

## **An Alternative Model for Analyzing the Physician-Hospital Relationship in Rural Areas**

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### **Abstract**

We introduce a modeling framework called Transaction Cost Economics to help decision makers in rural health care markets choose among alternative organizational relationships in order to more cost-effectively deliver healthcare services. In particular, the hospital-physician relationship is analyzed and the transactional attributes, institutional environment, and market characteristics are identified as key variables influencing the organizational relationship between hospital and physician. As asset specific investments are made by either the hospital or physician, vertically integrated relationships are more likely to occur. The degree of remoteness of rural areas is also considered to affect the impact of these asset-specific investments.

**Keywords:** transaction cost economics, rural hospital, organizational arrangements

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## **Introduction**

Access to health care in rural markets has been studied at length (Bull et al., 2001). The majority of studies have examined access to health services for children (Goodman et al., 1992), adults with disabilities (Lishner et al, 1996), and more generally barriers that prevent a wide variety of rural residents from health care services (Edelman et al., 1996). More recently, research has focused on how health markets have been organized to provide greater access to health care for rural residents by examining the degree of vertical integration of services in rural hospitals (Mick et al, 1993) and the possible impact new rural health networks may have on improving access to health services in rural settings (Minyard et al., 2003). This paper builds on these organizational studies on access to care in rural settings by introducing a new economic organization framework which can be used to examine issues of organization and access to health care services in rural settings.

We begin by introducing rural health researchers to a rapidly evolving field within economics that studies vertical and horizontal boundaries of firms called transaction cost economics (TCE). We explain the theoretical framework of TCE, how scholars in previous studies have conducted empirical tests of TCE's main organization hypothesis, and the empirical challenges of conducting this type of research. As an example of TCE's usefulness, we examine the vertical boundaries between primary care physicians and rural hospitals to identify some TCE-organization hypotheses that could be tested. We conclude by highlighting other possible applications of TCE in rural health markets. The explication and application of TCE to the study of health services in rural markets charts a new rural health research agenda, one in which we hope many will choose to participate.

## **Transaction Cost Theory**

The origins of the Transaction Cost Theory can be traced back to some of the early writings of the Nobel Prize winning economist, Ronald Coase (1937). Coase was interested in answering the question of why the firm existed. The modern empirical application of TCE to organization is credited to Oliver Williamson. Williamson's working hypothesis was that economic organization occurs to "align transactions, which differ in their attributes, with governance structures, which differ in their costs and competencies, in a discriminating (mainly, transaction cost economizing) way" (Williamson 1991, p. 79). Here, governance structures are the alternative forms of organizational arrangement. For Coase, the alternative forms of organization were the two extremes of either an arm's length spot market transaction or a transaction internalized (made) within the firm. Williamson, in his later writings expands on the number of governance structure (organizational arrangement) alternatives from simply market transactions and internal organization to include additional hybrid forms. These hybrid forms may include more market-like transactions such as short-term and informal contracts as well as forms that are more similar to internal organization such as long-term contracts, partial ownership agreements, franchises, networks, alliances, and firms with highly decentralized assignments of decision rights (Klein 2004). Organizational forms most similar to market transactions include transaction costs of discovering relevant prices and negotiating and enforcing contracts. Organizational forms similar to internal organization address transaction costs of information flow, incentives, monitoring and measuring performance evaluation (Klein).

#### Behavioral Assumptions and the Holdup Problem

Two behavioral assumptions underly Williamson's TCE framework. The first assumption is that individuals have bounded rationality, or in the words of Herbert Simon (1992), individuals are "intendedly rational, but only limitedly so." Individuals cannot comprehend and compute all

of the information available to them from which to determine how to organize a transaction. Second, Williamson assumes that individuals possess opportunism, here defined as self-interest seeking with guile. Individuals will be willing to take advantage of transactional attributes in order to increase their bargaining power in negotiating a transaction ex ante or the incompleteness of a contract in order to re-negotiate the contract ex-post.

Given these behavioral assumptions, one of the issues Williamson addresses in his articulation of transaction cost theory is how parties to a transaction address what he defines as the “holdup” problem (Williamson 1975, 1985). The holdup problem occurs when one or both parties must make relationship-specific investments in order for the transaction to occur. When only one party must make these investments ex-ante, that party exposes themselves to a potential hazard or risk ex-post. That is, the other party may take advantage of the relationship-specific investment of the former party by acting opportunistically and changing the terms of the transaction ex-post. Because it is difficult to identify all potential opportunistic behaviors as a contract is being negotiated, any contract agreed to is incomplete and a contracting party that must make a relationships-specific investment puts itself at risk from the incompleteness of the contract. Williamson posits that when a party has this level of asset specific investment in a transaction, rather than deal with the hazards of an incomplete contract, the party with that up-front investment should simply internalize the transaction within the firm.

### **Transaction Cost Economics and Health Care Markets: A Review of Studies**

Several studies have examined how vertical relations affect the performance of organizations operating in health care markets. For example, some studies have examined the performance of hospitals and managed care organizations. A large majority of studies have examined how hospitals can improve performance (Estough, 1992); the role of alternative

business expansion strategies have on performance (Gillard, 1998); the determinants of profitability for hospitals (Langland-Orban et al 1993; Gapenski et al 1999); and why performance varies between non-profit and for-profit hospitals (Rosenau 2003). Finally, Gaynor et al. (2004) examined how physician incentives in health maintenance organizations (HMOs) affected medical expenditures. However, little is known about the causal factors which lead to increased vertical integration within health care markets (Gaynor and Wilson, 1999). Of these few studies, only a few have examined contractual arrangements from a hospital perspective. Studies by Alexander et al. (1996), Morrisey et al. (1999), and Esposito (2004) examined why hospitals choose different contractual arrangements with physicians. Some scholars have begun applying TCE to understand vertical relations between hospitals and physicians, but these studies feature the use of case studies and descriptive analysis of relations rather than empirical testing TCE hypotheses.<sup>1</sup> However, only three studies have used TCE reasoning to explain why vertical integration may be preferred when hospitals organize medical (e.g., physicians) and non-medical services (e.g., housecleaning and food). In what follows, we review these studies in detail to explain how TCE research has been conducted in health care markets.

Three studies have empirically tested the central TCE hypothesis in health care markets. For example, Coles and Hesterly (1998a) examined how public and private hospitals choose their vertical boundaries regarding medical and non-medical services. They examined vertical integration of medical services including respiratory therapy, laboratory, radiology, physical therapy, outpatient services, emergency room and pharmacy. Non-medical services included housekeeping, laundry, food services, computer services, maintenance and landscaping. Coles and Hesterly asked hospital administrators to complete a survey which measured whether these services were outsourced, performed in-house, or not provided as an empirical measure of

vertical integration. They measured physical and human asset specificity and technological uncertainty as being the primary transaction costs variables of importance when hospitals chose to integrate both medical and non-medical services. Using a sample of 13 transactions in 196 hospitals, which produced over 2500 observations, Coles and Hesterly found general support for the central vertical integration-asset specificity hypothesis. In particular, they concluded that firm-specific training time (human asset specificity), technological uncertainty, and economies of scale were fundamentally important when integrating these services. Coles and Hesterly measured technological uncertainty using a scale ranging between infrequently to very frequently regarding the introduction of new methods or technologies. As new methods and technologies were introduced, uncertainty increased. Likewise, they also measured economies of scale as the number of beds. This variable was a proxy for service capacity, or firm size. Results indicated the larger the hospital, the more likely outsourcing of non-medical services would occur; this is because outsourcing using market contracting for services is possible more so in larger, markets (Lyons, 1995). However, results also indicated larger hospitals were more likely to offer physician services in-house.

Coles and Hesterly (1998a) reasoned their results also indicated hospitals had an even stronger incentive to integrate medical services in an effort to control quality of patient treatment. Thus, hospitals opted to integrate medical services which were used during critical stages of patient care (radiology, emergency room, etc.). Based on TCE, this implies the costs of outsourcing would exceed integration: if a hospital outsourced for medical services the likelihood of hold-up would be significantly higher. The remedy according to TCE would be for hospitals to provide these services in-house to maintain superior quality of care of patients. Otherwise, hospitals could become locked-in to inferior technologies needed for patient care,

which would place them at a competitive disadvantage. The study by Coles and Hesterly (1998a) represents one of the broadest empirical tests of TCE while controlling for a number of important factors such as economies of scale, market size, and the types of liability associated with medical versus non-medical services.

In a slightly different study, Coles and Hesterly (1998b) examined the choice to integrate medical (e.g., radiology and pharmacy) and non-medical (e.g., housekeeping and landscaping) services. However, this study focused two different and important areas in TCE research. First, they examined differences in vertical integration between public and private hospitals when integrating these services. Their results indicated private hospitals were more sensitive to efficiency pressures of competition. In fact, Coles and Hesterly (1998b) concluded: “These differing incentives [between public and private hospital ownership] create a situation where other forces, be they political or other non-economic forces, have a greater impact on the integration decision than do transaction costs” (p. 407). The second important area of new research provided by Coles and Hesterly (1998b) was the more explicit examination of interaction effects between technological uncertainty and measures of physical and human asset specificity. The probability of integrating medical services increased substantially by adding these interaction effects and improved the power of empirical tests of transaction cost theory.

The early studies by Coles and Hesterly (1998a, 1998b) represent the first attempts to apply TCE to explain vertical integration of services in health care markets. Building on these seminal works, the study by Esposto (2004) provides the first and only study where TCE was applied specifically to the hospital-physician relationship. That is, Esposto examined which organizational (or governance) structures hospitals chose when employing physicians—the integration of the physician services transaction. However, Esposto’s study differed in two

important respects. First, empirical proxies of human or physical asset specificity were not measured. Instead, a measure known as the case-mix index was used to approximate the degree of complexity associated with performing the average procedure by physicians.<sup>2</sup> The higher the value of the case-mix index, the greater the complexity of the average procedure performed by a physician. The measure of complexity represents a proxy on the likelihood a physician may act opportunistically toward the hospital and the usage of its resources.

The second contribution of the Esposto (2004) study was a more refined empirical examination of the choices available to hospitals when employing physicians. The simple ‘make-or-buy’ decision, where ‘make’ referred to in-house production and ‘buy’ referred to outsourcing, was replaced with a range of available governance choices identified by Alexander et al. (1996). Using governance choices of physician-hospital organization (PHO), management services organization (MSO), foundation and integrated salaried-staff model, Esposto (2004) hypothesized that the choice among these governance structures was a function of complexity-uncertainty (the case-mix index), hospital characteristics such as public-private ownership, market share, and market characteristics such as a HMO penetration rate, population, average household income, physician density per 1000 population, and the percent of population equal to or over age 65. Results indicated a positive relationship between the case-mix index and organizational structures where hospitals have greater internal control. That is, hospitals opted to integrate or employ the services of physicians using a salaried-staff arrangement as complexity increased more so than using governance structures with fewer controls over hospital resource usage (e.g., PHO, MSO joint ventures).

The early studies by Coles and Hesterly (1998a, 1998b) and Esposto (2004) have begun the empirical testing work of TCE in health care markets. However, there is an absence of

research applying TCE to understand hospital-physician relations in settings where regulation or other non-economic factors may influence governance choices, such as in rural health markets. The only mention of rural hospitals and governance choice was in the Coles and Hesterly (1998a) study: “Small hospitals are generally located in more rural areas, where there may be only one hospital for hundreds of miles. Larger hospitals, however, are located in urban areas where there may be a number of other large hospitals located in close proximity. In the case of small hospitals geographical isolation means that a contractor would not be in a position to take advantage of the economies of servicing a number of similar firms” (p. 342). The implication is rural hospitals will be more likely to integrate, or choose governance structures with more vertical control over physicians, in an effort to control quality of patient care. But to our knowledge, there has not been a study which has examined hospital-physician relations in rural health markets. Would TCE equally do well at predicting optimal governance structures for rural hospitals? In the next section, we explain an action plan rural health researchers can follow to begin TCE empirical work in rural health markets.

### **Applying Transaction Cost Economics in Rural Health Markets**

Our action plan for explaining how rural health researchers can apply TCE in rural health markets has four important areas which require further development in this paper. First, we need to concisely identify the types of dependent, independent and other control variables that can be used when conducting empirical tests of TCE. To do this, we draw from Coles and Hesterly (1998a, 1998b) and Esposito (2004) and identify reasonable approaches for ascertaining measures of vertical integration, attributes of transactions (asset specificity, uncertainty, frequency), controls, and other variables that might affect the rural hospital-physician relationship (e.g., government programs or changes in payment systems). We also list other variables that might

affect rural hospital-physician relations and therefore TCE's predictive power. For example, when determining if a rural hospital should vertically integrate physician services using one or more governance choices, other political or non-economic variables should be included in the empirical specifications (Coles and Hesterly, 1998a).

### Selecting Empirical Proxies for Transaction Cost Theory

One of the formidable challenges when conducting TCE research is the selection of the appropriate empirical proxies that correspond to the core tenets of transaction cost theory. To provide some guidance, we explain how Coles and Hesterly (1998a, 1998b) and Esposto (2004) conducted their empirical tests of TCE. These three studies, though similar, provide alternative approaches for measuring dependent (vertical integration) and independent (attributes of transactions) variables using survey and secondary data sources. The review below, we only focus on most important variables in these specifications, which are those that are most related to measures of vertical integration and asset specificity—the core tenets of transaction cost theory. We conclude by also highlighting other important empirical proxies for variables that should be included when applying TCE in rural health markets.

### Dependent Variables

Based on Coles and Hesterly (1998a, 1998b) and Esposto (2004), a variety of approaches have been used to measure vertical integration in health care markets according to transaction cost theory. The studies by Coles and Hesterly used a survey and asked hospital administrators if medical and non-medical services were performed using: (a) contracts; (b) in-house; or (c) not performed. The advantage of this approach is its simplicity. Hospital administrators can relate to this question while at the same time clear vertical boundaries of operations can be assessed. The disadvantage of this approach is when hospital administrators chose (a) we do not observe

the details of those contracts, which means our ability to understand the type of 'buy' decision from the market is limited. The same can be said of choice (b) in that we do not know the exact form of the in-house employee-employer arrangement.

However, the Esposito (2004) study provides significant detail on the types of vertical arrangements between hospitals and physicians. Esposito explained there are four types of arrangements based on the work of Alexander et al. (1996). To begin, consider the most basic relationship between hospital and physician: the integrated salary arrangement (table one). Here, the hospital employs the services of the physician to provide health services according to surrounding demand for services, such as primary care. The physician agrees to the employment contract-arrangement and therefore allocates the majority of authority and residual control to the hospital concerning the use of hospital or system assets. The physician also makes what Williamson (1985) calls human specific investments with the hospital -- the use of the physician's knowledge when treating patients. However, the hospital also makes physical and/or site specific investments with the physician. The physician may provide treatment knowledge while the hospital provides lab, pharmacy or other services at a location near by (site specificity). In addition, the hospital also makes physical asset specific investments in that if physicians need specialized equipment for treating patients, the most likely case is those physical assets will be purchased by the hospital and made available for use by physicians. Thus, the integrated salary arrangement closely approximates what Williamson (1985) refers to as hierarchical or internal control: the hospital makes services internally through this arrangement with a physician rather than using some type of market contracting or outsourcing arrangement. From the hospital perspective, the integrated salaried (hierarchical) choice would be the preferred mode of organization give that the hospital has made significant human, physical and site specific asset

investments—a high asset specificity condition which favors greater vertical control according to TCE.

At the other end of the vertical integration spectrum, we have the hospital-physician arrangement called foundation (Alexander et al. 1996). Here, the physician remains in a legally separate entity from the hospital. The hospital contracts for services depending on the volume of surrounding demand for services. Thus, authority or residual control over the use of physician knowledge for services and hospital assets is not shared. Instead, both parties make decisions in an autonomous manner. However, only the terms of the contract explain in detail this arrangement, but the idea is the physician and hospital use this arrangement to gain the greatest ability to adapt to changes in market conditions or patient needs. From the hospital perspective, the foundation arrangement choice would be the preferred mode of organization given that the hospital does not make significant human, physical and site specific asset investments—a low asset specificity condition which has less vertical control according to TCE. According to Williamson (1985), there are also hybrid forms of organization where asset specific investments can be made by both parties. This relationship is represented by the PHO and MSO arrangements where authority or residual control is shared and each party makes human, physical or site specific investments in the relationship. The hospital may provide the equipment, buildings and medical staff to the physician in exchange for treatment services. The physician may also agree to refer patients only to the hospital specified in the contract thereby excluding other hospitals from his services.

[Table 1 Here]

Independent Variables

While some variation exists when measuring hospital-physician arrangements, perhaps the most challenging empirical task is to identify the appropriate proxies for alternative measures of asset specificity (site, physical, dedicated or human). Coles and Hesterly (1998a, 1998b) developed proxies for human and physical asset specificity. Following the work of Anderson and Weitz (1986), they use the length of time it takes to train an individual with previous experience in another firm as a proxy for human asset specificity. Using a survey, Coles and Hesterly asked hospital administrators how long it would take an individual with previous experience in the service at another hospital to achieve satisfactory performance level in the respondent's hospital. This represented firm-specific training time in their specifications. Following the work of Jacobsen (1988), they also measured physical asset specificity, which represented the firm-specific nature of investments made in equipment and facilities. They asked hospital administrators how much of the equipment in a department is not routinely used in the provision of the service at other hospitals (e.g., equipment for heart transplants).

While Coles and Hesterly (1998a, 1998b) developed proxies for asset specificity, Esposto (2004) did not. Instead, he examined the complex nature of the average procedure provided by hospitals as a proxy for complexity—the case-mix index. Complexity implies there is some type of tacit knowledge which is difficult to transfer to others in the routine practice of treating patients. For example, a surgical operation on a patient's brain is generally considered more complex than a hip or knee replacement. The complexity brings with it the risk of failure and the potential for significant costs to both physician and hospital. Esposto (2004) concluded: “the case-mix index should provide some evidence on whether a hospital's exposure to the risk of physician opportunistic behavior is a valid explanation of the changes in the economic relationship between physicians and hospitals” (p. 56). The idea is the higher the value of the

case-mix index, the more complex the average procedure performed. The greater the case-mix index, the more likely vertical structures such as the integrated salaried arrangement would be the optimal governance structure chosen.

### Rural Health Policy Variables

While the studies by Coles and Hesterly (1998a, 1998b) and Esposito (2004) provide empirical proxies for right-hand-side variables associated with asset specificity and complexity, rural health researchers should also consider additional controls related policies that affect the performance of rural hospitals. For example, if estimating the degree of vertical integration between hospitals and physicians in rural markets, scholars would also control for any changes in what Williamson (1991) calls the institutional environment. In rural health markets, this may correspond to whether the rural hospital has converted to critical access status. Critical access status brings with it additional revenue enhancing benefits, which may affect a rural hospital's ability to choose among different arrangements with physicians. Other changes in Medicare and Medicaid policies could also affect the hospital business model enough to alter the decision to integrate physician services using PHO, MSO, salaried or foundation arrangements in rural health markets. These are only a few examples of how changes in the institutional environment affect the choice of governance structure between physicians and hospitals in rural health markets. Other examples abound and should be incorporated when empirically estimating the choice of governance form between physicians and hospitals in rural health markets.

### Estimation of Econometric Models

In real-world application, transaction costs are difficult to observe. As an alternative approach, empirical applications of TCE developed a reduced form analysis where the attributes of the transaction predicted the unobservable costs of the transaction. TCE empiricists assume

that organizations have a goal of minimizing transactions costs, and therefore, the organizational form actually chosen by the firm represents the transaction-cost minimizing choice. Hence, a reduced form version is estimated by

$$(1) \quad G^* = \mathbf{a}X + e ;$$

where  $X$  represents a vector of attributes of the transaction,  $\mathbf{a}$  is vector of parameters for the transaction attributes, and  $e$  represents the disturbance vector.

The most basic of reduced form analysis occurs when the dependent variable, governance choice, can be only one of two alternatives: internal organization ( $G=1$ ), or market transaction ( $G=0$ ). In cases where the dependent variable takes on only two distinct values, the probit model or other appropriate qualitative choice model is most often applied<sup>3</sup>.

We propose to develop a TCE model to identify the optimal hospital-physician relationship for rural hospitals in the U.S. using secondary data from public and private sources. We propose a model similar to the one developed by Esposto (2004). In the model, the dependent variable is the physical-hospital organizational arrangement. These include the Physician-Hospital Organization (PHO), Management and Services Organization (MSO), Independent Practice Association (IPA), Integrated Salary Model, and all other physician-hospital organizational arrangements.

The physician-hospital organizational arrangement is a function of the asset specificity, complexity, as well as market characteristics hypothesized by Robinson (1997) where the hospital-physician organization (HPO) is determined by

$$(2) \quad HPO = f(\text{Asset Specificity, Complexity, Market Characteristics}).$$

Complexity in the hospital-physician relationship would be measured by two variables, the hospital's case mix and the number of services provided by the hospital. As both the case

mix and facility code count increase, it is assumed that an increase in the complexity of the transactions between the physician and hospital occurs. It is expected as the case mix and facility code count increase, the probability of a tighter physician-hospital relationship increases.

Further, both Esposto (2004) and Robinson (1997) recognize additional market characteristics impact the physician-hospital organizational arrangement. A number of these characteristics will be added to the model to serve as controls on the reduced-form TCE model. The county HMO penetration rate (the percent of a county's population covered by an HMO plan) will be used as a proxy to identify the level of risk contracting and other cost control incentives generated by managed care organizations. It is expected as the HMO-penetration rate increases, tighter physician-hospital organization will occur as hospitals identify alternative organizational arrangements to control cost. The distance to nearest hospital and number of beds x miles from the hospital will also be added control variables. It is expected that as the number of beds x miles from the hospital increases, the probability of tighter physical-hospital organization increases as hospitals have to compete for physician loyalty in admissions. Likewise, as distance to the nearest hospital increases, the lower the likelihood that a physician would switch to another hospital in admitting patients would occur. Hence, as the distance to the nearest hospital increases, the lower the probability of tighter physician-hospital organization.

Also included in the model are dummy variables to control for specific hospital characteristics. These include dummy variables for whether or not the hospital is for-profit, whether or not the hospital is part of a health care system or network, and the number of physicians per 1,000 residents in the county. Based on evidence from Esposto, non-profit hospitals would be more likely to tightly integrate with physicians in order to effectively and efficiently meet their historical role of providing health care to low income communities.

Hospitals that are a part of a health care system or network may have additional economies of scale that would spread out the fixed internal costs of monitoring transactions within the network leading to a higher probability of hospital-physician integration. Further as the number of physicians increased for a given population, the increased competition for patients would create incentives for physicians to reduce uncertainty and align themselves more tightly with hospitals.

### **Concluding Remarks**

TCE has become the dominant industrial organization approach in organizational economics. However, few studies have applied TCE in health markets. Furthermore, there has not been a study that has examined vertical integration in rural health markets. To begin this work, we have developed an action plan or a ‘how to’ approach rural health researchers can follow. We believe many more applications of TCE can be made in health markets (urban and rural alike) to improve our understanding of optimal organization. We believe this is necessary to assist rural hospitals when choosing the appropriate hospital-physician arrangements. This is necessary so rural hospitals can continue to provide vital health services to rural residents. We also believe TCE can be applied to explain other vertical arrangements in health markets in general and in rural settings in particular. Future work will be devoted to applying TCE to study vertical boundaries of nursing homes, community health center services (primary care, dental, mental and pharmacy), rural health clinics and managed care organizations (HMOs and PPOs).

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<sup>1</sup> Our focus in this review is on empirical tests of TCE. For reviews of hospital-physician arrangements in the U.S., see Snail and Robinson (1998) and Lake et al. (2003); also see Casalino and Robinson (2003) for an excellent discussion of how TCE explains risk contracting between hospitals and physicians. However, these studies do not empirically test TCE hypotheses. For this reason, we review only those articles where TCE hypotheses have been tested so rural health researchers have some idea of the: (a) proxies used to capture vertical integration, asset specificity, and other important control variables; (b) statistical models used such as probit and logit models; and (c) empirical challenges ahead that rural health researchers must manage to conduct this type of research.

<sup>2</sup> Esposito (2004) used the case mix index which was estimated by the Health Care Finance Administration of the U.S. Department of Health and Human Services.

<sup>3</sup> The logistic regression model is another qualitative choice model often applied to the binary dependent variable case. In cases where more than two alternative organizational forms are chosen, a multinomial probit or logit model is often applied.

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**Table 1. Hospital-Physician Vertical Arrangements in Health Markets.**

	<b>Authority or Residual Control</b>	<b>Human Asset Specificity</b>	<b>Physical or Site Asset Specificity</b>	<b>TCE Organizational Form</b>
<b>INTEGRATED SALARY</b>	Hospital	Physician	Hospital	Hierarchy or Internal Control ('make' internally)
<b>FOUNDATION</b>	Autonomy	Physician or Hospital	Physician or Hospital	Market Contract Control ('buy' from market)
<b>PHO<sup>1</sup></b>	Shared	Physician	Hospital	Hybrid Control
<b>MSO<sup>2</sup></b>	Shared	Physician	Hospital	Hybrid Control

<sup>1</sup> PHO stands for a Physician-hospital organization (PHO) which represents a joint venture..

<sup>2</sup> MSO stands for Management-services organization, which also is a joint venture.

SOURCE: Alexander et al.: 1996, "Organizational Approaches to Integrated Health Care Delivery Systems: A Taxonomic Analysis of Physician-organization Arrangements", *Medical Care Research and Review* 53: 93.