

Physician Joint Ventures and Performance: The Contingency Impact of Organizational Characteristics

Harry D. Holt¹

Abstract

This study assesses the impact of hospital physician joint venture activity on hospital performance using a resource dependence and institutional theory framework. Hospital performance is measured in general acute care facilities from 2004 through 2006 in the state of Pennsylvania. We use cross-sectional ordinary least squares regression models to assess the relationship of joint ventures on performance and occupancy. We examine the moderating influence of hospital size and teaching status on occupancy and financial performance measurements. Results indicate that hospital physician joint venture activity significantly impacts occupancy and financial performance. Further, smaller hospitals experience increases in total occupancy and stronger financial performance at a higher rate than larger hospitals. The results provide support for resource dependence, institutional theory, and contingency theory as conceptual frameworks to explain the benefits of physician joint ventures for hospitals. We provide implications for managers. Findings provide empirical support for managers to initiate joint venture activities with physicians by showing their positive impacts on hospital occupancy and financial performance, especially for smaller hospitals.

Keywords: Joint ventures, hospitals, physicians, financial performance, occupancy, small hospitals, healthcare management.

2. Introduction

Many hospitals face direct competition from competing physicians. Joint ventures are a growing strategy used by hospitals to stem and improve alignment with physicians. Studies report that joint ventures may promote alignment of interests and physician loyalty and trust in the organization, and may be a means for hospitals to provide practice management expertise for physicians and promote greater administrative integration between the hospitals and physicians (Goes & Zan, 1995; Mark, Evans, Schur, & Guterman, 1998). As a result, hospital performance may also be strengthened through joint ventures.

Studies indicate that joint ventures are associated with higher hospital occupancy (Goes & Zan, 1995); higher average length of stay, more diversification of services, lower long-term debt, and more managed care contracts (Harrison, 2006); further, physician participation in hospital decision-making and management, financial incentives, and joint ventures are positively associated with stronger financial performance (Mark, Evans, Schur, & Guterman, 1998). However, other studies indicate that joint ventures do not provide performance advantages for hospitals (Douglas & Ryman, 2003).

Other mechanisms may exist that enable and improve alignment between hospitals and physicians. For example, legitimacy may improve alignment due to hospital reputation, size, visibility, and brand recognition. Such legitimacy may derive from key organizational characteristics (Bazzoli, Chan, Shortell, & D'Aunno, 2000). For example, small non-teaching hospitals may lack brand recognition, and visibility, and may lack institutional leverage with physicians.

¹ West Chester University, 855 South New Street, 222N Sturzebecker Health Sciences Center, West Chester, PA 19382, USA
Email: hholt@wcupa.edu

The lack of these informal sources of alignment may make the use of formal arrangements such as joint ventures more critical. Accordingly, we might expect that the benefits of joint ventures depend on organizational characteristics that confer legitimacy such as size or teaching status. Our study aims to refine empirical findings on the performance impact of joint venture within the framework of resource dependence, institutional, and contingency theories. Specifically, we examine whether organizational characteristics moderate the relationships between joint ventures and organizational performance.

3. Theoretical Framework & Hypotheses

Organizations interact with other firms to secure access to critical resources while also seeking to maintain autonomy (Pfeffer & Salancik, 2003). Ultimately, organizations seek to acquire control over resources that minimize their dependence on other organizations, and thereby enhancing the firm's power (Pfeffer & Salancik, 2003). From this perspective, hospitals have incentive to form joint ventures with physicians in order to manage the potential volatility of the physician referrals and leverage the complementary skills of the two groups (Pfeffer & Nowak, 1976). Hospitals may also form joint ventures with physicians to preserve as much of their patient volume as possible rather than losing patients to physician-competitors (Berenson et al., 2007). Hospitals that have formed joint ventures with physicians are the logical choice for referrals from partner physicians due to the financial investment, shared risk, and collaborative decision-making between the two organizations. Based on these expectations we examine the following hypothesis:

Hypothesis 1a: A positive association exists between joint venture activity and higher hospital occupancy rates. Hospitals that increase occupancy rate should also be able to decrease their operating cost, which translates into increased profitability. Past studies show that unused bed capacity costs an estimated \$25 billion annually, while increasing utilization of beds lowers hospital costs (Keeler & Ying, 1996). Unused hospital beds are opportunity costs for hospitals, which still must cover their fixed costs of investment, regardless of whether the bed is filled (Gaynor & Anderson, 1995). An unused hospital bed costs an estimated \$36,443 in 1987 dollars (Gaynor & Anderson, 1995); therefore, the cost is most likely higher in 2012 dollars.

A study of rural hospitals reported that hospitals may improve their profits from increasing their occupancy rates (Finch & Christianson, 1981). A cost-minimizing occupancy rate is estimated at 73 percent occupancy (Finch & Christianson, 1981). Hospitals with this occupancy rate have average costs per patient day, which are \$5.96 (log specification) to \$11.15 (quadratic specification) lower than the average costs in hospitals with 51 percent occupancy rates, if other factors are held constant (Finch & Christianson, 1981).

Further, hospital occupancy rate measures how efficiently the hospital utilizes its staffed beds (Gapenski, 2003). An efficient organization with higher occupancy spreads as much of the fixed costs across more patients and, therefore, increases patient profitability ratios (Gapenski, 2003). As hospital occupancy rates increase and the hospital manages its costs, profitability should also increase (Gapenski, 2003). Therefore, it is proposed:

Hypothesis 1b: A positive association exists between hospital-physician joint ventures and hospital profitability

Occupancy and profitability may also be influenced by another key characteristic. For example, size or membership in prominent industry organizations may convey organizational legitimacy (Pfeffer & Salancik, 2003). Firms will adopt similar structures to achieve legitimacy in their market, improve their competitive position, and increase market visibility (DiMaggio & Powell, 1983). Hospitals operate in highly institutional environments and may possess legitimacy from membership in groups that approve of their structures, staffing, and programs (Ruef & Scott, 1998). Membership in prestigious industry organizations, such as the Council of Teaching Hospitals of the Association of American Medical Colleges (COTH), conveys legitimacy, salient market power, and added stature for physicians who are aligned with such organizations (Ruef & Scott, 1998).

From an institutional theory perspective, alignment with large academic medical centers may be a source of legitimacy for physicians. Physician alignment enables such hospitals to secure reliable patient referral sources that generate revenue, to strengthen market share, and to invest in technology and service lines that increase occupancy levels. Academic medical centers with organizational legitimacy may experience higher hospital occupancy levels. Just as large academic medical centers are a source of legitimacy, they also are autonomous and possess resources to compete with rivals, recruit and retain physicians, and develop diverse patient services (Aldrich, 1976).

They have stronger competitive positioning, market visibility, and are more attractive to physicians as a source of support and employment in their clinical practice. Physician alignment provides large academic medical centers with additional competitive advantages to secure reliable patient referrals that may increase occupancy levels. Size may be an additional characteristic that confers similar legitimacy benefits. Size may allow large hospitals to form a proper fit with its environment and its subsystems (Fiedler, 1964). Size may improve a firm's ability to compete, and larger firms have the advantage when compared with their rivals (Mintzberg, 1979). Large hospitals possess competitive advantages that attract physicians, such as capital to invest in new buildings and medical equipment, information technology systems, and expensive marketing campaigns. Size, market visibility, and brand recognition may be a source of legitimacy for large hospitals. Therefore, it is proposed:

Hypothesis 2a: A positive association exists between organizational legitimacy (as measured by bed size and teaching status) and occupancy rate

Hypothesis 2b: A positive association exists between organizational legitimacy (as measured by bed size and teaching status) and financial performance.

While size and teaching status may be a source of legitimacy and physician alignment, the lack of these informal sources of alignment may make the use of formal arrangements such as joint ventures more critical. Accordingly, we might expect that legitimacy, as measured by size and teaching status, moderate the positive relationship between physician joint ventures and occupancy. For example, small non-teaching hospitals may lack similar sources of prestige, competitive advantages, and market visibility (Pfeffer & Salancik, 2003). Many small hospitals may operate in hostile economic conditions with low or erratic patient censuses, and be dependent on government reimbursement sources. They may lack financial capital and talent necessary for implementing state-of-the-art medical technology and infrastructure necessary for physician alignment; particularly with new physicians in emerging specialties who may require the latest technological advancements available only at larger teaching hospitals. Further, a physician shortage may exist in many markets in which small hospitals operate, creating obstacles to integration.

As small hospitals seek to survive by aligning themselves with physicians through joint ventures, they may experience improvements in patient occupancy and financial performance. Alignment may facilitate diversifying patient services to capture more patients along the care continuum. When linked through a joint venture, physicians have a stake in admitting and referring patients to their hospital partner. They may enable smaller hospitals to secure referrals for profitable services, such as ambulatory surgery, cardiac care, orthopedic surgery, and advanced diagnostic imaging (MedPAC, 2008). Such services are both profitable and may increase occupancy levels due to the ancillary services required to deliver them to patients. Alignment with physicians also may strengthen a small stand-alone hospital's bargaining position with payers.

From a contingency theory perspective, size is a constraint that bounds a hospital's ability to align with physicians (Mintzberg, 1979). Joint ventures may provide smaller hospitals with mechanisms to overcome organizational constraints by creating an alignment of financial and clinical interests. Smaller hospitals that form joint ventures may experience a more positive impact on occupancy and financial performance than larger teaching hospitals with pre-existing competitive advantages. Therefore, we expect hospital size and teaching status to moderate the positive impact that joint ventures may have on performance. Hypothesis 3a: The positive impact of joint ventures on occupancy is moderated by organizational legitimacy (as measured by bed size and teaching status).

Hypothesis 3b: The positive impact of joint ventures on hospital financial performance is moderated by organizational legitimacy (as measured by bed size and teaching status).

4. Data and Analytic Methods

We examined data on all general acute care hospitals in Pennsylvania with joint ventures from 2004 to 2006. Data for this study were drawn from three sources: The Pennsylvania Health Care Cost Containment Council (PHC4) Financial, Utilization and Payer dataset; the American Hospital Association (AHA) Annual Survey Database; and county level market data from the Area Resource File (ARF). The study is limited to hospitals in Pennsylvania to capture uniformly the impact of regulation, reimbursement, and other unique market and demographic characteristics.

4.1 Dependent variables

The dependent variables in this study are based on extant literature and measure hospital occupancy and total margin (Gapenski, 2003). Occupancy demonstrates the hospital's ability to use its fixed assets effectively to produce revenue and its efficiency in utilizing staffed beds (Gapenski, 2003). The goal of the efficient organization is to spread as much of the fixed costs across more patients and, therefore, increase the patient profitability ratio (Gapenski, 2003). Total margin measures the ability of the hospital to control expenses as it is defined as net income divided by total revenues (Gapenski, 2003). Total margin captures the return on operating and non-operating sources of revenues (Cleverly & Cameron, 2007). Operating margin captures core business operations and removes the transitory influence of non-operating sources of revenue and cost, which is often temporary and not related to the core functions of the hospital (Gapenski, 2003).

4.2 Independent Variable

The independent variable for this study is joint ventures with physicians as reported by hospitals through the AHA Annual Survey for 2004 through 2006. While hospitals may participate in more than one physician joint venture and in diverse forms of joint ventures, this is not captured in the defined variable (American Hospital Association, 2006).

4.3. Control Variables

Control variables that could influence the occupancy and performance of hospitals were based on the extant literature. Organizational characteristics include bed size, teaching status, ownership type, location, and payer mix. Hospital bed size captures the market strength and measures a hospital's competitive advantages and legitimacy in its market (Goes & Zan, 1995). Bed size is a categorical variable that separates the hospital sample into two groups; group 1 is below the median bed size and labeled as (0), and group 2 is above the median and labeled as (1). We formed these categories to test the moderating impact of hospital size on occupancy for hospitals with joint ventures.

Teaching status is a three-level categorical variable, including (0) non-teaching hospital, (1) teaching hospital affiliated with a medical school, and (2) teaching hospital that affiliated with a medical school and a member of Council of Teaching Hospitals of the Association of American Medical Colleges (COTH), which consists of major teaching hospitals and health systems.

Ownership type captures hospital profit incentives, such as generating maximum profit for shareholders or providing comprehensive care to patient populations due to strong mission objectives (Gapenski, et al., 1993). Hospital location reflects the differences between urban and rural operating costs, wage index, competition, and patient access. Rural is defined by the Center for Rural Pennsylvania based on population density (Center for Rural Pennsylvania, 2010).

Payer mix variables were added since hospitals with high margin reimbursement contracts may be in better financial health and have more access to capital (McCue & Diana, Assessing the performance of freestanding hospitals, 2007). Hospitals with a payer mix with higher percentages of Medicaid and Managed Care reimbursement may experience poorer performance, which influences incentives to engage in joint venture activity (McCue & Diana, Assessing the performance of freestanding hospitals, 2007).

Market characteristics such county unemployment rate, per capita income, and market concentration levels capture the overall market demand for the hospital services (Harrison, 2006). Each calendar year is measured with a categorical variable, which captures unobserved trends in occupancy or financial performance due to factors other than those included in the regression models. Table 1 provides descriptions of the variable categories, formulas, and data sources.

Table 1: Constructs, Variables, Measures, and Data Sources

Variable Category	Variable	Measures	Source
Dependent Variables			
Hospital Performance	Occupancy Rate	Total Patient Days of Inpatient Care During the Fiscal Year Staffed Beds × 365 Days	PHC4, 2006 - 2004
Total Margin		Revenue over Expenses Total Operating Revenue + Non-operating Income	PHC4, 2006 - 2004
Operating Margin		Operating Income Operating Revenues	PHC4, 2006 - 2004
Independent Variable			
Hospital Joint- Venture.	Hospital Has Joint-Venture with Physicians or Physician Groups	1 = Hospital with a joint-venture with physicians or physician groups. 0 = Hospital without a joint-venture with physicians or physician groups.	AHA Annual Survey Database, 2006 - 2004
Control Variables			
Hospital Characteristics	Bed Size Category	0 = Below the median (50th percentile) for total staffed beds 1 = Above the median (50th percentile) for total staffed beds	AHA Annual Survey Database, 2006 - 2004
Teaching Status		0 = Non-teaching hospital 1 = Teaching hospital affiliated with a medical school 2 = Teaching hospital that is a member of Council of Teaching Hospitals of the Association of American Medical Colleges (COTH).	AHA Annual Survey Database, 2006 - 2004
Hospital Ownership Type		1 = Not-for-profit hospital 0 = Other ownership	AHA Annual Survey Database, 2006 - 2004
Hospital Location		1 = Hospital is in an urban region 0 = Hospital is in a rural region	PHC4, 2006 - 2004
Total commercial share of net patient revenue (NPR)		Commercial insurers encompass all non-government contracted health insurance plans, including Blue Cross and Blue Shield plans, and hospital and health system plans.	PHC4, 2006 - 2004
Total Managed Care Share of Net Patient Revenue		The percentage of net patient revenue that is comprised of reimbursement from managed care payers	PHC4, 2006 - 2004

Table 2 provides descriptive statistics for all variables including means and standard deviations for continuous variables and percentages for categorical variables. We generated a correlation matrix for all covariates and found no indications of collinearity. The study population consists of all non-governmental general acute-care hospitals in Pennsylvania between 2004 through 2006.

Table 2: Descriptive Statistics of Variables for General Acute Care Hospitals, 2004 – 2006.

Variable Category	Variable	Mean (Standard Deviation) N = 393
Dependent Variable	Total Hospital Occupancy Rate	.6632234 (.1427404)
Total Margin	.023342 (.0591557)	
Operating Margin	.010859 (.0634039)	
Independent Variable	Hospital physician joint venture Yes = 1, N = 96 No = 0, N = 297	24.43% 75.57%
Hospital Organizational Characteristics	Bed Size Below median (50th percentile) = 0, N = 162 Above median (50th percentile) = 1, N = 231	41.22% 58.78%
Teaching Status 0 = Non-teaching hospital, N = 246 1 = Teaching hospital affiliated with a medical school, N = 101		62.60% 25.70% 11.70%

4.4. Models

Cross-sectional linear regression models were computed with the ivreg2 procedure using STATA/IC 11.1 (STATA CORP, 2011). We used the ivreg2 procedure to correct the panel data for heteroskedasticity and autocorrelations (Pevalin & and Robson, 2009). We used robust standard errors for more efficient estimation of the coefficients of the independent variables and to generate statistics that were robust to both random heteroskedasticity and arbitrary intra-group correlation (Pevalin & and Robson, 2009). The assumptions of linearity, normally distributed errors, and uncorrelated errors were checked and met. Means and standard deviations are presented in Table 2.

The following formulas were used to test the six hypotheses for the study:

Hypothesis # 1a [Testing the association between hospital physician joint ventures and hospital occupancy rate]

$$\text{Hospital Occupancy Rate } 2006 - 2004 = \beta_0 + \beta_1 \text{JointVenture } 2006 - 2004 + \beta_2 \text{ Hospital Characteristics } 2006 - 2004 + \beta_3 \text{ Market Characteristics } 2006 - 2004 + \epsilon$$

Hypothesis # 1b [Testing the association between hospital physician joint ventures and hospital financial performance]

$$\text{Hospital Total Margin } 2006 - 2004 = \beta_0 + \beta_1 \text{JointVenture } 2006 - 2004 + \beta_2 \text{ Hospital Characteristics } 2006 - 2004 + \beta_3 \text{ Market Characteristics } 2006 - 2004 + \epsilon$$

$$\text{Hospital Operating Margin } 2006 - 2004 = \beta_0 + \beta_1 \text{JointVenture } 2006 - 2004 + \beta_2 \text{ Hospital Characteristics } 2006 - 2004 + \beta_3 \text{ Market Characteristics } 2006 - 2004 + \epsilon$$

Hypothesis # 2a [Testing the association between organizational legitimacy and occupancy rate]

$$\text{Hospital Occupancy Rate } 2006 - 2004 = \beta_0 + \beta_1 \text{JointVenture } 2006 - 2004 + \beta_2 \text{ Hospital Bed Size} + \beta_3 \text{ Hospital Characteristics } 2006 - 2004 + \beta_4 \text{ Market Characteristics } 2006 - 2004 + \epsilon$$

Hypothesis # 2b [Testing the association between organizational legitimacy and hospital size and financial performance]

$$\text{Hospital Total Margin Rate } 2006 - 2004 = \beta_0 + \beta_1 \text{JointVenture } 2006 - 2004 + \beta_2 \text{ Hospital Bed Size} + \beta_3 \text{ Hospital Characteristics } 2006 - 2004 + \beta_4 \text{ Market Characteristics } 2006 - 2004 + \epsilon$$

$$\text{Hospital Operating Margin Rate } 2006 - 2004 = \beta_0 + \beta_1 \text{JointVenture } 2006 - 2004 + \beta_2 \text{ Hospital Bed Size} + \beta_3 \text{ Hospital Characteristics } 2006 - 2004 + \beta_4 \text{ Market Characteristics } 2006 - 2004 + \epsilon$$

Hypothesis # 3a [Testing association between joint ventures and occupancy with interaction between teaching status and occupancy rate]

Hospital Occupancy Rate $_{2006} - 2004 = \beta_0 + \beta_1 \text{JointVenture}_{2006} - 2004 + \beta_2 \text{Hospital Bed Size} * \text{Joint Venture}_{2006} - 2004 + \beta_3 \text{Hospital Teaching Status} * \text{Joint Venture}_{2006} - 2004 + \beta_4 \text{Hospital Characteristics}_{2006} - 2004 + \beta_5 \text{Market Characteristics}_{2006} - 2004 + \epsilon$

Hypothesis # 3b [Testing association between joint ventures and financial performance with interaction between hospital size and teaching status]

Hospital Total Margin Rate $_{2006} - 2004 = \beta_0 + \beta_1 \text{JointVenture}_{2006} - 2004 + \beta_2 \text{Hospital Bed Size} * \text{Joint Venture}_{2006} - 2004 + \beta_3 \text{Hospital Teaching Status} * \text{Joint Venture}_{2006} - 2004 + \beta_4 \text{Hospital Characteristics}_{2006} - 2004 + \beta_5 \text{Market Characteristics}_{2006} - 2004 + \epsilon$

Hospital Operating Margin Rate $_{2006} - 2004 = \beta_0 + \beta_1 \text{JointVenture}_{2006} - 2004 + \beta_2 \text{Hospital Bed Size} * \text{Joint Venture}_{2006} - 2004 + \beta_3 \text{Hospital Teaching Status} * \text{Joint Venture}_{2006} - 2004 + \beta_4 \text{Hospital Characteristics}_{2006} - 2004 + \beta_5 \text{Market Characteristics}_{2006} - 2004 + \epsilon$

5. Results

Table 3 provides a summary of regression results from testing of the hypotheses in the study.

Measurement	Hypotheses	Results P-values
H1a: Occupancy Rate	A positive association exists between joint venture activity and higher hospital occupancy rates.	Yes***
H1b: Total Margin and Operating Margin	A positive association exists between hospital-physician joint ventures and hospital profitability	Yes** (Interaction Models)
H2a: Occupancy Rate	A positive association exists between organizational legitimacy (as measured by bed size and teaching status) and occupancy rate	Yes***
H2b: Total Margin and Operating Margin	A positive association exists between organizational legitimacy (as measured by bed size and teaching status) and financial performance.	Yes***
H3a: Interaction Effect of Joint Venture and Bed Size on Occupancy	The positive impact of joint ventures on occupancy is moderated by organizational legitimacy (as measured by bed size and teaching status).	Yes** (Bed Size Only)
H3b: Interaction Effect of Joint Venture and Bed Size on Total Margin and Operating Margin	The positive impact of joint ventures on hospital financial performance is moderated by organizational legitimacy (as measured by bed size and teaching status).	Yes*** (Bed Size Only)

* = $p < 0.10$; ** = $p < 0.05$; *** = $p < 0.01$

The results of Table 4, Column 1 indicates that hospitals with joint ventures are associated with higher levels of occupancy ($\beta = 0.04$, $p < 0.01$), these findings support Hypothesis 1a. The results of Columns 5 and 6 indicates that hospitals with joint ventures are associated with stronger financial performance, as measured by total margin ($\beta = 0.03$, $p < 0.05$) and operating margin ($\beta = 0.03$, $p < 0.05$). These findings support Hypothesis 1b.

The results of Table 4, Column 1 indicate that larger size hospitals, as measured by bed size, are associated with higher occupancy levels ($\beta = 0.0674$, $p < 0.05$). These findings support Hypothesis 2a. The results of Table 4, Column 1 indicate that large academic medical centers are positively associated with higher occupancy levels ($\beta = 0.0773$, $p < 0.01$). These findings support Hypothesis 2a.

Columns 2 and 3 indicate the larger hospitals are associated with stronger financial performance, as measured by total margin ($\beta = 0.03$, $p < 0.01$) and operating margin ($\beta = 0.03$, $p < 0.01$). These findings support hypothesis 2b. Columns 2 and 3 indicate a non-significant trending in the predicted direction indicating a positive association between COTH members and stronger financial performance as measured by total margin ($\beta = 0.01$, $p > 0.10$) and operating margin ($\beta = 0.01$, $p > 0.10$).

The results in Table 4, Column 4, 5, and 6 indicates that size moderates the positive association between small hospitals with joint ventures and higher occupancy and stronger financial performance. Column 4 indicate that smaller hospitals with joint ventures (category 0) are associated with a higher occupancy levels as compared with larger hospitals ($\beta = -0.07$, $p < 0.05$). This supports Hypothesis 3a. Column 4 results, or COTH membership ($\beta = -0.02$, $p > 0.10$), indicates a non-significant trending in the predicted direction signifying that teaching status may moderate the positive association between joint ventures and higher occupancy levels. This provides tentative support for Hypothesis 3a.

The results in Columns 5 and 6 indicate that smaller hospitals with joint ventures are associated with stronger financial performance relative to larger hospitals with joint ventures. Specifically, the results indicate that hospital size moderates the positive association joint ventures and stronger financial performance, as measured by total margin ($\beta = -0.04$, $p < 0.01$) and operating margin ($\beta = -0.05$, $p < 0.01$). This finding supports Hypothesis 3b.

Table 4, Columns 5 and 6 further test Hypothesis 3b and the results show there may be a non-significant interaction effect of teaching status on financial performance. The coefficient for teaching hospital affiliated with a medical school for total margin ($\beta = -0.00855$, $p > 0.10$) and operating margin ($\beta = -0.00432$, $p > 0.10$) indicate a non-significant trending in the predicted direction. This provides tentative support for Hypothesis 3a.

The results of several control variables are worth noting. Table 4, Column 1 and 4 results indicate that nonprofit status is a significant positive impact on occupancy in both the base ($\beta = 0.09$; $p < .01$) and interaction models ($\beta = 0.09$; $p < .01$). This may reflect the role that non-profit hospitals play in providing long-term care for patients requiring lengthy average lengths of stay. Column 2 and 5 results indicate a positive relationship between non-profit status and total margin in both the base ($\beta = 0.03$; $p < .10$) and interaction models ($\beta = 0.03$; $p < 0.10$).

Column 1 indicates a significant negative association between patient revenue from commercial payers and occupancy ($\beta = -0.18$; $p < 0.01$). However, columns 2 and 3 indicate a positive impact from commercial reimbursement sources on financial performance, as measured by total margin ($\beta = 0.09$; $p < 0.05$) and operating margin ($\beta = 0.10$; $p < 0.05$). These results are mirrored in the interaction model.

Results in columns 2 and 3 indicate a significant positive association between managed care sources of net patient revenue and financial performance, as measured by total margin ($\beta = 0.08$; $p < 0.01$) and operating margin ($\beta = 0.06$; $p < 0.01$). However, Medicare as a source of net patient revenue was negatively associated with occupancy ($\beta = -0.30$; $p < 0.01$) in both the base and interaction models.

The results in columns 1 and 4 indicate that less market competition, or higher levels of market concentration at the system level, is negatively associated with occupancy ($\beta = -0.19$; $p < .01$) and in column 3 with stronger financial performance, as measured by operating margin ($\beta = 0.04$; $p < 0.05$). This may indicate that hospitals in more concentrated markets are able to generate higher revenue and profits from lower occupancy levels due to their negotiating power with payers.

Results in columns 2 and 3 indicate that the unemployment rate has a marginally significant negative impact on financial performance, as measured by total margin ($\beta = -0.02$; $p < 0.01$) and operating margin ($\beta = -0.02$; $p < 0.01$). This may reflect the influence of employer-sponsored insurance on the financial strength of local hospitals.

Table 4: Cross-Sectional Model Results: Impact of Hospital Physician Joint Ventures on Hospital Occupancy, Total Margin, and Operating Margin

Variable Category	Variable	Base Models			Interaction Models			
		(1) Hospital Occupancy	(2) Total Margin	(3) Operating Margin	(4) Hospital Occupancy	(5) Total Margin	(6) Operating Margin	
Independent Variable	Hospital Physician Joint Venture	0.0368*** (0.0142)	-0.00364 (0.00570)	-0.00672 (0.00589)	0.105*** (0.0316)	0.0285** (0.0124)	0.0302** (0.0149)	
Hospital Organizational Characteristics	Bed Size 1	0.0674*** (0.0179)	0.0258*** (0.00763)	0.0283*** (0.00843)	0.0732*** (0.0196)	0.0296*** (0.00789)	0.0332*** (0.00892)	
	Bed Size 1 x Joint Venture (Bed Size 0 omitted)				-0.0727** (0.0360)	-0.0366*** (0.0139)	-0.0452*** (0.0170)	
	Teaching Status 1	0.0155 (0.0153)	-0.0141* (0.00785)	-0.0192** (0.00814)	0.0202 (0.0193)	-0.00976 (0.00988)	-0.0158 (0.0103)	
	Teaching Status 2	0.0773*** (0.0214)	0.00851 (0.00946)	0.00794 (0.0101)	0.0855*** (0.0273)	0.00367 (0.0123)	0.000780 (0.0134)	
	Teaching Status 1 x Joint Venture (Teaching Status 0 omitted)				-0.00686 (0.0287)	-0.00855 (0.0128)	-0.00432 (0.0136)	
	Teaching Status 2 x Joint Venture (Teaching Status 0 omitted)				-0.0177 (0.0354)	0.0146 (0.0135)	0.0220 (0.0154)	
	Hospital Ownership Type: Nonprofit vs Other	0.0943*** (0.0352)	0.0277* (0.0156)	0.0203 (0.0265)	0.0930*** (0.0358)	0.0272* (0.0154)	0.0198 (0.0261)	
	Hospital Location: Rural vs Urban	0.0152 (0.0211)	-0.0173** (0.00809)	-0.0132 (0.00869)	0.0141 (0.0209)	-0.0181** (0.00792)	-0.0144* (0.00855)	
	Total Commercial Share of NPR	-0.183** (0.0841)	0.0943** (0.0387)	0.0865** (0.0382)	-0.188** (0.0842)	0.0909** (0.0390)	0.0922** (0.0393)	
	Total Managed Care Share of NPR	0.0442 (0.0496)	0.0792*** (0.0219)	0.0646*** (0.0218)	0.0458 (0.0501)	0.0783*** (0.0220)	0.0645*** (0.0219)	
	Total Medicare share of NPR	-0.303*** (0.0997)	-0.0691 (0.0574)	-0.0888 (0.0603)	-0.300*** (0.102)	-0.0708 (0.0585)	-0.0924 (0.0610)	
	Market Characteristics	Market Concentration at the System Level	-0.186*** (0.0671)	0.0295 (0.0219)	0.0440** (0.0209)	-0.179*** (0.0690)	0.0314 (0.0227)	0.0448** (0.0215)
		Unemployment Rate in Country	0.000201 (0.00789)	-0.0170*** (0.00415)	-0.0152*** (0.00460)	-0.000353 (0.00783)	-0.0174*** (0.00413)	-0.0156*** (0.00460)
		Per Capita Income in Country	0.00000198 (0.00000150)	-0.00000139** (0.000000653)	-0.000000741 (0.000000810)	0.00000199 (0.00000153)	-0.00000132** (0.000000647)	-0.000000656 (0.000000810)
Year (2004 omitted)	2005	0.00208 (0.0132)	-0.00103 (0.00510)	-0.000237 (0.00609)	0.000395 (0.0133)	-0.00197 (0.00509)	-0.00133 (0.00608)	
	2006	-0.00997 (0.0156)	-0.0106 (0.00715)	-0.0141* (0.00831)	-0.00956 (0.0156)	-0.0111 (0.00710)	-0.0147* (0.00828)	

* p < 0.10, ** p < 0.05, *** p < 0.01. For all Models : N = 393 ; Groups = 151

6. Discussion

Hospitals are seeking tighter alignment with physicians, and joint ventures represent an opportunity to share risk and align incentives with physicians. Our results indicate that they offer hospitals potential benefits, including increasing occupancy and stronger financial performance, especially for smaller hospitals. However, such relationships are exceptionally complex. Due to the complexity and costs associated with alignment strategies, managers should assess their unique organizational characteristics when choosing among integration approaches with physicians.

Benefits that accrue to small hospitals through forming joint ventures derive from the disadvantages they may face from lack of legitimacy in institutional fields. Small hospitals that lack legitimacy should consider formal alignment mechanisms in the form of joint ventures to increase occupancy and strengthen financial performance. Financial strength may be critical to forming joint ventures with physicians as it may provide additional resources to invest in infrastructure and technology. Diminishing margins and physicians partnering with larger competitors, along with hostile economic conditions may be signals for smaller hospitals to initiate physician alignment efforts through joint ventures. Our results indicate that smaller hospitals experience a significant positive impact in occupancy and financial performance from joint ventures. Our findings indicate that larger hospitals, such as academic medical centers, may find that other physician alignment strategies may provide more advantages. Large hospitals that possess diverse sources of legitimacy, such as size, teaching status, medical technology, and industry prestige, may benefit from focusing on other alignment strategies. CEOs may want to focus on a broad range of strategies that, when used in conjunction with one another, leverage legitimacy to align with physicians.

For instance, large hospitals may use their information technology superiority to provide physicians with timely access to patient information, test results, and diagnostic imaging (Bates & Gawande, 2003). Such technology structures allow referring physicians to admit patients, and then monitor their care by other specialists and hospitalists. Enhancing a large hospital's reputation for care quality may establish the facility as the premier place for physicians to practice and patients to receive care (Bates & Gawande, 2003). Fostering a reputation for clinical excellence may also enable large hospitals to differentiate themselves from their competition and increase bargaining power with insurers over reimbursement rates. Involving physicians in active involvement in the management of the hospital through board membership or medical directorships may provide further alignment potential. Physician involvement in hospital governance has consistently shown to improve financial performance (Goes & Zan, 1995; Molinari, et al., 1995).

Physicians may improve the value of strategic planning by aligning interests and producing more cooperative decision-making (Goes & Zan, 1995). Specifically, board participation by outside physicians may improve patient referrals (Molinari, et al., 1995). Direct employment, particularly among physicians providing primary care, may be another source of alignment, enhance hospital efficiency, and care quality. Size may assist in establishing professional service agreements to provide emergency call coverage that may alleviate ER over-crowding and enhance patient flow productivity. Hospitalists may provide large hospitals enhanced patient throughput and efficiency by providing emergency call coverage. Such structures can potentially enhance alignment with community physicians as it allows them to remain focused on their office practice wherein their highest revenue potential is. have been reported to result in physician loyalty and reliable referral patterns.

In summary, our results shed new light on the role of legitimacy as a moderator of the occupancy and financial performance benefits of joint ventures. They bring additional clarity to the findings of Goes and Zan (1995), who found that joint ventures associated with higher hospital occupancy rates. Specifically, joint venture formation enables smaller hospitals with fewer sources of legitimacy to align themselves with physicians and improve their performances.

7. Study limitations

We recognize there are considerations other than occupancy and financial performance that managers should consider when aligning with physicians. The hospital's mission, access to capital, governing board position, and physician relationships all are critical in strategy formation.

Pennsylvania hospitals provide a wealth of performance data that may be applied to other markets (PHC4, 2006). While the study is confined to Pennsylvania hospitals, single-state financial assessments are frequent in the extant literature (Gapenski, Vogel, & Langland-Orban, 1993; Langland-Orban, Gapenski, & Vogel, 1996; Wang, Wan, Falk, & Goodwin, 2001). However, Pennsylvania hospitals possess characteristics that may not be fully generalizable to other states. For instance, Pennsylvania has a high percentage of non-profit hospitals, many rural counties, and state hospital reimbursement levels that may differ from other states (PHC4, 2006). Only three years of data were available to determine the impact of physician joint ventures on performance. Additional data could be used to provide an assessment of long-term impact of joint ventures on performance, macro-economic cycles, changes in federal and state reimbursement policy, as well as changes in regulations.

Data are not available to capture whether hospitals participate in more than one joint venture. The data show only that the hospital participates in the physician joint venture, not the nature of the joint venture such as ownership or contractual models (Cohn, Thomas, Rosenfield, & Schwartz, 2005).

The study did not include data on joint venture type, case-mix, wage-index, and consumer price index for all of the hospitals and counties over the three years. The joint venture variable is dichotomous and does not reflect the variation in types of joint ventures. Case-mix captures the complexity of the patients who are treated at the hospitals, and the county wage-index captures the variation in price for hospital staff. The consumer price index captures price inflation changes across time, and inflation is reflected in the prices that hospitals pay for supplies and cost of patient operations.

8. Conclusion

Our results indicate that the benefits experienced by small hospitals from joint ventures may derive from the disadvantages they face in terms of legitimacy. Larger hospitals with other sources of alignment may not find joint ventures to be as beneficial. Larger hospitals may find more benefits from focusing on other alignment mechanisms such as size, teaching status, medical technology.

Future scholarship may focus on additional contingencies that impact the success of joint ventures as a means for physician alignment, such as the entry and exit of other market competitors. The varied types of joint ventures may impact the performance of hospitals differently based on incentives for physicians to refer patients to their partner hospitals. Additional contingency factors such as executive leadership, corporate mission, community focus, and culture may be assessed in future empirical studies of hospitals and joint ventures.

References

- American Hospital Association. (2006, January 1). Annual Survey Database. Chicago, IL, United States.
- Bazzoli, G., Chan, B., Shortell, S., & D'Aunno, T. (2000). The financial performance of hospitals belonging to health networks and systems. *Inquiry*, 37(3), 234-252.
- Bazzoli, G., Lindrooth, R., Kang, R., & Hasnain-Wynia, R. (2006, August). The Influence of Health Policy and Market Factors on the Hospital Safety Net. *Health Services Research*, 41(1), 1159-1180.
- Berenson, R., Bodenheimer, T., & Hoangmai, P. (2006, July 25). Specialty-service lines: salvos in the new medical arms race. *Health Affairs*, w337-w343 .
- Berenson, R., Ginsburg, P., & May, J. (2007, December). Hospital-physicians relations: cooperation, competition, or separation? *Health Affairs*(26), w31-w43.
- Center for Rural Pennsylvania. (2010, December 23). Rural / Urban PA. Retrieved December 23, 2010, from Center for Rural Pennsylvania: http://www.rural.palegislature.us/rural_urban.html
- Cleverly, W., & Cameron, A. (2007). *Essentials of health care finance* (6th ed.). Sudbury, MA: Jones and Bartlett Publishers.
- Cohn, K., Thomas, R., Rosenfield, R., & Schwartz, R. (2005). Overview of physician-hospital ventures. . *The American Journal of Surgery*, 189, 4 – 10.
- DiMaggio, P., & Powell, W. (1983, April). The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review* , 48(2), 147-160.
- Donaldson, L. (2001). *The contingency theory of organizations*. Thousand Oaks, California: Sage Publications, Inc.
- Douglas, T., & Ryman, J. (2003). Understanding competitive advantage in the general hospital industry: Evaluating strategic competencies. *Strategic Management Journal*, 24(10), 991–995.
- Dranove, D., & Lindrooth, R. (2003). Hospital consolidation and costs: Another look at the evidence. *Journal of Health Economics*, 983-997.
- Finch, L., & Christianson, J. (1981, September-October). Rural hospital costs: An analysis with policy implications. *Public Health Reports*, 96(5), 423-434.
- Fine, A., & Frazier, B. (2011, May). Can a hospital benefit from partnering with physicians? *Healthcare Financial Management*, 65(5), 70 - 76.
- Gapenski, L. (2003). *Understanding health care financial management*. Washington, D.C.: AUPHA.
- Gapenski, L. C., Vogel, W., & Langland-Orban, B. (1993). The determinants of hospital profitability. *Hospital and Health Services Administration*, 63-80.
- Gaynor, M., & Anderson, G. (1995). Uncertain demand, the structure of hospital costs, and the cost of empty hospital beds. *Journal of Health Economics*, 14, 291-317.
- Ginsburg, P., & Grossman, J. (2005, August). When the price isn't right: How inadvertent payment incentives drive medical care. *Health Affairs*, W 5 - 3 76 - W 5 - 3 8 4.
- Goes, J., & Zan, C. (1995). The effects of hospital-physician integration strategies on hospital financial performance. *Health Services Research*, 30(4), 507 - 531.
- Harrison, J. (2006). The impact of joint ventures on US Hospitals. *Journal of Healthcare Finance*, 32(3), 28 - 38.
- Horwitz, J. (2005). Making profits and providing care: Comparing nonprofit, for-profit, and government hospitals. *Health Affairs*, 24(3), 790-801.
- Inkpen, A., & Tsang, E. (2008). Learning and Strategic Alliances. In J. Walsh, & A. Brief, *The Academy of Management Annals* (Vol. 1, pp. 480-511). New York: Lawrence Erlbaum Associates.
- Keeler, T., & Ying, J. (1996, August). Hospital costs and excess bed capacity: A statistical analysis. *The Review of Economics and Statistics*, 78(3), 470-481.
- Lake, T., Devers, K., Brewster, L., & Casalino, L. (2003, February). Something old, something new: Recent developments in hospital-physician relationships. *Health Services Research*, 38(1), 471–488.
- Langland-Orban, B., Gapenski, L., & Vogel, W. (1996). Differences in characteristics of hospitals with sustained high and sustained low profitability. *Hospital and Health Services Administration*, 385-399.
- Mark, T., Evans, W., Schur, C., & Guterman, S. (1998, January). Hospital-physician arrangements and hospital financial performance. *Medical Care*, 36(1), 67-78.
- McCue, M., & Diana, M. (2007). Assessing the performance of freestanding hospitals. *Journal of Healthcare Management*, 299-308.
- Medicare Payment Advisory Commission (MedPAC). (2008). *Report to Congress: Exploring hospital-physician collaborative relationships*. Washington: Medicare Payment Advisory Commission.
- Mintzberg, H. (1979). *The Structuring of Organizations*. Englewood Cliffs: Prentice-Hall.
- Peters, J., & Blasco, T. (2004, Nov/Dec). Enhancing hospital performance through perioperative services. *Physician Executive*, 30(6), 26 - 30.

- Pevalin, D., & Robson, K. (2009). *The Stata survival manual*. New York, New York, United States of America: Open University Press.
- Pfeffer. (1972, June). The size and composition of corporate boards of directors: The Organization and its Environment. *Administrative Science Quarterly*, 17(2), 218-228.
- Pfeffer, J., & Nowak, P. (1976, September). Joint ventures and interorganizational interdependence. *Administrative Science Quarterly*, 21(3), 398-418.
- Pfeffer, J., & Salancik, G. (2003). *The external control of organizations*. Stanford, California, United States: Stanford University Press.
- Pizzo, J., & Redd, L. (2006, November). Hospital-physician joint ventures maximizing the potential. *Healthcare Financial Management*, 60(11), 80-84.
- Proenca, E., Rosko, M., & Zinn, J. (2000). Community orientation in hospitals: An institutional and resource dependence perspective. *Health Services Research*, 35(5), 1011-1035.
- Provan, K., Beyer, J., & Kruthosch. (1980, June). Environmental linkages and power in resource-dependence relations between organizations. *Administrative Science Quarterly*, 25(2), 200-225.
- Ruef, M., & Scott, R. (1998, December). A Multidimensional Model of Organizational Legitimacy: Hospital Survival in Changing Institutional Environments. *Administrative Science Quarterly*, 43(4), 877-904.
- Scott, W. (2001). *Institutions and organizations* (2nd ed.). Thousand Oaks, CA: Sage Publications.
- Sheppard, J. (1995, March). A resource dependence approach to organizational failure. *Social Science Research*, 24(1), 28-62.
- Shortell, S., & Kaluzny, A. (2006). Organizational theory and health services management. In S. Shortell, & A. Kaluzny, *Health care management organization design and behavior* (5th ed., pp. 5 - 41). Clifton Park, New York: Thomson Delmar Learning.
- STACORP. (2011). STATA/IC 11.1. College Station, Texas: STACORP LP.
- Stensland, J., & Stinson, T. (2002, October). Successful physician-hospital integration in rural areas. *Medical Care*, 40(10), 908-917.
- Strode, R. (2004, July). Hospital-physician joint ventures threat or opportunity. *Health Care Financial Management*, 80-86.
- Strunk, B. C., Ginsburg, P. B., & Gabel, J. R. (2002, September 22). Tracking Health Care Costs: Growth. *Health Affairs*, W299 - W310.
- Swayn, L., Duncan, W., & Ginter, P. (2006). *Strategic management of health care organizations* (5th ed.). Malden, MA: Blackwell Publishing.
- The Pennsylvania Health Care Cost Containment Council. (2006). *An annual report on the financial health of Pennsylvania's hospitals*. Harrisburg: Pennsylvania Health Care Cost Containment Council.
- Trinh, H., & O'Connor, S. (2000). The strategic behavior of U.S. rural hospitals: A longitudinal and path model examination. *Health Care Management Review*, 25(4), 48 - 64.
- Wang, B., Wan, T., Falk, J., & Goodwin, D. (2001). Management strategies and financial performance in rural and urban hospitals. *Journal of Medical Systems*, 25(4), 241 - 255.
- Wang, B., Wan, T., Falk, J., & Goodwin, D. (2001). Management strategies and financial performance in rural and urban hospitals. *Journal of Medical Systems*, 25(4), 241-255.
- Young, G., Parker, V., & Charns, M. (2001, Spring). Provider integration and local market conditions: A contingency theory perspective. *Health Care Management Review*, 26(2), 73-79.
- Zakus, J. (1998). Resource dependency and community participation in primary health care. *Social Science Medicine*, 46(4 - 5), 475 - 494.
- Zinn, J., Mor, V., Castle, N., Intrator, O., & Brannon, D. (1999, February). Organizational and environmental factors associated with nursing home participation in managed care. *Health Services Research*, 33(6), 1753 - 1767.
- Zinn, J., Proenca, J., & Rosko, M. (1997, Spring). Organizational and environmental factors in hospital alliance membership and contract management: A resource dependence perspective. *Hospital and Health Services Administration*, 42(1), 67 - 86.
- Zinn, J., Weech, R., & Brannon, D. (1998, June). Resource dependence and institutional elements in nursing home TQM adoption. *Health Services Research*, 33(2), 261 - 273.