The Effects of Competition on Referral Alliances of Professional Service Firms

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Abstract:

The supply side of many professional service markets consists of two different pools of providers: generalists and specialists. Specialists usually gain access to new clients through referrals from generalists. To ensure a continuing stream of engagements, specialists often form referral alliances with multiple generalists. Engaging the right generalist partners and allocating resources to the resulting referral relationships are among the most important challenges facing these specialist firms. In this study, we examine how competition affects the management of referral alliances over time.

Due to the high level of inseparability of the professional service engagement, the nature of competition among specialists is complex. Building on the ecological view of competition, we model the degree of niche overlap in the specialist’s home markets and the generalists’ markets as well as the potential overlap due to the proximity of rivals vis-à-vis generalists. Using data on visiting consulting clinics involving cardiology specialty practices and rural hospitals from a Midwestern state over a 13 year period, we find that the various aspects of niche overlap influence the involvement of these specialist PSFs in referral alliances as well as resources they allocate to these relationships.

In addition to expanding our understanding of vertical, bilateral alliances between professional service firms, this study enhances our general understanding of strategic alliances by demonstrating how partner attractiveness and the actions of rivals affect the resource allocation decisions of firms managing multiple strategic alliances over time.
A problem common to all professional service firms (hereafter PSFs) is to develop a continuing stream of remunerative engagements from new and existing clients (Gardner, Morris and Anand 2006). One approach to meeting this challenge is to foster alliances with other organizations. PSFs use a variety of alliance strategies. In some cases, these are multi-lateral, horizontal networks in which any member of the network may be the point of initial contact with the client. For example, Nexia International is an alliance of independent public account firms who refer the foreign subsidiaries of their clients to network members practicing in the corresponding locations (Koza and Lewin 1999). Another type of alliance is the “professional service constellation” comprised of different types of PSFs linked for a fixed time period in order to complete a complex assignment (Jones, et al. 1998). Architectural, design and construction management firms often band together to tackle a large-scale building project.

A third type of alliance relationship is a vertical alliance between generalist and specialist PSFs. Also known as referral alliances, these bilateral relationships arise due to the structure of professional service industries. In most cases, the supply side of professional service markets consists of two different pools of PSFs: generalists and specialists. Generalist PSFs serve as an initial point of contact and screening mechanism to match the needs of the client with the rarer, more valuable and, therefore, more costly services offered by a specialist PSF (Shumsky and Pinker 2003). For example, consider a law firm specializing in probate, estate or trust issues. Most of its clients will originally seek advice from a family attorney who will refer its client to the specialist practice in order to best serve the client’s needs. Because specialists primarily gain access to clients via referrals from generalist PSFs, successfully managing one’s referral alliances is a key to the survival of a specialist PSF.

From the point of view of the client, the interaction with the specialized PSF is episodic and needed only in extreme or unusual circumstances. For the specialized PSF, however, the extraordinary is the routine. In order to efficiently use their storehouse of scarce, valuable and costly knowledge (Greenwood, et al. 2004), a specialist PSF has to form and maintain relationships with multiple

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1 A successful referral to a specialist is may also be important for the generalist since meeting a client’s needs through a successful referral may result in a repeat engagement.
generalists who refer clients with more advanced needs. Maintaining the relationship with a generalist PSF requires an investment of time and attention on the part of the specialist PSF. At the bare minimum, a specialist PSF has to review the needs of referred client to ascertain the fit between its narrowly focused capabilities and the client’s needs. If a specialist PSF is unable to successfully manage the flow of work to its team of professionals, it will eventually lose its ability to compete either in the market for clients or for scarce human resources (Stumpf, et al. 2002).

Involving generalist partners and allocating resources to the resulting referral relationships are among the most important challenges facing specialist PSFs. At the same time, specialist PSFs do not build and manage their portfolio of referral alliances in a vacuum. Specialist PSFs are likely to compete for the best generalist partners. In this study, we focus on how competition affects the involvement of specialist PSFs in referral alliances and the level of resources allocated to these relationships. Building on the ecological theory of firm rivalry (e.g. Hannan and Freeman, 1989; McPherson, 1983), we operationalize competition in terms of different aspects of niche overlap among rival PSFs.

Studying how a specialist PSF manages referral alliances over time is extremely difficult due to the value of this information to the firm (and its competitors). We are fortunate to have access to a unique resource that allows us to examine a population of specialized PSFs in the medical field. Using a longitudinal database spanning 13 years (1989-2001), we model the alliance involvement of and resource commitments by cardiology specialty practices. The referral alliances involve cardiology specialist practices located in urban areas of a Midwestern U.S. state and general hospitals located in nearby rural areas. These alliances result in an organizational form known in the medical field as a “visiting consulting clinic” (Tracy, Saltzman, and Wakefield 1996). The actual clinic involves regularly scheduled visits to rural hospitals by specialist physicians (Kellerman et al. 2001). During the clinics, the specialists provide a limited range of outpatient diagnostic and therapeutic care to patients as well as to consult with local physicians (Wakefield, Tracy, and Einhellig 1997). In return, it is expected that the more difficult cases are referred to the specialist PSF for advanced treatment in its urban home market (Deprez 2004).

Our study makes three contributions. First, we explore the impact of competition on the
management of vertical alliances between specialist and generalist PSFs. In his study of airline alliances, Gimeno (2004: 839) calls for further research on vertical alliances to evaluate the generalizability of his findings with respect to the impact of competition on horizontal alliances. Using the ecological view of competition, we examine how the different aspects of niche overlap between specialist PSFs affect vertical referral alliances over time. We find that the multiple types of niche overlap have a significant effect on which referral alliances are formed and the level of resources specialist PSFs dedicate to these relationships.

Second, as noted by Gulati (1998), few empirical studies explicitly model firms’ decisions about dedicating resources across multiple alliance partners that may possess asymmetric attractiveness. This is surprising given how often we observe firms with multiple alliance partners (e.g., Baum, Calabrese and Silverman 2000; Silverman and Baum 2002; Baum, Shipilov and Rowley 2003; Stuart 1998). The current study seeks to understand how specialist PSFs allocate resources across multiple referral alliance relationships.

Finally, our study fills in a gap in the empirical literature on the structure of professional services alliances. Prior empirical research has concentrated on multi-lateral alliance networks (e.g. Rowley et al. 2004). Our study examines the management of portfolios of bilateral, vertical alliances involving separate pools of specialist and generalist PSFs over time. This is an understudied area of research given the prevalence of referrals in professional services (Koza and Lewin 1999; Wheiler 1987).

The balance of this paper is organized into three major sections. In the first, we discuss prior research on the nature of PSFs and the ecological view of competition (i.e. niche overlap between rivals). From this literature, we develop our hypotheses on alliance involvement and resource commitment decisions by specialist PSFs. In the second section, we present our empirical study. The third section closes the paper with a discussion of our results.

**Theoretical Background**

**Characteristics of Professional Service Firms and their Markets**

Greenwood, et al. (2005) suggest that the inputs and outputs of the professional service firm help
distinguish it from a producer of goods. The inputs for the PSF are a highly educated work force of professionals. In these professionals resides the “tacit knowledge” (Polanyi 1967) that allows a PSF to fulfill the complex, customized engagements their clients require. These engagements represent the intangible output of any PSF. An additional factor distinguishing a professional service engagement from other service encounters is a high degree of inseparability. The production of a service is inseparable from the provider. In addition, the consumption of a service is usually inseparable from the location of the service provider. Inseparability is an important characteristic that distinguishes services in general from products (Zeithaml, Parasuraman, & Berry 1985). Some services such as computer software programming are more separable, i.e. the production of the service and its consumption can be separated in space and time (Sampson and Snipe 1985). However, the degree of inseparability is much greater for professional services. As noted by Alreck (1994, p.143), “One of the most distinct features of service marketing is that it brings customers and service providers into direct interpersonal contact with one another more often and more intensely than the relationship between the producers or sellers and the buyers of goods. Providing professional services brings the professional and the client into even closer and more prolonged contact.” This suggests that many PSFs must regularly interact face-to-face with their clients in order to successfully complete their engagements (Stumpf, Doh and Clark 2002). While the degree of inseparability is uniformly higher for professional services compared to other services, it is a key distinction in such fields as medicine, dentistry, psychiatry, law, auditing and many areas of consulting (e.g. organizational change, executive coaching, training, team development, etc.). Therefore, the high level of inseparability introduces a spatial element to the interactions between PSFs and their clients.

Traditionally, the demand for professional services far outstripped the supply of providers (Stumpf, Doh and Clark 2002). Usually, clients seek out a provider and travel to a centralized site for the engagement, e.g. visiting the office of one’s lawyer. More recently, many PSFs face increasing levels of competition from within the profession and from other organizations outside the field seeking to offer similar, substitute services (Jones et al. 1998). Consequently, PSFs are under a great deal of pressure to seek out and engage new clients. These demands are an addition to their efforts to maintain and expand
their relationships with existing clients. The responses of PSFs range from opening branch offices in growing international markets (Laird, Kirsch and Evans 2003) to forming alliances with other PSFs to ensure a steady flow of engagements (Jones, et al. 1998).

Whether the PSF forms a horizontal or vertical alliance with other PSFs depends on the structure of the supply side of the professional service market. In many instances, the supply side of professional service markets consists of two different types of PSFs: generalists and specialists. In choosing to focus on a narrow area of practice, the specialist PSF must acquire unusual knowledge, usually in the form of rare and mobile human resources (Greenwood et al. 2005). The resource-based view of the firm suggests that scarcity of such resources increases their value in the market place (Barney 1986). Having such resources at one’s disposal creates the potential for the specialist PSF to successfully complete difficult and financially rewarding engagements. However, the specialist PSF must actively seek out highly remunerative engagements in order to attract, compensate and retain its pool of scarce talent. In order to efficiently utilize its more specialized base of human resources, a specialist PSF often relies on referrals from generalist PSFs as its source of new clients.

The importance of referrals to the success of all PSFs is the subject of a great deal of writing in the practitioner literature (e.g., Kotler and Connor 1977; Wilson 1994). However, there is relatively little discussion of the nature of referrals among professional service providers outside of the studies of referral patterns of physicians. That stream of research primarily focuses on the effects of patient and physician characteristics on the incidence of referrals (e.g. Shea, et al. 1999) and does not address the structural relationship between the specialist and generalist PSFs. The lack of research on bi-lateral referral alliances is surprising given their ubiquity in various fields of professional service (Koza and Lewin 1999: 639).

A wide range of possible referral arrangements can exist between a generalist and specialist PSF. At one end of the spectrum are sporadic, ad hoc referrals. These may or may not involve an explicit agreement between the participants; there is no formal contract between the parties. These relationships are not exclusive and participation is completely voluntary. Very little investment from either participant
is required to create or maintain this type of referral arrangement. At the other end of the spectrum are exclusive, formal referral contracts that guarantee referrals from the generalist to the specialist PSF. These contracts usually are exclusive and require a comparatively high level of investment by the participants. For example, these investments may involve joint marketing costs for the participants.

In this study, we focus on an intermediate level of formality we refer to as a “referral alliance.” Like all strategic alliances, a referral alliance requires investments by both the specialist and generalist participants. However, the non-exclusivity and voluntary nature of referral alliances results in a much higher degree of uncertainty of gain for the specialist PSF. To illustrate, consider the case of two airlines deciding to have a code-sharing agreement (e.g., Gimeno 2004) or two manufacturers forming a joint venture to co-develop a new product (e.g., Rindfleisch and Moorman 2001). In such strategic alliances, any benefits will be enjoyed by both parties. On the other hand, if a specialist PSF enters into a referral alliance with a generalist PSF, it may or may not experience any net gain from its investment in the relationship. The client can choose to ignore the generalist’s referral and choose another specialist PSF. Or, after assessing the client, the specialist PSF might find that its particular expertise is a poor fit with the client’s needs or available resources. When either of these situations occurs, the resources that the specialist PSF has dedicated to identifying potential generalist PSF alliance partners and cultivating that relationship may have been wasted. Since they are heavily dependent on referrals to generate revenue, specialist PSFs must engage the right generalist PSFs for their portfolios of referral alliances.

The non-exclusivity of referral alliances suggests that competition between specialist PSFs for the best generalist partners plays a role in referral alliances over time. In the next section, we discuss these competitive effects building upon the ecological model of competition (e.g. Hannan and Freeman 1989; McPherson 1983).

**Competition as Niche Overlap between Professional Service Firms**

To understand the various aspects of competition in professional service markets, we turn to the ecological view of competition (e.g. Hannan & Freeman 1989; McPherson 1983). Organizational theorists have adapted a model of the competition between species to understand rivalry between
organizations. In nature, two species compete when they depend on the same limited resources to sustain and increase their respective populations. Just as species rely on the natural environment for food, shelter, water, etc., organizations look to their own environments for the resources necessary to survive and thrive. The resources that an organization needs to sustain itself are known collectively as its resource niche. The level of competition between two organizations depends on the degree of overlap between their resource niches (Hannan & Freeman 1989). A high level of niche overlap and, therefore, a high level of competition between two organizations occurs when they both are seek to gain access to the same resources and the two firms are substitutes in the marketplace. For example, Gimeno (2004) defined niche overlap in the airline industry on the basis of two (or more airlines) offering service between a particular pair of cities. The limited resource consists of the pool of travelers willing and able to travel between these two cities. Since the airlines are substitutes in the minds of customers, there exists a high degree of niche overlap among all carriers serving the same pair of cities. This type of measure captures much of the nature of competition between horizontal rivals. However, by their very nature, vertical strategic alliances require a richer conceptualization of niche overlap since they involve linkages between different types of organizations.

In vertical markets, multiple levels of competition simultaneously influence alliance formation. By definition, vertical markets consist of two different sets of firms which are substitutes for one another within their respective sets of rivals. These two sets of organizations also have a degree of mutual interdependence that requires some degree of interaction. For a concrete example, consider the case of specialized and generalized dentistry practices. Generalist practices handle routine treatments such as cleanings, check-up, fillings, etc. The generalist dentistry practices in a given geographic area compete with one another for patients. A generalist’s patient who has advanced periodontal disease requires a referral to a specialist practice able to provide that type of treatment. If there are multiple specialists in the area, they compete with each other for referrals from generalist PSFs. This competition may result in specialist dental practices forming referral alliances with generalist practices for cases which require a higher level of expertise. In large urban areas, these referral alliances are localized – involving pools of
generalist and specialist PSFs from the same geographic area.

In other circumstances, a specialist PSFs will form referral alliances with generalist PSFs outside their home markets. This addition of a geographic component to the competition among specialist PSFs involves other types of niche overlap in formation of referral alliances. A specialist PSF may be motivated to seek to form referral alliances with generalist PSFs in other geographic areas due to a high level of niche overlap among specialist PSFs within its home market. In evaluating potential referral alliance partners outside its home market, a specialist PSF will have to consider the size of the opportunity represented by the generalist’s home market. In addition, there may be existing referral alliances involving rivals to consider. These specialist PSFs may be from the same market as the generalist PSF or from other geographic areas. Due to the inseparable nature of the professional service engagement, location also plays major role in which markets a specialist PSF will seek a referral alliance with a generalist PSF. Longer distances increases the relative costs to serve clients located far from the specialist PSF’s home market (Wheiler, 1987). In the next section, we expand on these three types of niche overlap to develop our hypotheses regarding the effects of competition on the involvement of specialist PSFs in referral alliances and their allocation of resources to those relationships.

**Study Hypotheses**

As mentioned above, specialist PSFs maintain a portfolio of alliances with generalist PSFs to ensure a steady stream of more complex and remunerative engagements to compensate their staff of rare, valuable and mobile professionals. The main goal of this study is to understand the impact of competition in the involvement of specialist and generalist PSFs in referral alliances and the resources dedicated to these relationships.

**Niche Overlap in Specialist Home Market**

A specialist PSF’s need to form referral alliances with generalist PSFs outside its home market has a parallel in the ecological notion of the “carrying capacity” of a given resource space (Popielarz and Neal 2007: 68-69). A finite supply of resources puts a boundary on the growth of organizations dependent on that resource. The growth and survival of a specialist PSF is influenced by the supply of referral clients
in its home market as well as the presence of rival specialist PSFs. Under high levels of competition for local referrals, a specialist PSF is more motivated to consider forming a referral alliance with a generalist outside its home market.

_Hypothesis 1: A specialist PSF is more likely to be involved in a referral alliance with a generalist PSF when there is a high degree of niche overlap in the specialist PSF’s home market._

**Niche Overlap in Generalist Market**

One major purpose of all strategic alliances is to share resources (Das and Teng 2000; Ireland, et al. 2002). In the case of referral alliances, a specialist PSF seeks to gain access to the clients of a generalist PSF who require services that cannot be provided by the generalist. Clearly, a specialist PSF would be more attracted to an unallied generalist PSF. An existing alliance between a given generalist PSF and a rival specialist might reduce the attractiveness of that partner if the specialist seeks exclusive access to the generalist PSF’s referrals.

However, while exclusivity is desirable for a specialist PSF, having a single referral alliance may be a less attractive option for the generalist PSF. A generalist PSF may seek a referral alliance with another specialist in order to reduce its dependence on a single alliance partner (Deprez 2004). Competing specialist PSFs should be less likely to engage in opportunistic behavior with respect to the generalist PSF.

The competing influences of exclusivity and opportunism avoidance may cancel each other out leading to existing referral alliances having no measurable influence on a specialist PSF’s involvement with a particular generalist PSF. On the other hand, as a particular generalist SPF forms multiple referral alliances with rivals, a specialist PSF wish to become involved with that generalist to avoid being at a competitive disadvantage with respect to accessing referrals from generalist PSF’s clients.

This latter situation leads to our second hypothesis.

_Hypothesis 2: The likelihood that a specialist PSF in involved in a referral alliance with a generalist PSF is related in a U shaped manner to the number of rivals already involved with the same generalist._
Niche Overlap Due to Proximity

The inseparability of professional services suggests that the locations of a specialist PSF, its rivals and potential referral alliance partners (i.e. generalist PSFs) influence the fundamental niche for a specialist PSF as well as its realized niche. Hannan, et al. (2003) define a fundamental niche as “the region of a resource space in which an entity can persist in the absence of competition” (page 309). For a specialist PSF, its fundamental niche includes both its home market and any other geographic areas which contain generalist PSFs who can act as a source of referrals. However, proximity to one’s home market is an important consideration limiting the geographic scope of a specialist PSF’s fundamental niche. Time spent traveling to interact with the generalist PSF’s clients located at a great distance represents resources that could have been spent advancing one’s home market practice or serving generalists in closer locations.

At the same time, the proximity of rivals to generalist PSFs influences the geographic scope of a specialist PSF’s realized niche. The specialist PSF’s realized niche is, “the subset of the fundamental niche in which an entity can sustain itself in the presence of given competitors” (Hannan, et al. 2003: 310). A rival located close to a generalist PSF would incur lower costs to sustain a referral relationship with a nearby generalist PSF. At the same time, a generalist PSF would be very attracted to a referral alliance with a rival specialist PSF located nearby. A specialist PSF located very far from a generalist partner is exposed to the risk that the generalist may form a future referral alliance with a rival located in closer proximity to itself. This is consistent with the trade-off between niche width and strength of appeal (e.g. Hannan, et al. 2003). Therefore, we expect that specialist PSFs are less likely to be involved with generalist PSFs located close to rivals.

Hypothesis 3: The likelihood that a specialist PSF is involved in a referral alliance with a generalist PSF is inversely related to the proximity of rival specialists.

Understanding Resource Commitment in Strategic Alliances

While the subject of our empirical study is PSFs, this paper attempts to contribute to our general knowledge of strategic alliances by modeling how firms allocate resources across multiple alliance
partners. Prescriptive writing on strategic alliances often discusses the importance of assessing the benefits and costs associated with a particular strategic alliance partner (e.g. Johnson, Lewin and Spekman 1999). However, partner selection is but one step in the strategic alliance process. Once it has chooses an alliance partner (or partners), the firm must make a commitment to the relationship. Commitment reduces uncertainty between alliance members and thereby increases both satisfaction with the alliance and desire for continued interactions with partners (Shamdasani and Sheth 1995). Consequently, commitment is seen as a key to strategic alliance success (Gulati, Khanna and Nohria 1994). Current research in this area usually often relies on partner choice decisions made in hypothetical settings (Hitt et al. 2004) or cross-sectional surveys of commitment intentions (Sarkar et al. 2001). While very useful, these methods may have limited external validity.

Measures of alliance commitment should represent actual decisions with important resource implications for the firms involved. Alliances are, “socially contrived mechanisms for collective action, which are continually shaped and restructured by actions and symbolic interpretations of the parties involved,” (Ring and Van de Ven 1994). Therefore, commitments must be made manifest through actions since it is action rather than intent that engenders trust in the partner (Parkhe 1993). However, not all actions imply that the firm will continue with an alliance. Actions involving investments in resources which are non-transferable to another purpose are more likely to signal commitment to the strategic alliance (Heide and John 1988). Therefore, we move beyond the current focus on behavioral intentions or other attitudinal measures of commitment to explicitly measure the “relationship specific” resources committed to the referral alliances by specialist PSFs (Madhok and Tallman 1998: 331).

The Effects of Niche Overlap on Resource Commitments

The level of niche overlap in a specialist PSF’s home market may influence the level of resources available to dedicate to referral alliances with generalists in other geographic markets. The supply of specialist PSFs is highly concentrated in urban areas. For example, lawyers specializing in securities law are likely to find that the preponderance of clients to be courted and engaged are headquartered in the New York City area, the City of London or Tokyo (Foroohar 2006). In general, urban areas provide large
enough referral base to support the specialized technological or human resources often required by specialist PSFs (e.g. Rosenthal, et al. 2005). In addition, urban areas may be more attractive to potential members of a specialist PSF due to better opportunities for dual-career couples and increased access to entertainment and cultural attractions.

However, no matter how attractive a given urban area may be, the supply of highly remunerative engagements is limited. Specialist PSFs in a given geographic area often find themselves competing vigorously strongly over a fixed base of referred clients. Once one’s home market has reached its carrying capacity, the specialist PSF can utilize referral alliances with out-market generalists to provide challenging and lucrative assignments to its staff of professionals and continue to grow the business. This suggests that specialist PSFs whose home markets have high levels of niche overlap among rivals are more likely to have the “slack” necessary to dedicate more resources to referral alliances with generalists outside the home market.

At the same time, generalist PSFs may have more bargaining power with specialist PSFs from over-crowded home markets. This is due to an important asymmetry in the relationship between generalist and specialist PSFs. The success of specialist PSFs depends in large on its ability to attract referrals from generalists, whether these partners are local or in different geographic markets. In contrast, the overall success of generalist PSFs is less dependent on their relationships with specialists since generalists tend to be the first point of contact with clients (Shumsky and Pinker 2003).

We combine the influences of slack resources and generalist bargaining power in our fourth hypothesis.

*Hypothesis 4: The resources a specialist PSF commits a referral alliance with a generalist PSF increases with the level of niche overlap in specialist’s home market.*

When a strategic alliance partner has established relationships with rival firms, it is in a powerful bargaining position. Such organizations “can create advantages for themselves by playing one off against the other and brokering tension between the other players. These advantages can translate into concrete benefits in the form of favorable terms in their exchange relationships,” (Gulati 1998:297). In the setting
of referral alliances between specialist and generalist PSFs, we expect that a generalist PSF may be able to leverage referral alliances with rival specialist PSFs to its benefit. In order to secure a larger proportion of a generalist’s referrals, a specialist PSF may have to allocate more resources to a generalist PSF that enjoys high levels of resources from its rivals. This leads to our fifth hypothesis.

**Hypothesis 5:** The resources a specialist PSF commits a referral alliance with a generalist PSF increases with the level of resources committed by rivals to the same generalist.

The inseparability of the service encounter involving a specialist PSF implies that one of two situations must occur when the client is located in another geographic area. Either the client must travel to the home market of the specialist PSF or the specialist PSF must travel. In either case, the shorter the distance between the client and the specialist PSF, the more attractive any referral alliance would be to the generalist PSF. Closer proximity would allow for more frequent interactions between the specialist and generalist PSFs and more timely access for clients.

Therefore, a specialist PSF might allocate fewer resources to an alliance with a generalist PSF located in close proximity to a rival. There is always a level of uncertainty associated with the payoff of a referral alliance for the specialist PSF. Not all referred clients will choose to engage the specialist PSF nor will referred clients have problems of sufficient complexity to warrant the services of a specialist PSF. But there is no uncertainty about the costs of the resources dedicated to a referral alliance (i.e. screening costs, opportunity costs, etc.). The uncertainty regarding the expected payoff of a referral alliance involving a generalist PSF located close to a rival is greater given the likelihood of a future referral alliance involving a nearby rival. Therefore, the possibility of a future increase in competition for referrals would lead a specialist PSF to allocate fewer resources to generalist PSFs located in close proximity to rivals. This leads to our final hypothesis.

**Hypothesis 6:** The resources a specialist PSF commits a referral alliance with a generalist PSF is inversely related to the proximity of rival specialist PSFs.

**Empirical Study**

**Study Context**

The setting for our empirical study is the market for specialized physician services in a
Midwestern state. Over time, many specialist group practices that are located in urban areas have entered into referral alliances with rural hospitals. Known in the medical field as “visiting consulting clinics” (hereafter VCCs), the actual clinic consists of having specialists travel by car from an urban area to a rural hospital (Tracy, Saltzman, and Wakefield 1996). The specialist provides a limited range of outpatient diagnostic and therapeutic care to patients in the rural hospital and consults with local physicians. In addition to providing on-site care, these specialists expect to influence future referrals of more complex cases (e.g., cardiac bypass surgery) for treatment in an urban hospital with which they are affiliated.

Forming this type of referral alliance provides a number of advantages for all participants. For the urban specialist practice, a VCC assists in retaining and enhancing its referral base (Drew, et al.2006). These referrals improve relations with the urban hospitals where they practice. For the rural hospital, a VCC increases the availability of needed specialty services, reduces the professional isolation for its staff, and heightens its local reputation as a medical care provider (Wakefield, Tracy, and Einhellig 1997). For patients, the primary benefit is access to specialty care in their own community (Hicks, et al. 1997).

Usually, a specialty practice located in an urban area enters into referral alliances with hospitals in more than one rural area. At the same time, a rural hospital can enter into a referral alliance with more than one PSF in the same area of specialty. Like other alliances (Gulati et al. 1994), VCCs reviewed regularly (at least yearly). Unlike equity-based joint ventures common between manufacturers (e.g. Kogut 1988), an agreement governing a VCC may be terminated by either party.

Data

The primary data for our study comes from Visiting Medical Consultant Database maintained by Office of Statewide Clinical Education Programs which is housed in the medical school of a Midwestern state. This office collects data continuously as new VCC alliances are formed. In addition, a telephone census of hospitals in the state ensures that complete data is being captured on a yearly basis. In addition to the location of the VCC, the database includes the name and location of the participating specialist physicians as well as their group practice affiliation and location. Statewide data collection began in 1989.

In this study, we will focus on referral alliances involving cardiology group practices and rural
hospitals. We choose cardiology due to the increasing demand for services in rural areas where the population is rapidly aging and advances in high-technology treatment options including procedures such as cardiac catheterization that require specialized facilities. These specialized facilities are concentrated in a small number of urban areas.

Overall, the number of urban cardiology group practices participating in referral alliances grew from 14 in 1990 to 26 by 2001. These practices are located in 12 different cities within the state. The pool of potential generalist PSFs consists of rural hospitals located 98 towns and small cities outside the major urban areas of the state. These hospitals are generally small with 94% having fewer than 100 beds (1990 data). They have limited medical staffs and less access to medical technology than hospitals in nearby urban centers.

The data we have span the period from 1989 until 2001. While VCCs did exist before 1989, there is no statewide data available before this time. This is a common problem with longitudinal data on strategic alliances (e.g., Gulati 1995; Gimeno 2004). However, since these alliances are reviewed and renewed at least on a yearly basis, the effect of missing initial period data is less severe than for other types of alliances such as those whose formation entails the creation of a new legal entity.

**Variables**

*Dependent variables*. The first dependent variable of interest is the involvement of a cardiology specialty practice in a VCC with a rural hospital in a given year. Due to frequent reviews, the status of these referral alliances can change year to year.

The second variable we study is the level of resources committed to a given referral alliance by the specialist PSF. We measure these in terms of its average number of visits per month to a given rural hospital. These visits reflect significant, non-transferable, non-recoverable investments by the cardiologists in the referral alliance.

*Independent variables*. We describe the independent variables in the same order as they appear in the

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2 Unlike urban areas which often have competing hospitals, the rural towns and small cities in our study have only one hospital. This means that the set of alternative markets to enter and pool of generalist partners has a one-to-one correspondence for the specialist PSF.
hypotheses discussed above.

To measure the *degree of niche overlap in the home market* of the specialist PSF (Hypothesis 1), we determine the number of active cardiologists in the same city (and contiguous cities). These data were supplied by Physicians Information System maintained by Office of Statewide Clinical Education Programs which is housed in the medical school of a Midwestern state. To account for differences in population between home market areas, we standardized this measure using the total county population from the 2000 U.S. Census.

To measure the effect of existing referral alliances with rivals on involvement in VCCs (Hypothesis 2), we measure the *number of rivals*. The value of this variable in a given time period is determined by the number of VCCs involving a given rural hospital and rival cardiologist practices in the immediate prior year. It is zero otherwise. In order to test the shape of the relationship, we include a squared term in the alliance involvement model.

The third hypothesis considers the impact of the location of rival specialist PSFs on alliance involvement. The associated independent variable – *distance to nearest rival* – is defined as the distance between the rural hospital and the closest rival cardiology practice. This distance may be more or less than the distance between a given cardiology specialty practice and a specific rural hospital.

In the resource commitment model, the same measure - *degree of niche overlap in the home market* - is used to test Hypothesis 4.

To test Hypothesis 5, we created a measure of *commitment by rivals* which is determined for each pairing of cardiology practice and rural hospital separately. For a given year, it is the total number of days in the past year that a VCC was held in an average month at a given location by rival specialists.

The test of Hypothesis 6 uses the same variable - *distance to nearest rival* - described above.

**Control variables.** Our control variables fall into two categories. The first set reflects the asymmetric attractiveness of various generalist PSFs as referral alliance partners. The second set consists of controls appropriate for cross-sectional, longitudinal data. The former control variables represent an important expansion of the type of information available about prospective strategic alliance partners. For all of the
importance that authors place on choosing the right alliance partners (e.g. Hitt, et al. 1995), there are relatively few empirical studies on this subject. Existing studies focus on how status (Podolny 1993), past interactions (Gulati 1995) and interactions with rivals (Gimeno 2004) affect partner choice. Our study explicitly measures variations in attractiveness across potential partners in the generalist PSF population.

From the point of view of specialist PSFs, the goal of a referral alliance is to generate referrals of more advanced cases leading to more challenging and remunerative engagements. Therefore, specialist PSFs are more likely to form alliances with a generalist PSF partner that provides a greater level of benefits and requires a lower level of costs, all else being equal. The benefits from an alliance with a generalist PSF are driven primarily by the size of the generalist PSF’s client base. In this Midwestern state, most patients treated in the rural hospitals are from the same county in which the hospital is located. Therefore, we used the number of acute care beds of the rural hospital as a measure of the size of client base (Drew, et al. 2006). The higher the number of acute care beds that a local market can support, the more referrals may be available for the visiting cardiology specialists.

A specialist PSF may have alliances with multiple generalist PSFs outside its home market as well as clients to serve in its home markets. The value and mobility of the workforce associated with a specialist PSF suggests that an alliance with a generalist PSF that requires a great deal of time and attention is less desirable. This is due to the uncertain nature of the pay off of the referral alliance as discussed above.

Specialty medical care is an inseparable service, one that requires the physical presence of the provider (Erramilli and Rao 1993). Therefore, the cost to serve a given VCC alliance are proportionate to the distance between the home market of cardiology specialty practice and the rural hospital. This mileage represents the opportunity costs of the time spent by physicians traveling to and from the rural hospitals. This same time could be been used to serve patients in the home market or dedicated to another referral alliance partner.

In this Midwestern state, there is a well-developed road system and an absence of significant geographic impediments, such as rivers and mountains (Wakefield et al. 1997). These conditions ensure
relatively straightforward travel between urban centers and rural hospitals. Therefore, we use the Euclidean distance (in miles) between the centroid of the area in which an urban specialty practice is located and the location of the rural hospital. In other settings involving travel within large urban areas, estimates of drive times should be used.

To control for serial correlation and heteroskedasticity, we included lagged dependent variables in the models and we estimated the standard errors of all parameters using the Newey-West correction (Newey and West 1987). To account for time varying effects, we also included a set of yearly dummy variables using 1990 as the baseline year (see e.g., Gimeno 2004). Finally, there were cardiologists practicing in a small number of rural markets (4 out of 98). We include a dummy variable to indicate the presence of a resident cardiologist in the same city as a rural hospital. This measure controls for the availability of level of cardiology specialty services in the generalist home market.

In Tables 1 and 2, we present the variable descriptions and sample statistics.

Tables 1 and 2 about here.

Model Estimation

Referral Alliance Involvement. The unit of analysis is dyad of a particular cardiology practice and a rural hospital. To test our hypotheses, we estimate the impact of the measures of competition and control variables (see Table 1) using a logit model (Maddala 1983). Due to the lagged nature of some explanatory variables, we restricted our analysis to VCCs present in the years 1990 to 2001.

Our data includes specialist PSF located in 12 different cities and 98 rural hospitals scattered throughout the state. However, it seems very unlikely that cardiology practices would seek for form referral alliances with rural hospitals located far away from its home market given the opportunity costs of time lost to travel and the lack of timely availability (Wheiler 1987). This reluctance to form alliances with distant rural hospitals is confirmed by an observational study of VCCs by Wakefield, et al. (1997) that found the average round-trip for a specialist physician is about 2 hours. Moreover, a survey of specialist physicians involved in VCCs by Drew, et al. (2006) found that only a small proportion (about
11%) were willing to travel more than one hour to a rural site.

In our data, there were no referral alliances between cardiology practices and rural hospitals located more than 100 miles apart. Therefore, we defined a cardiology practice’s fundamental niche as consisting of all rural hospitals within a 100 mile radius of its home market. Restricting the estimation sample to this smaller set of alternatives significantly increases the efficiency of the parameter estimates (e.g., Horowitz and Louviere 1995).

Resource Commitment. The unit of analysis for this model is the individual referral alliance involving a particular dyad of a cardiology practice and a rural hospital. Due to the lagged nature of some explanatory variables, we restricted our analysis to VCC alliances in existence between the years 1990 to 2001. As in the alliance involvement model, we restricted our observations to all rural hospitals within a 100 mile radius of a given cardiology practice.

There are more than 10,000 dyadic observations in our sample. Most are zero since we only observe a positive number of visits to a rural hospital when a VCC alliance is in place, i.e. these data are censored. Therefore, we estimated a regression model with selection (Heckman 1979). This approach incorporates a selection model to account for the differences between zero (no VCC alliance in place) and non-zero observations. The selection model is estimated simultaneously with a regression model whose dependent variable is the level of resources dedicated to a particular VCC alliance in a given year. This simultaneous estimation approach correct the problems associated with the censored data. The resulting coefficient estimates from the regression model are used to test our hypotheses.

Results

The correlation matrices for the two models are presented in Table 3. The parameter estimates for the referral alliance involvement model are presented in Table 4.

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Tables 3 & 4 about here
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Referral Alliance Involvement Model

The Wald chi-square test indicates that the fitted model achieved statistically significant
improvement over the null model ($\chi^2=1746$ d.f.=19, p<0.001).

The effect of niche overlap in the home market on the likelihood of a cardiology practice being involved in a referral alliance with a rural hospital is positive and significant (p < 0.02, one-tailed test). This result suggests that a high level of niche overlap in a specialist PSF’s home market significantly influences their involvement in referral alliances with generalist PSFs located in nearby rural markets.

The linear and squared terms of the number of competitors have opposite signs and are significantly different from zero (p < 0.001, one-tailed test). This result suggests there is a U-shaped relationship between the number of existing VCC relationships that a rural hospital has with rivals and the likelihood that a given specialist PSF will form another referral alliance. The size of the coefficients suggests that specialists are more likely to be involved in a referral alliance with a generalist PSF that does not already have an existing referral alliance with a rival than a generalist with such one such pre-existing relationship. At two existing VCC relationships, the likelihood of another alliance being formed is at its minimum point and rises slightly thereafter. These results provide support for Hypothesis 2.

The distance to nearest rival variable is positive and significantly greater than zero (p < 0.001, one-tailed test). This result indicates that a specialist PSF is less likely to be involved in a referral alliance with a generalist located in close proximity to a rival specialist. This result supports Hypothesis 3.

**Resource Commitment**

The parameter estimates for the resource commitment model are presented in Table 5.

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**Table 5 about here**

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The overall F-test indicates that the fitted system (regression model and selection model) represent statistically significant improvements over the null model (F=16.63, d.f.=19, p<0.001).

The effect of niche overlap in the home market of the cardiology practice has a significant positive effect on the level of resources committed to the referral alliance (p < 0.00 for a one-tailed test). This means that high levels of niche overlap in a specialist PSF’s home market provide additional resources to allocate to referral alliances with generalists located in other geographic areas. Therefore, we
find support for Hypothesis 4.

The variable commitment by rivals has a significant positive effect on the resources committed to a referral alliance by a specialist PSF (p < 0.000, one-tailed test). Thus, it appears that specialists allocate more resources to alliances involving generalists linked to rivals. A comparison of the 46 rural hospitals in 2001 with multiple VCC alliances shows that they attract a higher overall number of visits (per month) from urban specialists (6.40) compared to those 50 hospitals with, so far, exclusive strategic alliances (2.88, t value = 5.40, p < 0.01). Therefore, we find support for Hypothesis 5.

The effect of distance to nearest rival on resource commitment is positive and marginally significant (p < 0.054, one-tailed test). This finding suggests that close proximity to a rival reduces the resources a specialist PSF dedicates to a referral alliances with the generalist PSF. In the context inseparable professional services, this result makes a great deal of sense. The resources of time committed to a relationship with a generalist represent opportunity costs that cannot be recovered if the referral alliance fails to bring about the hoped-for engagements. Therefore, specialist PSFs invest comparatively less in a referral alliance with a generalist that is likely to be involved (due to proximity) with a rival. Therefore, we find support for Hypothesis 6.

**Results for control variables**

The coefficient for size of client base is not significant in the alliance involvement model (p < 0.178, one-tailed test) but it is significantly greater than zero in the resource commitment model (p < 0.001, one-tailed test). The former results may be due to the relatively high level of involvement of the rural hospitals at the beginning of our data. Fifty percent of these rural hospitals were involved in at least one VCC in 1990, a proportion which rose to 87% by 2001. It may be that the impact of the size of the client base more pronounced at lower levels of referral alliance penetration among the pool of generalist PSFs. The latter result indicate that specialist PSFs dedicate more resources to generalist PSFs with larger client bases. The cost to serve measure has a significant negative impact on alliance involvement (p < 0.001, one-tailed test) and the level of resource commitment (p < 0.001, one-tailed test). Together, these results advance our understanding of how firms with a portfolio of strategic alliances allocate scarce
resources across partners with varying levels of costs and potential benefits.

**Discussion and Conclusions**

This study examines the impact of competition on referral alliances between specialist and generalist PSFs. We find that the niche overlap between specialist PSFs in their home market or in the generalist PSF’s market affect their involvement in and resources dedicated to referral alliances. While specialist PSFs are less likely to be involved with a generalist PSF linked to a rival, they allocate more resources to such a relationships. In addition, the proximity of rivals affects a specialist PSFs realized niche. Specialist PSFs are specialists are less likely to be involved in referral alliances with generalists in close proximity to rivals and, when such a relationship exists, the specialist PSF dedicates comparably fewer resources to it.

This study focuses on referral alliances between rural hospitals and cardiology practices in a single Midwestern state. Patient privacy regulations prevent our being able to determine the overall success of these referral alliances for the specialist PSF. In addition, the nature of referral relationships in medicine have legal and ethics limitations regarding such issues as payment for referrals, demonstrated need for care, etc. that might not hold in other fields where referral alliances are widespread, e.g., law, insurance, investment banking, consulting, etc.

While our study is set in the context of vertical alliances between PSFs, our results provide some insight into important yet understudied aspects of strategic alliances in general. Many firms have multiple strategic alliances. Each of these relationships requires resources whether these are denominated in terms of money, time or attention. Our results show that the same factors – competition, expected benefits and costs – which may influence alliance involvement also significantly affect the resources allocated to these alliances. These findings represent an important firm step in understanding how firms with multiple alliances allocate the resources needed to support multiple strategic alliances. This is a key area for future research given the role of effective resource allocation in the successful management of strategic alliances (Ireland et al., 2002).

Our study focuses on the influence of competition on vertical alliances between specialist and
generalist PSFs. Prior research on horizontal alliances by Gimeno (2004) suggests that firms react to the alliance formation behavior of rivals in one of two ways. If a rival and its partners have made substantial investments in the relationship (i.e. high level of cospecialization), a firm is more likely to form a parallel alliance with other partners. If the rival and its partners have a less involved relationship (i.e. low level of co-specialization), the firm may seek to “break into” the existing alliance structure. In our study, specialist PSFs do not have the opportunity to form parallel alliances to access the same pool of referral engagements. It is a characteristic of our setting that there is only one generalist partner in each of the separate geographic markets. This implies that specialists have one of two choices when faced with the existence of a referral relationship between a rival and a generalist PSF: avoidance or intensification.

We find that both behaviors are present, depending on the circumstances. In general, the existence of a referral alliance between generalist and a rival greatly reduces the likelihood that an additional referral alliance will be formed. However, if referral alliance is undertaken under these conditions, the specialist PSF allocates more resources to that alliance. These finding suggest that the effect of competition on alliance formation is strongly influenced by the opportunities available to firms to link up with the partners of rivals. In situations such as ours, the lack of a suitable set of substitutable generalists reduces the strategic options available to specialist PSFs since a truly “parallel” alliance does not exist. An interesting area for future research would be to examine situations in which there are sets of multiple substitutable generalists from which rival specialist could choose to form alliances.

The results with respect to the effect of proximity to rivals raise some interesting questions. Perhaps, we observe this outcome is due to professional norms within the community of specialty PSFs. Being involved with a referral alliance with a rural hospital located very close to a competitor may be considered too aggressive. Such an “ungentlemanly” action might result in an unseemly reputation among members of the profession. On the other hand, perhaps the specialist fears retaliatory actions by a specialist PSF located very close to one’s referral alliance partner. An interesting direction for future research would be to disentangle these two alternative explanations.

In conclusion, this paper seeks to advance our understanding of alliances among PSFs by
focusing on vertical, bi-lateral referral alliance between specialist and generalist providers. Due to the high level of inseparability of the professional service engagement, the nature of competition for attractive generalist referral partners is multi-faceted. We argue that the relevant aspects of competition include niche overlap in a specialist PSF’s home market, the level of niche overall in the generalist PSF’s market, and its relative location vis-à-vis generalist partners and rivals. Our longitudinal study shows that all of these factors significantly influence which referral alliances are formed. Moreover, this study extends our general understanding of strategic alliances by demonstrating how partner attractiveness and the actions of rivals affect the resource allocation decisions of specialist PSFs managing multiple strategic alliances over time.
### Variable Descriptions in Referral Alliance Involvement Model (N = 10,155)

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Definition</th>
<th>Operationalization</th>
</tr>
</thead>
</table>
| **Alliance Involvement Model** | **VCC Involvement**<sub>ppq</sub> | Referral alliance between specialist p and generalist q at time t. 
= 0 otherwise | | |
| **Independent Variable** | **Competition** | Intensity of competition in specialist p’s home market | Number of cardiologists per 1000 population in the specialist p’s home county at time t | 0.1245 (0.0811) |
| | **Niche Overlap in Home Market** | Number of referral alliances between rivals and generalist q | Sum of VCC alliances between rivals and rural hospital q in year t-1 | 1.0138 (0.8516) |
| | **Number of Rivals** | Proximity of generalist q to the closest rival | Euclidian distance between rural hospital q and city centroid of rival in closest city that is not the cardiology practice p’s origin. | 27.2 (11.81) |
| | **Proximity to Rival** | Client base of generalist q | Number of acute care beds in rural hospital q at time t | 43.53 (25.69) |
| | **Cost to serve** | Costs for specialist p to serve clients of generalist q | Euclidian distance between city centroid of cardiology practice p and address of a rural hospital q. | 65.5 (22.0) |
| | **Local Competitor** | Cardiologist in the community of hospital j in time t | =1 if the community of hospital j has resident cardiologist in time t. =0 otherwise | 0.0167 (0.1279) |
Table 2
Variable Descriptions in Resource Commitment Model (N = 1089)

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Definition</th>
<th>Operationalization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resource Commitment Model</td>
<td>$Resources_{pqt}$</td>
<td>Level of commitment from specialist $p$ to generalist $q$ at time $t$</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Sample Mean (Std. Dev.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competition</td>
<td></td>
</tr>
<tr>
<td>Niche Overlap in Home Market</td>
<td>Intensity of competition in specialist p’s home market</td>
</tr>
<tr>
<td>Commitment by Rivals</td>
<td>Total number of monthly visits by from rivals to rural hospital $q$ in year $t-1$.</td>
</tr>
<tr>
<td>Proximity to Rival</td>
<td>Proximity of generalist $q$ to the closest rival</td>
</tr>
<tr>
<td>Control variables</td>
<td></td>
</tr>
<tr>
<td>Client Base</td>
<td>Client base of generalist $q$</td>
</tr>
<tr>
<td>Cost to serve</td>
<td>Costs for specialist $p$ to serve clients of generalist $q$</td>
</tr>
<tr>
<td>Local Competitor</td>
<td>Cardiologist in the community of hospital $j$ in time $t$</td>
</tr>
</tbody>
</table>
### Table 3-A

**Correlation Matrix for the Referral Alliance Involvement Model (N = 10,155)**

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. VCC Involvement</td>
<td>1</td>
<td>0.032</td>
<td>-0.156</td>
<td>0.002</td>
<td>-0.037</td>
<td>-0.295</td>
<td>-0.018</td>
</tr>
<tr>
<td>2. Niche overlap in home market</td>
<td>1</td>
<td>0.003</td>
<td>-0.061</td>
<td>0.078</td>
<td>0.007</td>
<td>0.081</td>
<td></td>
</tr>
<tr>
<td>3. Number of rivals</td>
<td>1</td>
<td>0.003</td>
<td>-0.079</td>
<td>-0.043</td>
<td></td>
<td>-0.018</td>
<td></td>
</tr>
<tr>
<td>4. Distance to nearest rival</td>
<td>1</td>
<td>0.078</td>
<td>-0.001</td>
<td>0.183</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Client base</td>
<td>1</td>
<td>-0.014</td>
<td>0.558</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Costs to serve</td>
<td>1</td>
<td>0.011</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Local competitor</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table 3-B

**Correlation Matrix for the Resource Commitment Model (N = 1089)**

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Resources</td>
<td>1</td>
<td>0.347</td>
<td>0.373</td>
<td>-0.077</td>
<td>0.136</td>
<td>-0.120</td>
<td>0.009</td>
</tr>
<tr>
<td>2. Niche overlap in home market</td>
<td>1</td>
<td>-0.125</td>
<td>-0.110</td>
<td>0.244</td>
<td>0.136</td>
<td>0.237</td>
<td></td>
</tr>
<tr>
<td>3. Commitment by rivals</td>
<td>1</td>
<td>-0.125</td>
<td>0.294</td>
<td>0.012</td>
<td>0.0236</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Distance to nearest rival</td>
<td>1</td>
<td>-0.134</td>
<td>.0210</td>
<td>0.6253</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Client base</td>
<td>1</td>
<td>0.0956</td>
<td>0.0569</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Costs to serve</td>
<td>1</td>
<td>0.0570</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>7. Local competitor</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 4
Estimation Results for Referral Alliance Involvement Model (N = 10,155)

<table>
<thead>
<tr>
<th>Referral Alliance Involvement&lt;sub&gt;pqt&lt;/sub&gt;</th>
<th>Variable</th>
<th>Coefficient</th>
<th>p value (one-tail)</th>
<th>Expected Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competition</td>
<td>Niche Overlap in Home Market</td>
<td>1.61</td>
<td>0.012</td>
<td>Positive (Hypothesis 1)</td>
</tr>
<tr>
<td></td>
<td>Number of Rivals</td>
<td>-0.66</td>
<td>0.000</td>
<td>Negative (Hypothesis 2)</td>
</tr>
<tr>
<td></td>
<td>Number of Rivals&lt;sup&gt;2&lt;/sup&gt;</td>
<td>0.17</td>
<td>0.000</td>
<td>Positive (Hypothesis 2)</td>
</tr>
<tr>
<td></td>
<td>Distance to nearest rival</td>
<td>0.009</td>
<td>0.025</td>
<td>Positive (Hypothesis 3)</td>
</tr>
<tr>
<td>Control Variables</td>
<td>Client base</td>
<td>-0.002</td>
<td>0.178</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Costs to serve</td>
<td>-0.04</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>VCC Involvement&lt;sub&gt;t-1&lt;/sub&gt;</td>
<td>5.59</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Local Competitor</td>
<td>-0.28</td>
<td>0.266</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Year 1991</td>
<td>-0.31</td>
<td>0.189</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Year 1992</td>
<td>-1.03</td>
<td>0.015</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Year 1993</td>
<td>0.47</td>
<td>0.051</td>
<td></td>
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<tr>
<td></td>
<td>Year 1994</td>
<td>-0.04</td>
<td>0.458</td>
<td></td>
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<tr>
<td></td>
<td>Year 1995</td>
<td>0.06</td>
<td>0.430</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Year 1996</td>
<td>-0.02</td>
<td>0.467</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Year 1997</td>
<td>0.02</td>
<td>0.476</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Year 1998</td>
<td>0.16</td>
<td>0.311</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Year 1999</td>
<td>0.19</td>
<td>0.278</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Year 2000</td>
<td>-0.12</td>
<td>0.357</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Year 2001</td>
<td>-0.17</td>
<td>0.292</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Constant</td>
<td>-1.49</td>
<td>0.000</td>
<td></td>
</tr>
</tbody>
</table>

Overall Model Fit  \( \chi^2 \)  1746.10  0.00 (19 d.f.)
### Table 5

**Estimation Results for Resource Commitment Model (N=1089)**

<table>
<thead>
<tr>
<th>Resources&lt;sub&gt;pqt&lt;/sub&gt;</th>
<th>Variable</th>
<th>Coefficient</th>
<th>p value</th>
<th>Expected Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competition</td>
<td><em>Niche Overlap in Home Market</em></td>
<td>2.46</td>
<td>0.000</td>
<td>Positive (Hypothesis 4)</td>
</tr>
<tr>
<td></td>
<td><em>Commitment by Rivals</em></td>
<td>0.08</td>
<td>0.000</td>
<td>Negative (Hypothesis 5)</td>
</tr>
<tr>
<td></td>
<td><em>Distance to nearest rival</em></td>
<td>0.004</td>
<td>0.054</td>
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<td>-0.01</td>
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*This table contains the results of resource commitment model after controlling the choice through the inverse Mill’s ratio. The results of the simultaneously estimated selection model are omitted due to space constraints and are available from the authors.*
REFERENCES


Foroohar R. 2006. Goodbye, Manhattan; London has turned hot for international banking. *Newsweek.* 147(12) 44.


