changes to the ASC payment system by the Center of Medicare and Medicaid Services. CMS has cut back on the payment rates for the highest volume procedures (MedPac 2009). Although the changed payment rates were implemented in 2008 and were planned to be phased in over four years, it is reasonable to assume that hospitals and ASCs took proactive measures to lessen their reliance on payments for their Medicare and Medicaid beneficiaries and increase their financial profitability by targeting commercially insured patients. This might have provided additional incentives to hospitals to joint venture with ASCs.

**H<sub>1c</sub>:** Keeping regulatory, organizational, operational and financial factors constant, hospitals located in markets with fewer numbers of key specialists (gastroenterology, ophthalmology and orthopedics) in the market are more likely to enter into

joint venture arrangements with ASCs than other hospitals.

This hypothesis could not be tested in this study. Due to a high correlation of the variable ASC specialists (measuring the number of specialists in gastroenterology, ophthalmology and orthopedics in the market) with number of ASCs in the market, this variable was dropped from the analysis and hence this hypothesis could not be tested.

**H<sub>1d</sub>:** Keeping regulatory, organizational, operational and financial factors constant, hospitals located in markets with a higher HMO penetration are more likely to enter into joint venture arrangements with ASCs than other hospitals.

Again, this hypothesis could not be tested in this study. Due to a high correlation of the variable HMO penetration with number of ASCs in the market, this variable was dropped from the analysis and hence this hypothesis could not be tested.

**H<sub>2</sub>:** Keeping regulatory, organizational, operational and financial factors constant, hospitals located in markets with higher number of hospitals joint venturing with ASCs are more likely to enter into joint venture arrangements with ASCs than other hospitals.

This study found no statistically significant relationship between the number of hospitals in a joint venture with an ASC in a market and the likelihood of hospitals entering into joint venture arrangements with ASCs. Thus, it did not

provide any support for the mimetic mechanism postulated by neo-institutional theory.

*Research Question 2: Regulatory*

- ***Are regulatory constraints such as CON regulations and ownership status associated with a hospitals decision to joint venture with ASCs?***

The following  $H_{3a}$  and  $H_{3b}$  hypotheses restate the research question:

**$H_{3a}$ :** Keeping market, organizational, operational and financial factors constant, hospitals located in states without CON laws are more likely to enter into joint venture arrangements with ASCs than other hospitals.

Presence of certificate of need laws was found to be marginally significant (at 0.10 level) in the 2006 model and had a positive association with hospital-ASC joint venture arrangements. Presence of CON laws suggests that provider facilities (both hospitals and ASCs) are limited in their options to expand or upgrade their infrastructure. CON laws were implemented for cost containment purposes and to limit capital expansion (Henderson 2008). Research indicates that there is greater proliferation of ASCs in states without CON laws (Gregg et al 2010). There is significant overlap of CON laws applicable to hospitals and ASCs in many states. The three exceptions where CON laws applied to hospitals but not ASCs were Florida, Missouri and New Jersey (NCSL 2009). This study showed that in states with CON laws, there was a greater likelihood of hospitals

forming joint ventures with ASCs. No information was gathered regarding approvals or disapprovals of CON applications in this study. Therefore, a logical explanation is that CON laws could be perceived as a barrier to entry. Thus, the hospital may pro-actively want to further reduce competition by forming joint ventures with existing ASCs in the market.

**H<sub>3b</sub>:** Keeping market, organizational, operational and financial factors constant, for-profit hospitals are more likely to enter into joint venture arrangements with ASCs than non-profit hospitals.

As expected, for-profit hospitals were found to be more likely to JV with ASCs than non-profit hospitals. This association was found to be marginally significant (at 0.10 level) in the pooled model. Thus the results support prior theoretical and empirical research which suggests that similarity in culture and mission is one of the key attributes considered by organizations prior to joint venture (Pelfrey and Theisen 1989; Alexander and Morrissey 1989; Snail and Robinson 1998; Mark et al. 1998; Blaszyk and Hill-Mischel 2007). Most ASCs are for-profit in their ownership (MedPac 2010). There is mutual compatibility of mission between for-profit hospitals and for-profit ASCs as they are both profit seeking entities. Whereas not-for-profit hospitals might be less likely to joint venture with for-profit ASCs as it might result in conflict of mission and jeopardize their tax-exempt status (Anderson and Gevas 2006).



*Research Question 3: Organizational*

- ***Are the size of a hospital and its affiliation to a multi-hospital system related to hospital's decision to joint venture with ASCs?***

The following H<sub>4a</sub> and H<sub>4b</sub> hypotheses restate the research question:

**H<sub>4a</sub>:** Keeping market, regulatory, operational and financial factors constant, smaller bed size hospitals are more likely to enter into joint venture arrangements with ASCs than other hospitals.

Unexpectedly, the results of this study indicated that larger hospitals (as measured by bed size) were more likely to enter into joint venture arrangements with ASCs. Although the theoretical premise of this study posits that larger hospitals would prefer to internally restructure themselves (Greening and Gray 1994) prior to considering external alliances such as JVs, it is also true that bed size is a measure of complexity of acute care hospitals (Harrison 2006). Larger hospitals tend to be higher acuity hospitals and typically provide less profitable services such as emergency departments, intensive care units and burn units. These hospitals also rely greatly on more profitable services such as outpatient surgeries in order to compensate for their loss on less profitable services and remain financially viable. Thus, the reason for larger hospitals JVing with ASCs could be that these hospitals feel greater threat to their financial viability because of ASCs in their markets than smaller hospitals, and thus resulting in greater likelihood of entering into hospital-ASC JV arrangements.

**H<sub>4b</sub>:** Keeping market, regulatory, operational and financial factors constant, free-standing hospitals are more likely to enter into joint venture arrangements with ASCs than other hospitals.

This study found no statistically significant relationship between system affiliation of hospitals and the likelihood of hospitals entering into joint venture arrangements with ASCs.

*Research Question 4: Operational*

- ***Is operational performance of hospitals related to their decision to joint venture with ASCs?***

The following H<sub>5a</sub> and H<sub>5b</sub> hypotheses restate the research question:

**H<sub>5a</sub>:** Keeping market, regulatory, organizational and financial factors constant, hospitals with a lower occupancy rates are more likely to enter into joint venture arrangements with ASCs than other hospitals.

As expected, hospitals with lower occupancy rates were found to be more likely to enter into JVs with ASCs than hospitals with higher occupancy rates. This association was found to be marginally significant (at 0.10 level) in the 2007 model. Lower occupancy rates indicate weak demand for services and thereby decreased likelihood of hospital profitability (Harrison 2006). Based on the study's theoretical premise, hospitals operating in unfavorable market conditions characterized by lack of patient demand would be more likely to JV with ASCs in order to market directly their outpatient services and indirectly their inpatient

services, which will improve market share (Taparia 2010). The results of this study support this theoretical proposition.

**H<sub>5b</sub>:** Keeping market, regulatory, organizational and financial factors constant, hospitals with fewer outpatient surgeries are more likely to enter into joint venture arrangements with ASCs than other hospitals.

This hypothesis could not be tested in this study. Due to a high correlation of the variable number of outpatient surgeries with bed size, this variable was dropped from the analysis and hence this hypothesis could not be tested. This was done to avoid multicollinearity problems between independent variables.

*Research Question 5: Financial*

- ***Does the financial performance of hospitals (e.g., cash flow margin, days cash on hand, long term debt to total capital and operating expense per adjusted discharge) drive their decision to joint venture with ASCs?***

The following H<sub>6a</sub> to H<sub>6b</sub> hypotheses restate the research question:

**H<sub>6a</sub>:** Keeping market, regulatory, organizational and operational factors constant, hospitals with poor financial performance (e.g., lower cash flow margin and days cash on hand) are more likely to enter into joint venture arrangements with ASCs than other hospitals.

This study found no statistically significant relationship between cash flow margin and days cash on hand, and hospital-ASC JV arrangements.

**H<sub>6b</sub>:** Keeping market, regulatory, organizational and operational factors constant, hospitals with limited debt capacity and higher operating expense per adjusted discharge are more likely to enter into joint venture arrangements with ASCs than other hospitals.

This study results supported hypothesis H<sub>6b</sub>. This study found no statistically significant association between limited debt capacity and hospital-ASC joint venture. However, as expected, the results indicated that hospitals with higher operating expense per adjusted discharge were more likely to JV with ASCs than hospitals with lower operating expense per adjusted discharge. This association was found to be marginally significant (at 0.10 level) in the pooled model.

Literature suggests that operating expenses per adjusted discharge is a key operational indicator of hospitals (McCue and Thompson 2010) and it is often used to measure organizational efficiency (Harrison 2006). Resource dependency theory suggests that poor performing hospitals would like to engage in external linkages such as joint ventures to improve their performance. Thus, it follows that hospitals with higher operating costs look to joint venture arrangements in order to improve their financial performance. This could occur in two ways. Firstly, hospitals may try to lower their operating costs by shifting care

to outpatient basis provided in ASC setting and away from more costly inpatient setting. Another very likely occurrence could be that hospitals having higher operating expense might want to joint venture with ASCs in order to reduce their costs. ASCs are specialized facilities equipped with specialized labor. Labor costs form a large part of operating expenses for hospitals (McCue et al 2003). Hospitals may be able to reduce the burden of their labor costs and thereby their operating expenses, by joint venturing with ASCs.

#### Limitations of the Study

It is important to address the findings of this study in light of its limitations. This research was a cross-sectional study of the relationships between hospital-ASC JV and various market conditions, regulatory environment, organizational factors, operational efficiency and financial performance. The study examined the association of the independent variables with the dependent variable (hospital-ASC JV) at a single point in time. Thus, this study did not account for changes in variables over time. As the conceptual model based on prior research and theoretical premise suggests that time could influence JV decisions of hospitals, a longitudinal study would be able to incorporate these effects. However, it was not feasible considering the lack of available data. The current study design is the strongest plausible design given the current availability of data.

A second limitation of this study is with regard to the use of secondary data sources. This study relied on secondary data sources, which do have inherent limitations with regard to their accuracy and completeness of the data.

The key dependent variable in this study, hospital-ASC JV was derived from the American Hospital Association annual data for hospitals. Since the hospital submits the data in a survey, the authenticity of the data is on face value and subject to interpretation. For example, one primary issue with the dependent variable in this study is that JVs can be of many types and the AHA does not define the type of JV arrangements with ASCs. In this study, a broad definition of JV is assumed, as defined in earlier chapters (Introduction and Chapter 2).

The financial independent variables have been derived from the Medicare cost reports. These data elements, although reviewed by the Center for Medicare and Medicaid Services, are not audited by an external organization (Harrison 2002). Another data source, the National Council of State Legislatures which supplied the presence or absence of certificate of need (CON) laws variable for this study, does not provide detailed enforcement levels of these laws in different states. Thus, the differing levels of CON laws followed in different states could have had a different effect on the dependent variable compared to merely including the presence or absence of these laws in a state. Thus, it is observed that the ability of the secondary data to measure the constructs as governed by the theories in this study are limited.

A third limitation of this study concerns the reporting periods of hospitals in different data sources. The American Hospital Association reports data for the hospitals based on the calendar year whereas the Center for Medicare and Medicaid Services provides financial data in the hospital cost reports based on

the fiscal year. If the majority of the days (more than 180 days) of a hospital fell under a particular year (2006 or 2007), as reported in the CMS hospital cost reports, the hospital was included in that years study model. However, it is important to note that since data from both these sources were merged to analyze the association of the independent variables with the dependent variable, the differing reporting periods could result in under estimation of the financial variables.

A fourth limitation of this study pertains to a measure of supply of physicians. There has not been any validated variable to measure supply of physicians within a market specific to the type of ASCs present in the market. Thus the specialist index, based on the total number of specialists in ophthalmology, gastroenterology, and orthopedic disciplines per 1000 residents, was calculated and applied to all the markets. As different markets might have different specialty ASCs, it is important to interpret the results of this study with caution.

A fifth limitation of this study concerns the variations caused by geographical location. This study did not analyze hospital-ASC JVs according to geographic locality. However, incorporating CON laws (which are based on individual states) does reduce the effect of this omission considerably.

A sixth limitation of this study is with regard to urban-rural variation. This study included variables to measure the market construct at the county level and did not contrast hospital-ASC JVs based on urban versus rural variation.

Improvements in these limiting conditions should be incorporated in future studies on hospital JV arrangements with ASCs.

A final limitation of this study concerns the variables of interest that could not be examined due to high collinearity with other independent variables. Specifically, population size, HMO penetration, ASC specialists per 1000 population, case-mix index and number of outpatient surgeries were dropped from the empirical model due to high correlations with other predictor variables, as mentioned earlier in Chapter 5. Thus, their impact on hospitals decision to joint venture with ASCs could not be assessed.

#### Implications of the Research Study

This empirical study of hospital-ASC joint ventures has important theoretical, managerial and policy implications. This section presents these implications in detail.

##### *Theoretical Implications*

The results of this study provide support for the integrated applicability of resource dependency theory and neo-institutional theory to examine hospital joint venture arrangements. Resource dependency theory posits that organizations interact with the environment in order to generate or acquire access to key resources (patients, physicians, finances). It also posits that scarcer the resource or more uncertain the resource environment, higher the likelihood that organizations would forsake autonomy and consider engaging in external alliances. Therefore, applying this argument to the study context, it follows that



hospitals that engage in joint venture arrangements with ASCs are more likely to be in unfavorable markets.

The study provides empirical evidence that resource scarcity characterized by lack of demand (low percentage of elderly) leads to increased likelihood of hospital-ASC joint venture. In addition, resource dependency theory also posits that increasing access to resources is important for an organizations survival. In the case of this analysis, hospitals were more likely to joint venture with ASCs in markets with low unemployment rates which suggests that they are admitting patients who have the ability to pay for these healthcare services. Unemployment rate has been used as a proxy to measure a community's ability to afford healthcare services in a particular market (McCue et al 2000). This study provides further support for this view.

Surprisingly, the results of this study did not support the premise of environmental competition as posited by resource-dependency theory. Resource dependency theory suggests that competitive environments would encourage organizations to consider external linkages. However, this study found that hospital-ASC joint ventures were more likely in less competitive environments (as measured by higher Herfindahl-Hirschman index and fewer ASCs).

High Herfindahl-Hirschman index indicates more concentrated markets with low competition. Also, HHI reflects market structure and competition level more accurately than other similar measures of market concentration (Chen and Lii 2005). Furthermore, fewer competitors for the hospital translate into greater

dominance in the market. However, it could be possible that larger medical groups of specialists are forming ASCs resulting in fewer ASCs. Casalino et al (2003) identified that more number of specialists are joining large medical practices and the key reasons for formation of larger groups was to gain negotiating leverage with health plans and to gain a reputation for providing high quality of care to patients. In such a scenario, fewer medical groups in a market allow them to gain market power to attract patients away from hospitals. In turn, this market change would jeopardize hospitals ability to protect their existing patient base as well as attract new patients requiring hospital services in these specialties. Thus, hospitals located in less competitive markets may still view ASCs as a competitive threat and want to continue reducing their competition by joint venturing with them.

In this context, detailed ownership structure of the ASCs in the market could provide a better understanding of the underlying reasons. However, due to data constraints this could not be performed in the study and only the number of ASCs was included as a proxy measure to quantify market competition.

Neo-institutional theory emphasizes the importance of regulatory and mimetic pressure, and their effect on organizations. The theory suggests that organizations would try and adhere to the regulatory environment in order to maintain legitimacy amongst stakeholders. Also, the theory posits that organizations would try and mimic other organizations who are “early adopters”

of perceived successful strategies, in the hopes of becoming successful themselves.

The findings of this analysis support the theoretical premise in terms of the impact of regulatory pressure. The results indicated that for-profit hospitals were more likely to joint venture with ASCs, providing support for regulatory compliance behavior as posited by neo-institutional theory. The evidence towards mission compatibility between joint venturing organizations indicated that the regulatory pressures do impact hospital strategic decision making process. It was observed that for-profit hospitals were more likely to joint venture with ASCs. More than 90 percent of ASCs are for-profit in ownership (MedPac 2003). For-profit hospitals joint venturing with for-profit ASCs (similar mission to maximize profits for their stakeholders) does not raise regulatory concerns such as IRS. However, not-for-profit hospitals joint venturing with for-profit ASCs (incompatible mission) might come under regulatory scrutiny and may endanger their tax-exempt status and are thus less likely to joint venture with ASCs.

No statistically significant association was found between number of existing hospital-ASC JVs and the likelihood of new hospital-ASC joint venture arrangements. Thus the study did not provide support for the mimetic response behavior as posited by neo-institutional theory. Therefore, hospitals decision to joint venture with ASCs is a preemption strategy (to lessen competition) rather than a replication of competitors' strategy.

Resource dependency theory emphasizes the importance of uncertain environment, resource scarcity and competition. Neo-institutional theory lays emphasis on responses by organizations to regulatory norms in order to legitimize themselves in the view of stakeholders. An integrated approach to the context of hospital JVs with ASCs provides some valuable insights to the strengths of the theories individually as well as their complementarities. For example, resource dependency theory posited that organizations in unfavorable markets would seek to increase their financial viability and as thus consider engaging in external alliances. The results of this study provided support for the theory as hospitals entering into joint venture arrangements with ASCs were found to be more likely in markets which had lower percentage of elderly (lack of demand) and lower unemployment rate (higher ability to pay). Both these results were found to be highly significant in the study. Additionally, the finding of for-profit hospitals being more likely to joint venture with ASCs lent support to the regulatory premise of neo-institutional theory as discussed earlier.

This study also addresses the gap in the literature as identified by D'Aunno and Zuckerman (1987), who state that more research on the integrated approach of combining different theoretical perspectives is required to contribute meaningfully to theoretical literature. A hospitals decision to joint venture with an ASC is obviously complex involving multiple factors. This study makes a contribution by understanding what factors were significant in increasing the likelihood of joint ventures between hospitals and ASCs by examining them

under different theoretical perspectives such as resource dependency theory and neo-institutional theory.

### *Managerial Implications*

Findings of this study also have important managerial implications. The hospital industry is operating in an uncertain and unfavorable environment. More recent phenomena such as increasing number of elderly population (spurred by retirement of the baby-boom generation), increasing number of uninsured population and increasing operational expenses are further complicating the already complex environment. It is very evident that hospitals survival is increasingly depending on their proactive strategies in finding new innovative approaches to provide healthcare services.

Hospital managers are trying to find ways and means of improving their access to key resources such as patients and physicians under competitive pressures and stringent regulatory statutes. This study found that market factors were significantly associated with hospitals decision to joint venture with ASCs. The most significant market factors were low unemployment rate and lower percentage of elderly, both indicating that hospitals patient base comprised of commercially insured patients. ASCs in the market could attract these patients away from hospitals and threaten the hospitals market share. Thus managers of hospitals could use the joint venture strategy as a way to retain their commercially insured patients.

Also, the study found that larger bed size hospitals were more likely to joint venture with ASCs. Thus, managers of large bed size hospitals could consider joint venture arrangements as a viable option for developing better relationships with specialist groups in the markets. A joint venture arrangement with ASC could also benefit hospitals in two more ways. Managers may be able to reduce their hospitals' operating expense (which was found to be marginally significant in the study) by shifting to outpatient services. Also, hospitals could use these ventures to establish and improve their relationship with key specialist groups (Taparia 2010) and indirectly market their inpatient services. This might help hospital managers to improve their operational efficiency (as measured by occupancy rate which was found to be marginally significant in this study).

Finally, managers of for-profit hospitals consider joint venture strategy with for-profit ASCs as there is mission compatibility and lesser risk of scrutiny by regulatory authorities. A not-for-profit hospital manager should be careful in considering a joint venture arrangement with for-profit ASC in terms of not comprising their tax exempt status.

Therefore, this study provides hospital managers with valuable insights and a better understanding of the factors that are associated with JV arrangements with ASCs. With increasing environmental uncertainty due to changing market conditions and regulatory requirements, the findings of this study also help hospital managers make an informed decision towards

considering joint venture arrangements with ASCs amongst various external alliances.

### *Policy Implications*

From a policy perspective, joint ventures are viewed as means to enhance provision of health care services by ensuring a continuum of care. This study found that large bed size hospitals with lower occupancy rates were more likely to joint venture with ASCs. Most large bed size hospitals tend to be safety net hospitals providing a wide range of services and uncompensated care to the market in which they are located (Mann et al 1997; Zuckerman et al 2001). The range of services typically include low margin services such as trauma, emergency, psychiatric care, pediatric and neonatal intensive care, alcoholism inpatient care and burn care which are vital to the community (Gaskin 1999). A recent study found that non- safety net hospitals trimmed certain essential specialty services (Bazzoli et al 2005) leaving only safety net hospitals to offer these services.

Also, low occupancy rates in large bed size hospitals indicate greater pressure on hospitals. By joint venturing with ASCs these facilities curtail further erosion of market share by retaining patients and revenue from patient services lost to ASCs. This strategy could also have a positive impact for the community by financially helping these hospitals fund the previously mentioned low-margin, services.

Another important policy aspect of this study is the examination of impacts of regulatory pressures on joint venture arrangements between hospitals and ASCs. The results of this study revealed that for-profit hospitals were more likely to joint venture with ASCs than not-for-profit hospitals. In the 2006 study sample, about 74% of not-for-profit hospitals did not joint venture with ASCs. In the 2007 study sample, this percentage increased to 82%, indicating greater caution by not-for-profit hospitals in forming joint ventures with ASCs. These results provide reassurance to policy makers that the current IRS regulations are adequate to ensure that hospitals are mindful of their non-profit mission and are unwilling to lose tax-exempt status. The three main forms of tax-subsidies offered to not-for-profit hospitals are exemption from paying federal and state income taxes, access to tax-exempt bond financing and property tax abatements (Morrisey et al 1996). Not-for-profit hospitals would lose access to tax-exempt bond financing and be subjected to taxes if found to be in violation of IRS regulations.

In addition, this study analyzed data from 2006 and 2007, when reimbursements for Medicare services were undergoing drastic revisions for ASCs. The results of this study indicated that joint venture arrangements between hospitals and ASCs were occurring in markets with low unemployment rates and low number of elderly people. Whereas this provided greater opportunities to gain access to private paying patients, it is not clear that the interest of the vulnerable section such as the elderly and the indigents were being addressed. Public policy to rationalize Medicare and Medicaid payments



would have a salutary impact in markets not characterized by low unemployment rates and low elderly populations.

In light of the new Health Reform Legislation, studying hospital-ASC joint ventures becomes even more important. The Health Reform Legislation has introduced yet another regulatory change in the healthcare market. It is anticipated that hospitals and ASCs would both be impacted as healthcare service needs of 32 million additional Medicaid patients would have to be met. Early industry speculations suggest that this change would cause providers (hospitals and ASCs) to develop capacity and result in ASCs being considered as 'cost-saving contributors of system capacity' (ASC Advocacy Committee 2010). This also supports the results of the Harrison (2006) study which suggested that capacity to provide healthcare services is enhanced when hospitals and physicians enter into joint ventures.

Reports also suggest that the healthcare environment as a result of this legislation would be characterized by consolidation of providers offering integrated services (Neuterra Healthcare 2010). Increasing numbers of uninsured patients and rapidly rising elderly population warrants attention towards low cost alternatives. Page (2003) suggested health care costs can be controlled and medical errors can be reduced by hospital and physician collaborated networks.

The Patient Protection and Affordable Care Act (Health Reform Bill passed 2010) establishes Accountable Care Organizations (ACOs) as a new payment model under Medicare (Fisher and Shortell 2010). The plan also seeks

to extend the payment model to private payers and Medicaid. The new payment system is linked with performance measurement. For hospitals and ASCs, and their collaborative interests such as joint ventures, ACOs could either provide incentives to help improve quality of care to patients or stint on needed care by making them focus narrowly on higher margin services (Fisher and Shortell 2010; Shortell and Casalino 2010). Since policy measures should encourage the first and not the second outcome, it is important to have a transparent performance measurement system that can win the confidence of the provider organizations such as hospitals and ASCs. Lacking which, it may discourage joint venture arrangements between hospitals and ASCs in future.

#### Areas of Future Research

This study has provided important information on the key factors associated with hospital-ASC joint ventures at a time when Medicare reimbursements are undergoing drastic changes. Since, this is amongst the first empirical studies examining the association specific to ASCs; a simple base model is conceptualized. Further research is suggested in the following areas. The model in this study does not include an analysis of inter-relationships (excluding collinearity) amongst independent factors such as market, regulatory, organizational, operational and financial constructs. Further research involving development of more complex models using techniques such as structural equation modeling could reveal such causal relationships between the independent constructs and improve the predictive power of the model, providing

more accurate insights into the driving factors of hospital-ASC joint venture arrangements.

A longitudinal analysis incorporating data over a period of time could help analyze the effect of changes over time on hospital-ASC joint ventures. Such an analysis would help exclude time invariant unobserved effects and observe whether these joint ventures follow a temporal order. A longitudinal study could help examine hospital-ASC JVs over time and would help relate these occurrences to changes in the environment. It would be especially useful if this analysis is performed on data incorporating the effect of the last revision of Medicare payment changes in 2011.

Further research incorporating more market variables would also improve the understanding of hospital-ASC joint ventures. For example, incorporating variables identified in the limitation section of this study such as urban-rural location could be useful to better understand if hospitals located in urban areas differ in their choice of external alliance strategy with ASC than hospitals located in rural areas.

Further research could also include empirical evaluation of the effect of hospital-ASC joint ventures on the access to care. This research should quantify the impact of joint venture arrangements on the population in the respective market. Examining this association would be very crucial for policy makers in their decision to allocate funds for improving provision for healthcare services.

Lastly, this study focused on hospital-ASC new joint ventures. During the same period, it was observed that hospitals that were previously in JVs with ASCs exited the arrangement. A natural extension of this study would be to examine factors associated with the exit of hospital-ASC joint venture arrangements. This would provide a comprehensive picture of factors that drive joint venture arrangements and factors that oppose such arrangements.

### Conclusions

This study examined the association of market, regulatory, organizational, operational and financial factors with hospital-ASC joint ventures. Findings from this study laid foundational work for empirical research in the area of hospital-ASC joint venture arrangements. The results indicated that hospitals located in markets with lower unemployment rate and lower percentages of elderly were more likely to joint venture with ASCs. The results also indicated that hospital joint ventures were more likely to occur in markets with fewer ASCs. In addition the findings revealed that hospitals that joint ventured with ASCs have larger bed size, lower occupancy rate and higher operating expense per adjusted discharge.

While the hypotheses of the study clearly indicated a sound theoretical foundation, several unexpected results were also observed. As this area of study is complex, there is significant lack of empirical evidence in this area; all findings of this study provide valuable information for design and implementation of future studies.

The present study's findings partially support the integrated framework of resource dependency theory and neo-institutional theory in examination of hospital-ASC joint venture arrangements. This study also documents the important contributions of its findings in three key areas: theoretical development and application, managerial applicability and decision making process, and the policy implications.

### Chapter Summary

This chapter presented the discussion and interpretation of the study's findings. The limitations of this study were also detailed in this chapter. Implications of the study findings were elaborated for three audiences: researchers, hospital managers and policy makers. Future areas of research were also identified and presented in this chapter.

The results of this study are instrumental in understanding the association of various independent constructs to hospital-ASC joint venture arrangements. The findings of this study provide support for the conceptual framework in relation to showing an association between some of the key identified variables and the likelihood of the occurrence of joint venture arrangements between hospitals and ASCs.

Researchers can use this model as a foundational framework for further examining joint venture arrangements between hospitals and physician owned entities. Hospital managers can better evaluate the decision to joint venture or not depending on their preferences, performance and markets, as guided by

findings of this study. Policy makers can use the results of this study, especially the finding pertaining to larger sized hospitals, towards evaluating the societal benefit of these ventures and the potential harm to access of care if the laws governing these ventures are to be made more stringent. In summary, this study provides a good empirical model with good predictive power based on the integrated framework of resource dependency theory and neo-institutional theory to examine hospital-ASC joint venture arrangements.

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## VITA

Reethi Narasimhan Iyengar was born in Jabalpur, Madhya Pradesh, India on August 12<sup>th</sup>, 1982. She received her Bachelor of Science in Physics (Hons.) degree from Sri Sathya Sai Institute of Higher Learning, Puttaparthi, Andhra Pradesh, India in 2002. She received her Masters in Hospital Management degree from Apollo Institute of Hospital Administration, Osmania University, Hyderabad, Andhra Pradesh, India in 2005. She received her Masters in Business Administration degree from Radford University, Virginia, U.S.A in 2006.

She worked in the capacity of Executive-Quality in 2004-2005 for Apollo Hospitals- Hyderabad and was part of the core team primarily responsible for the Joint Commission Accreditation undertaking. Having worked at the largest private hospital chain in South-Asia, she began to see the areas which needed improvement and the gaps in the system that required rigorous research initiatives. Thence, she decided to pursue a research oriented doctoral program in Health Services Organization and Research, offered by the Department of Health Administration at Virginia Commonwealth University.

While a doctoral student, she worked with many faculty members on diverse topics such as organizational level research, financial analysis of hospitals, patient level cancer research and organ and tissue donation research.

She has worked with Dr. Cathy Bradley and Dr. Laura Siminoff as a research assistant on their grant funded projects. She has also interned at the World Health Organization in the Cancer research team under the Chronic Disease Prevention and Health Promotion Unit in Geneva, Switzerland.

More than four years of being a doctoral student has ingrained in her, a strong understanding of the U.S. Healthcare system and provided her a sound theoretical and methodological foundation to examine the key concerns surrounding the healthcare scenario. She completed all Ph.D. requirements and graduated in May 2011. Her research interests focused on strategic decisions taken by hospitals, Ambulatory Surgery Centers, effect of changing regulations on health care providers, quantitative and qualitative research methods and statistical applications and health policy. She is also very keen on pursuing research on topics pertinent to global health and international healthcare.