

**On the Uniqueness of Hybrids, Market Exchanges and Vertical Integration: Evidence
From Physician-Hospital Marketing Relationships**

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Introduction

The study of organizational structure has advanced considerably since Coase's seminal paper on the nature of the firm in 1937. An important question in this literature is what gives rise to different organizational structures. Originally this literature focused on the differences between market exchanges and vertical integration. However, scholars have also recognized that there are intermediate forms of organization, collectively known as hybrids, which more accurately consist of long-term contracting.

Williamson (1991), Hodgson's (2002), Ménard (2004) and other scholars have discussed the question of whether hybrids are an alternative to market exchanges and integration. Nevertheless, empirical researchers and academics continue to work as if the problem is decided, that is, as if hybrids are unique organizational structures. The purpose of this paper is to examine the question of whether hybrids are distinct from market exchanges and vertical integration. We use a unique database of physician and hospital contracting relationships that contains detailed information about different types of governance arrangements linking physicians to hospitals. Importantly, we can identify not only market exchanges and vertical integration, but also long-term contracting and other hybrid structures.

Specifically, we use data from the American Hospital Association's 2004 Annual Survey Database to conduct a canonical discriminant analysis of the data to determine if variables expected to affect the choice of governance structure effectively discriminate among markets, hybrids, and vertical integration. In this way we can determine the extent to which hybrids are

distinct from market and vertically-integrated governance forms. This analysis also allows us to better understand the connection between health policies and organizational structure differences between hospitals and physicians. Some of the differing influences may come from such health policies as related to Medicare and Medicaid reimbursement programs. This analysis makes possible an approach to understand how these policies affect organizational structure choice between hospitals and physicians. Finally, understanding differences in organizational structure can lead to improved health policy analysis as specific policies may affect the performance (costs, quality of care) of organizational structures differently. This type of second generation research can be conducted to examine how health policies affect the performance of alternative organizational structures, yet without understanding why organizational structures differ, such work will remain elusive.

Background

Since the 1990s, there has been a more rapid adoption of integrated relationships between hospitals and physicians (Wan, Lin, and Mas 2002). Hospitals may choose to integrate more tightly with physicians to coordinate care, gain leverage with health plans, increase admissions, and/or share in savings from reduced costs to shared-risk contracting (Casalino and Robinson, 2003; Robinson 1999). A plethora of integrated arrangements have evolved and have seen increased adoption such as Independent Practice Associations (IPAs), Physician Hospital Organizations (PHOs), Management Service Organizations (MSOs), and Medical Foundations among many others (cf. Morrissey et al 1996; Snail and Robinson 1998; Dynan, Bazzoli, and Burns 1998; Burns et al 2000; Cuellar and Gertler 2006). These forms of integration are an alternative to both a loosely integrated market arrangement as well as a fully integrated salary

model employment arrangement. Some in the literature have even claimed they represent a “hybrid” form of governance that fall between the market and integrated employment extremes of the continuum (Wan, Lin, and Mass 2002). Others have gone further to argue an ordering of these integrated arrangements from loose to tightly integrated (Morrisey et al 1996; Dynan, Bazzoli, and Burns 1998; Burns et al 2000; Cuellar and Gertler 2006).

Most of these studies attempted to create an ordering of integration based on the definitions of these arrangements. For example, Burns et al (2000) focuses on testing whether HMO counts and penetration have any impact on the adoption of these hybrid arrangements but does not test whether the marginal responses to the covariates are statistically different from each other for different integrated arrangements. The only study that attempted to test whether these integrations arrangements were significantly different from each other was Dynan, Bozzoli, and Burns (1998). They used factor analysis to identify similarities along different attributes affecting the integration decision. However, their study was generated from 1993 data and represents a comparison of these structures based on adoption by hospitals with low levels of experience with these arrangements. We argue that revisiting this question by evaluating data more than a decade later after many of these hospitals have had a much longer tenure with these structures offers additional insight into the question of the differentiation of these integrated structures.

Hence, our approach is to add to the literature by developing an organizational integration taxonomy based on previous research in two ways. We test if (1) a hybrid governance structure exists uniquely different from market and integrated governance structures in the spirit of theoretical framework of markets, hierarchies, and hybrids as outlined by Williamson and (2)

identify the factors associated with the level of integration among those forms of integration identified as “hybrid.”

Organizational arrangements in hospital-physician relationships

Two recent articles provide the basis for the organizational integration taxonomy used in this study. Following Burns et al. (2000) and Cuellar and Gertler (2006), we develop a taxonomy of organizational structures used by hospitals and physicians to coordinate the delivery of services in health markets. The key determinants that distinguish three integration categories, market, hybrids and vertical integration, include coordination intensity of business and clinical operations, degree of exclusive rights over patient flow/care and the level of investments made to buy physical (equipment, buildings) and intangible assets (reputation of system). An increase in each of these determinants indicates the move from market integration to more vertically integrated structures between hospitals and physicians.

The first category in the organizational taxonomy represents market integrated or loosely coordinated arrangements based on transaction costs theory (Williamson, 1991). Both Burns et al. and Cuellar and Gertler agree Independent Practice Associations (IPAs) and Physician Hospital Organizations (open and closed PHOs) represent arrangements whereby both physicians and hospitals retain a significant amount of autonomy over business and clinical operations and a relatively low level of joint investments to secure managed care contracts. Hospitals use IPAs to aggregate managed care contracts and provide physicians with assistance in obtaining participation in managed care plan networks. Physicians usually join IPAs for a fee. PHOs also facilitate managed care contracting, but also provide administrative services to physicians and can manage ambulatory care facilities (Cuellar and Gertler, 2006). PHOs that are classified as

open or closed. An open PHO means physicians and hospitals retain autonomy over business and clinical operations. The primary purpose of having a PHO is to centralize contracting efforts with health maintenance organizations (HMOs). In this analysis, we also capture an additional market integrated form. If hospitals do not choose to use the various integrated arrangements listed in the AHA questionnaire, we categorize ‘no arrangement’ chosen as a market integrated choice. Some empirical work suggests this is a reasonable means to understand more about market integrated forms of coordination between hospitals and physicians (Barnes and Fannin, 2006).

Hybrid integrated structures typically represent an increased degree of coordination and level of investments in physical and other assets. A common hybrid form of organization used by hospitals and physicians is a Management Service Organization (MSO). MSOs are similar to closed PHOs because the relationship with physicians is selective, which means hospitals and physicians use MSOs to pursue managed care contracts based on pay-for-performance metrics (Morrisey et al, 1999). However, MSOs also differ from closed PHOs. MSOs also buy physical assets for physician use and provide administrative services (billing, management of electronic records) for a fee (Cuellar and Gertler, 2006). Both MSOs and closed PHOs have been considered as integrated, hybrid forms of organization (Bazzoli et al. 1999/2000). Following Cuellar and Gertler (2006), we define the hybrid category to include MSOs and closed PHOs, because closed PHOs are more selectively contract with physicians based on performance metrics, such as quality of care and overall cost of treatment. Closed PHOs may provide better care than open PHOs based on selecting high performance physicians (Bazzoli al, 1999/2000). Other hybrids include Foundations and equity models whereby physicians take shareholder positions in joint venture arrangements between physicians and hospitals.

Vertically integrated is the simplest category and only includes the integrated salary model (ISM) (Cuellar and Gertler, 2006). Hospitals simply hire physicians as employees using ISM contracts which pay physicians a fixed salary. Burns et al. (2000) concluded that these types of arrangements have the greatest potential for providing high quality health care, yet they also face the greatest moral hazard risk due to low-powered incentives – fixed salary instead of salary plus pay for performance incentives tied to improving quality of care or reducing costs, etc. In this analysis, we define ISMs as the most vertically integrated structures between hospitals and physicians due to physicians make small if any investments in physical or other assets and hospitals retain the lion's share of decision rights over treatment of patients as the ISM contract creates an employee-employer relationship between physicians and hospitals.

Methods and procedures

In order to determine if hybrid structures are distinct from market exchanges and vertical integration, we conduct a canonical discriminant analysis of the data, using categories of markets, hybrids, and vertical integration as the dependent variable to determine which variables expected to affect the choice of governance structure discriminate among the different possible types of structures. The canonical discriminant procedure has been used in other studies to determine the extent to which hypothesized categories are distinct (e.g., Faulkenberry and Mason, 1978; James and Marks, 2008).

The canonical discriminant procedure finds coefficients for the linear combination of explanatory and control variables that best separates or distinguishes among each of the categories of a dependent variable (in this case, the different types or categories of governance structures). It does this $K-1$ times, where K is the number of categories, thereby creating $K-1$

orthogonal discriminant functions, such that the first discriminant function provides the best overall discrimination among the groups, the second function provides the second best discrimination, and so forth.

In presenting our results below, we first utilize probit models of each governance type to assess the extent to which variables reflecting characteristics of the hospitals and the socio-economic environment surrounding them affect the likelihood of producing that governance form. We then consider the canonical discriminant procedure to assess the extent to which our governance categories are distinct.

Our data comes from the 2004 edition of the American Hospital Association's database. We focus our study on the subset of for-profit and non-profit hospitals. Table 1 presents summary statistics for the dependent (market structure taxonomies) and explanatory variables used in the analysis. As suggested above, market or loose arrangements between physicians and hospitals consists Independent Physician Arrangements, OPHOs, and observations in which "no arrangement" was selected by respondents. Integrated arrangements are defined as Integrated Salary Model. All other physician-hospital arrangements were defined as hybrid structures.

Results

Table 2 presents results of the probit analysis. These results are consistent with previous studies of physician-hospital arrangements. For instance, the casemix variable has been shown to be positively related to integration by Esposito (2004). For-profit status has a positive effect on loose (market) arrangements and a negative effect on hybrid and integrated structures. Size, as measured by fulltime equivalent counts of MDs, is negatively related to loose structures and positively correlated with integration.

Table 3 presents results from the canonical discriminant analysis. Because there are three categories (loose, hybrid and integration), two discriminant functions were estimated. Both were significant. Because the first function estimated is the most discriminating, the differences in categories are more obvious for the first than the second function. The most important variables affecting the categories along the first dimension are for-profit status (negatively) and size of hospitals, as proxied by FT equivalent MDs (positively). The casemix index (positively) and hospital size (negatively) are most important along the second function (dimension).

Figure 1 shows a plot of the group centroids. As shown in the figure, loose, hybrid and market structures are distinct, but hybrids are more closely related to integrated structures than loose or market-based arrangements. Interestingly, along the second (vertical) function, hybrids and integration are quite distinct, with loose arrangements comprising an intermediate form.

Conclusion

We find some evidence suggesting hybrids are distinct, but they are closer in form to vertical integration and market arrangements. Although we don't report all results from our analysis, we note that our results are sensitive to which variables are included in the study, such as volume of patients treated (economies of scale), information costs between hospitals and physicians when filing reimbursements through Medicare and Medicaid programs, size of facility and hospital bargaining power, among others. In some cases, hybrids are indistinguishable from market exchanges, in other cases indistinguishable from vertical integration. One conclusion we draw from this analysis is that the idea of hybrids is a fluid concept. Hybrids could be tightly dependent on situations and questions asked. Whether hybrids are considered distinct should be made on a case-by-case basis. Incorrectly classifying

organizational structures can lead to poor health care policy development. Our results indicate policy makers need to consider multiple perspectives of organizational structures before enacting health care policy reforms that assume “one policy fits all.”

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Table 1. Variables and summary statistics, for all hospitals in sample (for-profit, non-profit and government)

Variable	Mean	St. Dev	Min	Max
Dependent variables				
Loose (market)	0.64	0.48	0	1
Hybrid	0.11	0.30	0	1
Integrated	0.25	0.43	0	1
Explanatory variables				
For profit status	0.23	0.42	0	1
HMO1986	0.71	0.45	0	1
MD FTE	15.65	70.07	0	1497
Log popSqMile (2001)	5.57	1.89	-0.91	11.12
Rural – urban code	3.00	2.30	1	9
Casemix index	1.37	0.28	0.38	3.21

Table 2. Probit models, where dependent variable is indicated in column heading, for all hospitals in sample (for-profit, non-profit and government); N=2368

	Loose=1	Hybrid=1	VI=1
For profit status	0.694*** (0.075)	-0.309*** (0.095)	-0.686*** (0.086)
HMO1986	-0.339*** (0.068)	0.090 (0.086)	0.351*** (0.074)
MD FTE	-0.001*** (0.0004)	-0.0003 (0.0004)	0.001*** (0.0004)
Log popSqMile	0.046* (0.025)	0.020 (0.031)	-0.064** (0.027)
Rural – urban code	-0.051** (0.021)	0.057** (0.027)	0.024 (0.022)
Casemix index	-0.533*** (0.107)	0.569*** (0.128)	0.233** (0.114)
Pseudo R square	0.11	0.03	0.09
Likelihood ratio (d.f.=6)	197.1***	32.3***	153.9***
% correctly pred	66.3	58.0	66.6

Standard errors in parentheses

* significant at 10%, ** significant at 5%, *** significant at 1%

Table 3. Standardized canonical discriminant function coefficients and group centroids for comparison of Loose, Hybrid and Integrated physician-hospital arrangements, for all hospitals in sample (for-profit, non-profit and government); N=2368

	Function 1	Function 2
For profit status	-0.692	-0.095
HMO1986	0.384	-0.141
MD FTE	0.406	-0.674
Log popSqMile	-0.242	0.529
Rural – urban code	0.249	0.600
Casemix index	0.361	0.890
Eigenvalue	0.086	0.006
(prob)	0.000	0.012
Canonical correlation	0.281	0.078
Squared canonical corr	0.079	0.006
Wilke’s Lambda		0.915
F stat (d.f.=12)		17.84
(prob)		(<.0001)
Group Centroids		
Loose	-0.232	-0.011
Hybrid	0.233	0.198
VI	0.416	-0.065

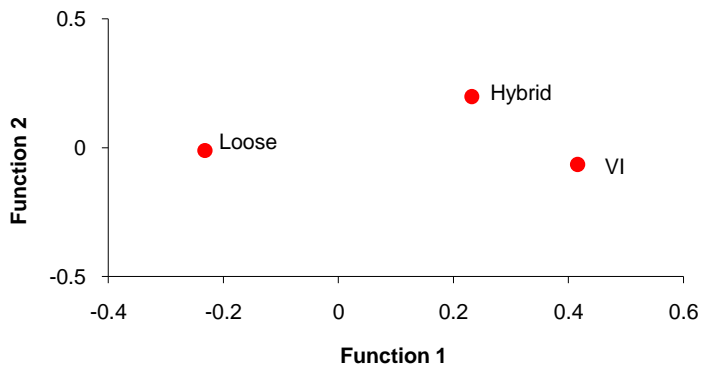


Figure 1. Group centroids from canonical discriminant analysis, distinguishing among loose, hybrid and integrated physician-hospital arrangements, for all hospitals in sample (for-profit, non-profit and government)