9

THE EFFECTS OF DOMAIN OVERLAP AND NON-OVERLAP ON ORGANIZATIONAL PERFORMANCE, GROWTH, AND SURVIVAL

Heather A. Haveman and Lisa A. Keister

OVER THE past twenty years research in organizational theory has increasingly acknowledged that organizations are not independent entities that rely exclusively on their own strategic advantages and competencies. Rather, researchers have come to realize, firms are dependent, like other social actors, on others in their environments, most often other organizations. Studies in four well-established research traditions—organizational ecology, the new institutionalism, social-network analysis, and resource dependence—have demonstrated the value of analyzing both the determinants and outcomes of interfirm interdependence. This research has shown that interorganizational relations can be either competitive or mutualistic. *Competitive* relations arise between organizations that draw on the same scarce resources. Each organization in a competitive system reduces the vitality of others in the system. *Mutualistic* relations arise between organizations that depend on each other for maintenance and survival. Mutualistic relations generally arise between organizations that draw on dissimilar sets of resources, but they sometimes also emerge where the firms draw on the same sets of resources. In either case, each organization in a mutualistic system improves the vitality of some or all of the organizations in the system.

One of the most fruitful efforts to understand the sources of competition and mutualism among organizations has been launched by organizational ecologists. Ecological studies of competition and mutualism build on the general proposition that organizational domains—the claims organizations stake out for themselves in terms of the clients they serve, the goods and services they produce, and the production, administrative, and distribution technologies they employ (Levine and White 1961; Thompson 1967)—

determine both organizations' resource requirements and demand for their products, and thus determine opportunities for interactions (Hawley 1950, 31–36; 1968, 10–44).[1] Similarities and differences among the domains of organizations within a population shape competitive and mutualistic interactions, respectively.

Miller McPherson and his colleagues (McPherson 1983; McPherson and Ranger-Moore 1991; McPherson, Popielarz, and Drobnic 1992; McPherson and Rotolo 1996) have examined voluntary associations and defined organizational niches on the basis of association members' characteristics—specifically, education, age, occupation, and sex. William Barnett and Glenn Carroll (1987) have defined the domains of telephone companies on the basis of technology (common-battery versus magneto) and legal form (mutual versus commercial company). Joel Baum and Jitendra Singh (1994a, 1994b) have defined the niches inhabited by day care centers according to the age ranges of the children served. Regardless of how organizational domains or niches are defined empirically, organizations whose domains overlap compete over common pools of scarce resources and limited client demand. The greater the overlap between two organizations' domains—and therefore the greater the overlap between the resources used and the clientele targeted by those organizations—the stronger the competition between those organizations. In contrast, organizations inhabiting completely different domains do not compete at all because they do not depend on the same resources or clientele; such organizations may benefit each other through mutualistic interactions that derive from either symbiosis or commensalism.

In this chapter, we build on Hawley (1950, 1968) and extend McPherson (1983) and Barnett and Carroll (1987) to propose that competition between organizations emerges from overlaps between organizations' domains and therefore overlaps between resources used and clientele targeted. In contrast, mutualism between organizations generally stems from *non-overlaps* between organizational domains: organizations inhabiting completely different domains often benefit each other through symbiotic interactions. Further, mutualism between organizations occasionally stems from shared interests rooted in partial domain overlaps: organizations inhabiting similar (not identical) domains often benefit each other through commensalistic interactions. We develop and test a model that involves both competition arising from domain overlap and mutualism arising from a combination of domain overlap and non-overlap.

We extend previous research on domain overlap in four ways. First, we develop a more elaborate theory of noncompetitive interactions. Second, we develop refined measures of domain overlap and non-overlap by weighting an organization's activities by the magnitude of its participation in each sector of its domain—each group of clients served and type of goods or services produced. Third, we investigate whether the effects of domain overlap and

non-overlap are size-localized—that is, stronger among firms of similar size (compare Hannan and Ranger-Moore 1990; Hannan, Ranger-Moore, and Banaszak-Holl 1990; Baum and Mezias 1992). Fourth, we follow McPherson and his colleagues (McPherson and Ranger-Moore 1991; McPherson and Rotolo 1996) and extend the range outcomes studied using the domain-overlap model from the long-term consequences of competitive interaction (organizational founding and failure) to more immediate outcomes (growth and economic performance).

This chapter's focus on the impact of competition and mutualism among organizations with varying domains and therefore varying (sub)forms necessarily—given the limitations on our data and the publisher's expectations concerning reasonable chapter length—begs three questions that are answered in other chapters of this volume. First, we beg the question of how competitive and mutualistic interactions stemming from domain overlap and non-overlap affect both interorganizational relations and the nature and location of organizational domains. The chapter by Richard Scott, which deftly summarizes an important co-authored book (Scott et al. 2000), describes the consequences of interactions among health care organizations for several types of interorganizational relations and for domains claimed by various health care populations. The growth of multihospital systems from the mid-1960s to late 1970s forged strong links between hospitals. Hospital domains shrank to a core set of services under an emerging logic of managerial control in the 1980s and 1990s; consequently, new kinds of health care organizations sprang up to serve several delimited peripheral areas. We see, therefore, that commensalistic mutualism among hospitals within a system was augmented by new symbiotic mutualistic relations between them, on the one hand, and supporting players, such as physician groups and end-stage renal disease centers, on the other. Second, we evade the question of whether and to what extent the organizations we study actively cooperate to limit the competitive effects of domain overlap. Bai Gao's chapter on the rise of trade associations and cartels in prewar Japan picks up where the lack of data forces us to leave off. He shows that state policies concerning property rights catalyzed the rise of an "associational order" in which cartels and trade associations could dominate and dictate limits to competition and mutualism. Gao's chapter highlights the third question that is not addressed in our study, namely, the role of the state in determining the forms and economic consequences of interorganizational relations. The chapter by Charles Perrow, which offers a skillful digest of his recent book (Perrow 2002), is similarly concerned with this issue. In contrast to Gao's study of the Japanese government's promotion of associationalism, Perrow demonstrates how the American state's concern for minimizing government had the unanticipated consequence of benefiting huge firms most. The issue of power, which we touch on only lightly, looms large in Gao's chapter, and even larger in Perrow's.

Forms of Competition and Mutualism

Relations between organizations, like relations between organisms and individuals, can be defined along two dimensions, one ranging from commensalism to symbiosis and the other ranging from pure competition through predation and parasitism to full mutualism (Hawley 1950, 36–41; 1968, 30–38; Aldrich 1999, 301–10).[2] Commensalism ("eating from the same table") involves relations between similar organizations; symbiosis involves relations between dissimilar organizations. In relations characterized by pure competition, both parties lose; in relations characterized by predation and parasitism, actors experience different outcomes, and individual actors may lose but aggregates of actors (populations) may gain. In mutualistic relations, similar benefits accrue to both actors. Figure 9.1 summarizes the variety of relations between organizations that result from considering the interplay between these two dimensions.

Pure competition describes head-to-head turf battles between pairs of organizations (Lucent and Northern Telecom in electronic networks, for example, or Coke and Pepsi in soft drinks). It also describes widespread and indirect scrambling for scarce resources among large coteries of firms (dozens of PC manufacturers worldwide jousting for market share or myriad small retail outlets in a city vying to sell food and sundries). In contrast, *commensalistic mutualism* often takes the form of industry associations (such as the National Association of Manufacturers and the American Banking Association) lobbying for expanded resources or more favorable legal regimes or collections of similar firms indirectly benefiting their members through mere existence and size (for example, the benefits from the taken-for-grantedness that accompanies increases in the number of organizations in an emerging industry such as biotechnology or cellular telephone service).

Asymmetric symbiotic relations, which are partly competitive and partly mutualistic, involve either *predation* (for example, relations between large corporations with deep pockets and law firms that specialize in class-action suits, or relations between highly diversified firms and leveraged-buyout specialists that seek to dismantle conglomerates) or *parasitism* (for example, relations between large corporations and management consultants pushing the latest "best practice," or relations between advertisers and Internet website creators). In such relations, one population typically loses while the other gains, although both can lose. In contrast, *symbiotic mutualism* includes relations in which both populations gain: direct relations between suppliers and their customer organizations (between business schools and consulting firms, for example, or between semiconductor integrated circuit manufacturers and the producers of many consumer and industrial goods), as well as community-building efforts between organizations that are functionally dissimilar (such as members of a chamber of commerce promoting municipal development interests). Symbiotic mutualism can

FIGURE 9.1 *Forms of Relations Between Organizations*

	Commensalism (Relations Between Similar Organizations)	**Symbiosis** (Relations Between Dissimilar Organizations)
One or both parties lose	**Pure Competition** • *Head-to-head battles* between pairs of organizations or among small groups of organizations (direct competition) • *General resource squeezing* by groups of organizations whose resource demands are large relative to the environmental carrying capacity (diffuse competition)	**Asymmmetric Symbiotic Relations** • *Predation:* one organization or one group of organizations feeding off another (direct or diffuse relationship)—the prey provides sustenance to the eater • *Parasitism:* one organization benefiting from another (direct relationship)—the host provides resources (may be nonlethal to the host), shelter, or distribution for the parasite; the parasite provides some service for the host
Both parties win	**Commensalistic Mutualism** • *Coalition formation or sociopolitical legitimation* derived from joint activity by groups of similar organizations (direct mutualism) • *Cognitive legitimation* derived from sheer numbers of organizations (diffuse mutualism)	**Symbiotic Mutualism** • *Customer and supplier relations* (direct mutualism) • *Coalition formation or sociopolitical legitimation* derived from joint activity by differentiated communities of organizations (direct mutualism) • *Visibility and legitimacy* accorded differentiated communities of organizations (direct mutualism)

Source: Authors' compilation.

involve tangible or material links, such as the physical infrastructure that connects the distribution networks of local producers seeking to reach wider markets (for example, local telephone companies interconnecting to offer longer-distance service) or to smooth out local imbalances in supply and demand (for example, networks of regional electric-power producers cooperating to balance supply and demand across Canada and the United States). Finally, a diffuse form of symbiotic mutualism occurs when visibility and legitimacy are accorded to clusters of differentiated firms (such as stores located in antique, art, or other specialized shopping districts in cities, or high-technology firms located in industrial parks or particular regions of the country).[3]

In the sections that follow, we explain how overlaps and non-overlaps in organizational domains create a system of competitive and mutualistic relations between organizations.

Domain Overlap and Competition

Scholars have long proposed that competitive interactions are strongest among organizations that rely on similar sets of scarce resources: the more similar the resource requirements, the greater the potential for competition (Hannan and Freeman 1977, 1989). Resource requirements, in turn, are a function of organizational domain, of activity in various product and client markets (see, for example, Meyer 1975; Haveman 1992), or of technological fields (see, for example, Podolny, Stuart, and Hannan 1996; Wade 1996). Holding constant the overall availability of resources and the level of customer demand, the competitive pressure felt by any organization is a function of how many, and to what extent, other organizations depend on the same resources.

Network analyses of organizations resonate with ecological thought. Perhaps the most famous is Harrison White's (1981, 2002) argument that markets (which can be interpreted, rather loosely, as equivalent to ecological niches) are socially constructed: firms observe what rivals do and react by avoiding competition through differentiation. Our analysis cannot be said to fall precisely within this line of work, but it is related. We do not investigate the social construction of markets—for example, organizations' moves into and out of product or client markets as a response to domain overlap. But we do study other important consequences of domain overlap. We also do not study the direct interorganizational ties that are common in network studies using White's ideas. But we do study role-equivalent (rather than structurally equivalent) ties among organizations whose domains overlap. Joint involvement in product or client markets creates a network of *indirect* ties between organizations. Domain overlap links organizations to each other through relations with clients in various niches; organizations with overlapping domains are involved in similar types of exchange relations, but not necessarily with the exact same partners (Winship and Mandel 1983; Winship 1988).

Several streams of research have extended the basic density-dependence model of organizational ecology (Hannan and Freeman 1987, 1988; Hannan and Carroll 1992) to investigate the relationship between the extent of domain overlap and competition. The three reviewed here focus on similarities between organizations based on size, geographic location, and strategic group membership.

Size Michael Hannan and John Freeman (1977, 945–46) have proposed that although organizations of different sizes may produce similar goods and services, they depend on different mixes of material, financial, informational, and human resources. This logic implies that organizations compete most intensively with other organizations of similar size and that the level of competition declines with the distance between firms on a size gradient. Studies of several organizational populations—Manhattan banks and life insurance com-

panies (Hannan, Ranger-Moore, and Banaszak-Holl 1990), Manhattan hotels (Baum and Mezias 1992), U.S. health maintenance organizations (Wholey, Christianson, and Sanchez 1992), U.S. credit unions (Amburgey, Dacin, and Kelly 1994), New York life insurance companies (Ranger-Moore, Breckenridge, and Jones 1995), and Japanese banks (Han 1998)—support the size-localized competition hypothesis.

Geography Researchers in organizational ecology have modified the density-dependence model to consider density in geographically bounded subpopulations: William Barnett and Glenn Carroll (1987) have studied local and nonlocal subpopulation density in telephone companies, and Anand Swaminathan and Gabriele Wiedenmayer (1991) and Glenn Carroll and James Wade (1991) have investigated density-dependence among breweries at the regional, state, and city levels. Two related studies show that density-dependent competition operates more locally than does density-dependent legitimation. Michael Hannan and his colleagues (1995) have contrasted the effects of within-nation density (which captures legitimation) and between-nation density (which captures competition) on foundings of automobile manufacturers in Continental Europe, while Lyda Bigelow and her colleagues (1997) have contrasted the impacts of national density (which captures legitimation) and regional density (which captures competition) on foundings of U.S. automobile manufacturers. Other scholars have studied the effects of geographic proximity—overlapping geographic domains—on firms' competitive interactions (Baum and Mezias 1992; Baum and Haveman 1997; Haveman and Nonnemaker 2000). Taken together, these studies show that competitive pressures within organizational populations are often segmented geographically.

Strategic Groups Research on strategic groups assumes that meaningful subgroups of organizations can be identified in terms of organizational strategies (McGee and Thomas 1986) and that the strength of the competitive pressures impinging on any organization depends on the location of its rivals in competitive space. Warren Boeker (1991) and Glenn Carroll and Anand Swaminathan (1992) have shown that members of two relatively new strategic groups in the U.S. brewing industry—brewpubs and microbreweries—respond to very different competitive pressures than do traditional mass producers. Similarly, William Barnett (1993) has found that competition is localized within strategic groups in the U.S. telephone industry. And Carroll and Swaminathan (2000) have demonstrated that in the U.S. brewing industry, strategic group membership (organizational form identity) is reinforced by cultural forces; because the cultural identities that accompany strategic group membership are emergent phenomena, they are difficult to manipulate,

and so strategic group membership has persistent effects on competitive interactions (see Carroll and Hannan 2000, 67–74).

In sum, as overlap between organizational domains increases, so does competition. This relationship holds whether organizations' domains are defined in terms of size (as a proxy for structure and strategy and therefore resources), geographic location (as a proxy for spatially localized customer demand and resources), or strategic group membership (as a proxy for technology, client group, product market, and/or cultural identity and therefore customer demand and resources).

We are concerned here with the consequences of domain overlap for three important organizational outcomes: economic performance, growth, and failure. Holding constant overall levels of resources and demand, domain overlap causes organizations to compete for the resources (skilled employees, funding, raw materials and components) and the customer demand they need to thrive. When domain overlap is great, organizations must search widely for resources, pay large sums to acquire resources, and often accept low-quality resources. Moreover, they must also work hard to attract and retain customers—that is, they must advertise and promote products and accept low prices for their products. In sum, when domain overlap is great, organizations' input and operating costs are high and their revenues are low; hence, their economic performance suffers. Moreover, when domain overlap is great, many rivals battle over scarce resources and limited customer demand; hence, growth (the expansion of organizational resource use and the customer base) is hampered. Growth is also hampered because the poor economic performance that attends great domain overlap diminishes the stocks of surplus resources that are needed to fuel growth. Finally, because economic performance suffers when domain overlap is great, organizations are more vulnerable to failure. Therefore, we hypothesize that:

> As domain overlap increases, economic performance worsens (hypothesis 1).
>
> As domain overlap increases, organizational growth slows (hypothesis 2).
>
> As domain overlap increases, the chance of organizational failure rises (hypothesis 3).

Domain Non-Overlap and Mutualism

Relations between organizations with overlapping domain sectors are competitive, and the level of competition increases with the extent of domain overlap. In contrast, relations between organizations with non-overlapping domains can be mutually beneficial. Indeed, research on business groups shows that membership in an interorganizational network improves member firm performance by facilitating cooperation and economizing on control (Lincoln, Gerlach, and

Ahmadjian 1996; Keister 1998, 2000). More generally, organizations operating in non-overlapping niches may help each other through the symbiosis created by their complementary differences or through the commensalism created by the commonality of their interests (Hawley 1950, 36–42). As discussed earlier, symbiotic mutualism can take various forms: interorganizational learning through benchmarking; client referrals in times of temporary undercapacity; and increases in overall customer demand as sales in one domain stimulate sales in another, related domain. Also as discussed earlier, commensalistic mutualism can take various forms: enhanced visibility and therefore enhanced legitimacy with suppliers, customers, and oversight agencies; increased volume and quality of complementary goods and services; increased volume and quality of specialized inputs, including skilled workers; cooperative advertising and promotion campaigns; and coordinated government lobbying efforts. We consider how each of the two types of mutualism develops.

Symbiotic Mutualism The theory of niche-partitioning in industrial systems (Carroll 1985) suggests two mechanisms by which symbiotic mutualism can develop between organizations whose niches do not overlap. The first mechanism involves flows of benefits from generalists to specialists. As industries that are subject to economies of scale mature, they tend to become more concentrated; that is, industry participants decrease in number and become larger and more generalized. The few large generalists that operate in concentrated industries tend to focus on serving the densely populated center of the industry's demand space and to ignore the sparsely populated periphery. These underserved peripheral sectors are available for exploitation by specialists; hence, specialists can enter concentrated industries and thrive because generalists release to specialists the demand in the periphery and the resources needed to meet this demand. Symbiotic mutualism thus develops because the domains of specialists and generalists become ever more differentiated as industry concentration increases, and so their domains come to overlap less and less.

The second mechanism by which symbiotic mutualism develops between organizations with non-overlapping domains involves flows of benefits from specialists to generalists. Because specialists tend to be small, their costs tend to be higher than those of large generalists. Therefore, to earn the same profits, specialists must charge higher prices than generalists. Specialists can do this because they focus on particular domain sectors (they offer distinctive products, market to small customer groups with distinctive needs, and use specialized production and distribution systems) and because their customers are willing to pay more for goods and services that meet their idiosyncratic needs. Specialists' pricing behavior has consequences for generalist organizations. When specialists charge more for their goods and services, all customers may become a little less price-sensitive. This reduction in customer price-sensitivity allows generalists to raise their prices too.[4]

Commensalistic Mutualism Research on the evolution of legitimacy in organizational populations (Hannan and Freeman 1989; Aldrich and Fiol 1994; Suchman 1995) suggests several related mechanisms by which such commensalistic mutualism develops. When an organizational form is new and its adherents are few, its goals and operations are not well understood—that is, the organizational form is not legitimated, not taken for granted as an acceptable social, economic, political, or cultural agent. As the density of an organizational form increases, however, it becomes increasingly taken for granted and amasses sociopolitical support (two instances of commensalistic mutualism among members of that form). The fates of all members of that form are improved when density-dependent legitimacy increases.

Another instance of commensalistic mutualism is discussed by Howard Aldrich and Marlene Fiol (1994) and Mark Suchman (1995). Organizations can use several strategies to establish, maintain, or enhance their legitimacy by manipulating actors in their environment—for example, product advertising, image advertising, and selective publication of data concerning technical performance. All of these manipulations are likely to benefit not just the focal organization but also other organizations in the same population by increasing awareness and acceptance of the general categories of goods and services produced by all organizations in the population. To the extent that such manipulations are more frequent when there are more organizations around, then such commensalistic benefits increase with density.

Commensalistic mutualism can also take the form of material, rather than cultural, benefits. As the density of an organizational form increases, organizations that supply goods, services, and trained workers to organizations with this form are more willing to make their production processes more specialized to meet the particular needs of this form. For example, vocational schools are likely to train workers in particular skilled trades when school administrators perceive large-scale demand for such specialized workers in a large or growing industry. More reliable supplies of other, specialized complementary goods and services may also develop as organizational-form density increases and suppliers come to depend more on exchanges with members of this form.

Finally, commensalistic relations between organizations whose domains overlap only a little can take the form of cooperative advertising and promotion campaigns or coordinated government lobbying efforts. Both types of action serve to improve understanding of and demand for the goods and services produced by organizations in the entire population.

Caveat: Limits to Mutualism Relations among organizations with nonoverlapping domains may not be purely mutualistic. Mutualism, especially

mutualism deriving from symbiosis, develops only to the extent that the product, client, and technology categories used to define various domain sectors are not substitutes—that is, to the extent that the organizations making and selling various products do not target a common general pool of customers, require similar generic resources, or rely on similar production systems. Organizations in the same population with non-overlapping domains may compete with each other to the extent that the product classes, client groups, or technology fields constituting these domain sectors are similar with respect to some aspect of resource acquisition or customer demand—that is, to the extent that these domain sectors overlap partially.

The difference between purely mutualistic and partly mutualistic and partly competitive cross-niche relations is most easily explained with examples. Consider the day care and financial services industries. Day care centers can be grouped into sectors based on the ages of the children they enroll (Baum and Singh 1994a, 1994b). Day care centers operating in different age markets are pure complements: they provide similar services to mutually exclusive client groups. Day care centers serving, for example, preschool-age children facilitate the operation of day care centers serving children of other ages, such as toddlers or school-age children. Together, organizations in this population offer services over the full range of children's ages. The existence of day care centers catering to children of all ages increases overall demand for child care services. In addition to these indirect, market-expanding effects of organizations in non-overlapping niches, direct spillover benefits occur between organizations in non-overlapping niches: day care centers that enroll younger children may refer clients to day care centers that enroll older children as their charges mature beyond their particular domain. Thus, day care centers in non-overlapping niches (non-overlapping age ranges for children) engage in completely mutualistic interactions.

In contrast, financial services firms are grouped into sectors based on a combination of the clientele they serve (consumer or commercial) and the products they sell (loans and other investments). For example, the U.S. General Accounting Office (1991, 63–66) classifies savings and loans (thrifts) into five main categories: traditional (focusing on home mortgages and mortgage-backed securities), commercial (making business loans and commercial mortgage loans, as well as consumer nonmortgage loans), mortgage banking (servicing other institutions' consumer and commercial mortgage loans), security and equity investment (investing heavily in service-corporation subsidiaries, corporate securities, and mortgage-backed securities), and real estate development (holding real estate for development and resale and investing heavily in construction loans). The services provided by thrifts in different sectors are in some cases partial substitutes for each other; for instance, consumers can borrow money to buy either houses (from "traditional" thrifts) or cars (from "commercial" thrifts). The financial services

offered by thrifts in these two sectors vary greatly in risk levels, term lengths, and rates and structures of return to the lending institution; indeed, that is why these are deemed by industry analysts to be distinct domains. But both sectors depend on general demand for consumer credit. Hence, thrifts operating solely in one product or client market (such as traditional thrifts) may compete to some extent with thrifts operating solely in another product or client market (such as commercial thrifts) if both markets serve the same clientele and involve products that are at least partial substitutes—that is, if both markets depend on some general demand, such as the demand for consumer credit. But thrifts that deal with mutually exclusive client groups (consumer versus commercial) and thrifts that sell distinctly different products to a common client group do not compete at all; instead, such thrifts engage in purely mutualistic interactions.

Balancing both possible consequences of domain non-overlap—competitive and mutualistic spillovers from one domain sector to another—we expect that organizations whose domains are in non-overlapping sectors will develop at least partly mutualistic interactions. Following this logic, we predict:

> As domain non-overlap increases, economic performance improves (hypothesis 4).
>
> As domain non-overlap increases, organizational growth accelerates (hypothesis 5).
>
> As domain non-overlap increases, the chance of organizational failure falls (hypothesis 6).

Research Design

We test these hypotheses using data on savings and loan associations (thrifts) operating in California between 1977 and 1987. Although the traditional core domain of thrifts is residential mortgage lending, deregulatory initiatives in 1980 and 1982 broadened the allowed scope of investment and lending activities for these firms. Thrifts operate in eight product and client markets that constitute eight distinct domain sectors: residential mortgages, nonresidential mortgages, mortgage-backed securities, consumer nonmortgage loans, commercial loans, direct investments in real estate, corporate and government securities, and service-corporation subsidiaries (for descriptions of these markets, see U.S. GAO 1991, 63–66, and Haveman 1992, 56–58).[5] Because thrifts can invest in such a wide variety of assets, the industry has become quite heterogeneous. Many thrifts remain focused on the traditional residential mortgage business. But others have adopted new strategies: some have become primarily commercial lenders, some offer mortgage-banking services (servicing loans originated at other institutions), others invest heavily in corporate and mortgage-backed securities, while still others have moved into real estate development. The wide array of business strategies and the large num-

ber of markets open to thrifts facilitate the investigation of how similarities and differences between these organizations influence competition and mutualism in this industry.

Data

Our data come from thrift regulators. The Federal Home Loan Bank Board in Washington, D.C., has compiled detailed financial reports of all regulated thrifts. These reports provide the balance sheets and income statements from which we draw most of our data. Other data on California thrifts, primarily headquarters location, date of founding, and information on mergers and acquisitions, come from the annual *Directories of Members* published by the Federal Home Loan Bank of San Francisco and from a merger file compiled by federal regulators. The data cover all savings and loans operating between June 1977 and March 1987. The data are semiannual from 1977 to 1983 and quarterly from 1984 on. To facilitate econometric corrections for violations of the assumptions of the classical linear model, we aggregated quarterly data into semiannual data for our analysis of both continuous dependent variables (economic performance and growth); however, to maximize information, we retained quarterly data for our analysis of the discrete dependent variable (failure). We updated all variables at the end of each period. We measured independent and control variables at the beginning of each period and dependent variables at the end of each period.

From the population of California thrifts, we selected thrifts headquartered in the state's three largest metropolitan areas: Los Angeles (163 thrifts), San Diego (26 thrifts), and San Francisco–San Jose (67 thrifts). (The appendix lists the cities included in these metropolitan areas.) Our sample contains 77 percent of the thrifts in the population in this time period (249 out of 322). We treated the three metropolitan areas as separate arenas of competition and pooled information on thrifts headquartered in each of the three areas. We judged the metropolitan area to be an appropriate unit of aggregation for studying competitive and mutualistic interactions because thrifts' primary activities, mediating consumer savings activities and home mortgage lending, tend to be local in nature (Friend 1969; Gart 1989). The fact that the names of these organizations frequently include a city or county supports this contention; First Federal Savings and Loan of Fresno and Century City Savings and Loan Association are typical California thrift names. We also judged that parameter estimates on performance, growth, and failure would be the same for thrifts operating in the three metropolitan areas because thrifts in the three areas tend to be subject to similar economic conditions and are performing similar functions in all three local economies; hence, pooling data on the three areas not only improves statistical power but is appropriate.

Measures of Independent Variables

Overlap Density

We measured domain overlap in four ways. First, we measured *overlap density* as:

$$\text{overlap density}_{it} = \frac{\sum_{j \neq i} \left(\sum_{m} D_{imt} \times D_{jmt} \right)}{\sum_{m} D_{imt}}$$

where D_{imt} equals one if firm i invests in market m at time t and zero otherwise, and D_{jmt} equals one if firm j invests in market m at time t and zero otherwise.[6] This formula counts the number of markets in which firm i meets every other firm j, aggregates this count over all firms j in the population, and scales it by the number of markets in which firm i operates. Thus, overlap density is equivalent to the average number of competitors that firm i meets across the m markets that constitute its domain at time t. The range of this variable is zero to $N_t - 1$, where N_t equals organizational population density at time t. Neither extreme value is likely. When overlap density equals zero, there is no competition between the focal organization and any of the other organizations in the population. When overlap density equals population density minus one, the focal organization competes with all other organizations in the population, in all markets.

Domain-overlap measures are generally asymmetric, in that firm i can have a different competitive impact on firm j than vice versa. For example, thrifts that offer only residential mortgages do not compete with those that offer only consumer nonmortgage financial services, but both of these types of specialist organizations compete with generalist organizations that are active in both markets. Thus, domain overlaps are complete for organizations that specialize in either residential mortgages or consumer nonmortgage loans, but only partial for organizations that serve both consumer financial markets. This means that generalist lenders represent a greater competitive threat to specialist lenders than vice versa.

Since many thrifts are active in some of the eight markets we study on a very small scale, we followed Haveman (1993) and calculated overlap density by setting a threshold of *5 percent of total assets* of the focal firm to mark substantial investment in each market.[7] Hence, D_{imt} is set equal to one if firm i's investment in market m is at least 5 percent of its total assets. We also set a threshold of 1 percent of market share to demarcate the presence of other organizations in the focal market at a level substantial enough to influence the behavior of the focal organization. Hence, D_{jmt} is set equal to one if firm j's share of market m is at least 1 percent. We did not use a threshold based on the relative importance of the market for firm j, such as 5 percent of firm j's

total assets, because we did not want to bias our measure against large firms and because we wanted to construct this variable from the focal firm's perspective. We reasoned that all firms with substantial market shares will be seen as significant competitors by any market incumbent.

Overlap Mass

Second, we weighted domain overlap by the magnitude of the overlapping organizations' activities in various markets. This allows us to discriminate between the effects of two different organizations that a focal firm meets in several markets, if the primary activities of one competitor are in the same markets as the focal firm and the primary activities of the other competitor are in different markets than the focal firm. Accordingly, we introduce a new measure of domain overlap, *overlap mass:*

$$\text{overlap mass}_{it} = \frac{\sum_{j \neq i} \left(\sum_{m} S_{imt} \times S_{jmt} \right)}{\sum_{m} S_{imt}},$$

where S_{imt} is the constant dollar amount firm i invests in market m at time t and S_{jmt} is the amount firm j invests in market m at time t. (We used the dollar value of investments to calculate overlap mass because that measure fit our research site best. Other scholars might use other measures of market share, such as the dollar value of sales or unit volume of sales.) For each market, we multiplied firm i's investment by firm j's investment and summed across all markets. We aggregated this dollar amount over all firms j in the population, and then scaled this by the total investments of firm i across all of its markets (total size). Thus, this variable measures the average mass of competitors that firm i meets in the m markets that constitute its domain at time t. The range of this variable runs from zero, at which point there is no overlap and therefore no competition between the focal organization and any of the other organizations in the population, to the total investments of all other organizations in the population (population mass), at which point the focal organization overlaps with and therefore competes with all other organizations in the population, in all markets.

Size-Localized Overlap Density and Mass

The foregoing definitions of domain overlap assume that domain overlap has uniform and ubiquitous competitive effects on all organizations in a population. But as noted earlier, previous research suggests that competition is constrained

by differences in organizational size (see, for example, Hannan and Freeman 1977; Hannan and Ranger-Moore 1990; Wholey, Christianson, and Sanchez 1992). To examine whether the competitive effects of overlap density and mass are size-localized, we weighted these measures by the closeness of pairs of firms in terms of size, as follows:

$$\text{Size-localized Overlap Density}_{it} = \sum_{j \neq i} \left[\frac{\sum_{m} [(D_{imt} \times D_{jmt}) \div (|S_{it} - S_{jt}| + 1)]}{\sum_{m} D_{imt}} \right]$$

$$\text{Size-localized Overlap Investment}_{it} = \sum_{j \neq i} \left[\frac{\sum_{m} [(I_{imt} \times I_{jmt}) \div (|S_{it} - S_{jt}| + 1)]}{\sum_{m} I_{imt}} \right]$$

where S_{it} is the size of firm i at time t and S_{jt} is the size of firm j at time t, in terms of total assets. These measures weight our original domain-overlap measures by the inverse of the distance between the focal organization and each of the other organizations in the population. We add one to the absolute value of the distance between the focal organization and each of the other organizations to constrain this weight to range between zero (when $|S_{it} - S_{jt}|$ is very large) and one (when $S_{it} = S_{jt}$ and $|S_{it} - S_{jt}| = 0$).

As the value of size-localized domain overlap increases, the extent to which other organizations' resource requirements overlap with those of the focal organization increases *and* the size-based distance between the focal organization and overlapping organizations decreases; together, these factors drive competition between the focal organization and overlapping organizations to higher levels. The maximum for size-localized overlap density is organizational population density (minus one for the focal organization); for size-localized overlap investment, it is the total investments of all other organizations in the population (population mass minus the investments of the focal organization). At the maximum for both variables, the focal organization competes with all other organizations in the population. But these maxima are unlikely to occur because they require all organizations in the population to be identical in size *and* domain.

Non-Overlaps

Domain non-overlap is the complement of domain overlap. Our first measure of domain non-overlap, *non-overlap density*, counts organizations whose resource requirements are not similar to those of the focal organization:

$$\text{non-overlap density}_{it} = N_t - \text{overlap density}_{it} - 1,$$

where N_t is the number of firms operating at time t (population density).

Similarly, our second measure, *non-overlap mass,* is the complement of overlap mass:

$$\text{non-overlap mass}_{it} = \sum_{j \neq i} \sum_{m} S_{jmt} - \text{overlap mass}_{it},$$

where $\Sigma\Sigma S_{jmt}$ represents the total investment in all markets by all firms except the focal organization (population mass minus the focal organization's investments).

Our third and fourth measures are size-localized equivalents of non-overlap density and mass, defined as follows:

$$\text{size-localized Non-overlap density}_{it} = N_t - 1 - \text{size-localized overlap density}_{it},$$

and

$$\text{size-localized Non-overlap mass}_{it} = \sum_{j \neq i} \sum_{m} S_{jmt} - \text{size-localized overlap mass}_{it},$$

where N_t is population density at time t and $\Sigma\Sigma S_{jmt}$ is population mass at time t (minus the focal organization).

Comparing Overlaps and Non-Overlaps

These measures of domain overlap and non-overlap are complex, and it is reasonable to conclude that non-overlap is merely the opposite of overlap. It is not. Instead, each measure of domain non-overlap is the complement of one measure of domain overlap. To illustrate this point, table 9A.1 shows the domains of six hypothetical thrifts, along with calculations of domain-overlap and -non-overlap measures; for the purposes of this exercise, we assume that these six thrifts constitute the entire industry. One of the hypothetical thrifts is very large, with investments in all eight markets, and five thrifts are medium-size to small, with investments in varying subsets of the eight markets. Rows 1 through 8 of table 9A.1 show the dollar value of investments (in millions of dollars) by each thrift in each domain sector. Row 9 shows the total size of each thrift, where total size equals investments in all eight domain categories plus fixed assets and other assets. Rows 10 through 13 show the values for four of the domain-overlap and domain-non-overlap measures, calculated using the formulae given earlier.

One nonobvious result is that the largest thrift (thrift A), which operates in all eight domain sectors, does *not* have the highest value for overlap density. On the contrary, it has the lowest value. Because in this example we are considering thrifts in a single time period, overlap and non-overlap density are complements; therefore thrift A also has the highest value for non-overlap density. This result comes about because only one of the other, smaller thrifts (thrift C) is nearly as diversified as thrift A. Therefore, although thrift A operates in all markets, it meets very few competitors, on average, across those markets. In contrast, the firm that operates in the only market that all other firms operate in (thrift D in the residential mortgage market) has the maximum possible value for overlap density and the minimum possible value for non-overlap density.

Measures of Dependent Variables

The first outcome we study is *economic performance,* measured using net income. To compare firms of different sizes, our models control for total firm assets; hence, our analyses are equivalent to estimating the effects of domain overlap and non-overlap on return on assets, which is recognized by industry analysts as the best scale-independent measure of performance in this industry (see, for example, Cole 1971), because it allows comparisons between joint-stock and mutual companies. Our second outcome is *growth,* the one-period change in firm size. This is measured in terms of total assets. Total assets and net income, like all other dollar amounts, were corrected for inflation using a GDP deflator index.

Our third outcome, *failure,* is measured with an indicator variable set equal to one if the firm under study dissolved or underwent involuntary merger at the end of the period and zero otherwise. Thrifts seldom disband outright. Instead, regulators tend to negotiate with potential investors (usually other, healthier thrifts) to acquire failing firms. Regulators underwrite the costs of these mergers, in effect selling failed thrifts for the assessed value of their investment portfolios, reimbursing depositors and other creditors, and absorbing a loss in the process (Woerheide 1984, 172–77). We distinguish between involuntary mergers (those forced by regulators or by impending insolvency) and voluntary mergers (those entered into freely, without coercion). Some forced mergers are noted by regulators, but most mergers are not recorded as either voluntary or involuntary. For these, we followed Haveman (1992) and used a simple classification rule: any thrift with zero or negative net worth in the period immediately prior to merger was coded as undergoing involuntary merger; any disappearing thrift with positive net worth was coded as undergoing voluntary merger. Failure thus encompasses three types of events: mergers that were explicitly labeled as federally supervised (and therefore involuntary), outright liquidations, and mergers of firms with zero or negative net worth. This classification scheme is a conservative one in that voluntary mergers (which may well be the result of success) are

very unlikely to be classified as involuntary (which are undoubtedly the result of failure).

Measures of Control Variables

Our analyses control for both organizational and environmental factors that are likely to influence the success and survival of savings and loan associations. In analyses of economic performance, we controlled for size by including assets invested in each of ten categories: eight product or client markets and the two non-investment categories (fixed and other assets). In analyses of growth, we controlled for prior size (total assets) and overall diversification of investments across the eight product or client markets. In analyses of survival, we controlled for investments in each of the eight product or client markets and the two non-investment categories. We measured overall diversification using an index of diversity (Berry 1974, 62–63; Blau 1977, 9):

$$\text{Diversification}_{it} = \sum_{m} P_{imt}^2,$$

where P_{imt} is the proportion of its assets that firm i invests in market m at time t. In analyses of all three outcome variables, we also controlled for organizational age, measured in terms of the number of years since founding.

Our environmental control variables capture external factors that influence the intensity of competition independent of domain overlap and nonoverlap: the presence of competing financial institutions and demand for thrift services. On the supply side, we counted the number of commercial banks operating in California. On the demand side, we controlled for the effects of housing sales (total house sales in California) and the gap between short- and long-term interest rates (which assesses the difference between thrifts' costs of funds from deposits and thrifts' uses of funds to underwrite mortgages).

Model Specification and Estimation

Economic Performance

We investigated economic performance using models of the following general form:

$$Y_{it_1} = \alpha Y_{it_0} + \beta' X_{it_0} + \varepsilon_{it_1},$$

where Y_{it_1} is the value of the dependent variable (net income) for firm i at the end of a period (at time t_1), Y_{it_0} is its value at the beginning of the period (at time t_0), X_{it_0} is a vector of independent and control variables measured at the beginning of the period, and ε_{it_1} is the error term.

Growth

We estimated logistic growth models of the following form:

$$\log[S_{it_1}] = \gamma \log[S_{it_0}] + \beta' X_{it_0} + \varepsilon_{it_1},$$

where S_{it_1} is the size (assets) of firm i at the end of a period, S_{it_0} is the value of this variable at the beginning of the period, X_{it_0} is a vector of independent and control variables measured at the beginning of the period, and ε_{it_1} is the error term. When the size distribution is skewed to the right, as it is for this organizational population, the error term in this equation is normally distributed (Ijiri and Simon 1977).

In analyses of both economic performance and growth, we pooled multiple observations over time for each organization. It is likely, then, that the assumption of independence required for ordinary least squares (OLS) regression is violated. This violation may result in biased parameter estimates. To correct this bias, we estimated fixed-effects models. We subtracted the value of each variable from its mean across all observations on an organization and suppressed the intercept. This is equivalent to introducing one dummy variable for each firm but is easier to estimate, since it eliminates the addition of a large number of variables to the dataset (Judge et al. 1982, 478–88).

We also corrected for serial correlation of errors, which can result from model misspecification caused by omitted variables. Such model misspecification introduces errors whose effects are felt in the coefficient estimates for the lagged dependent variable and the independent variables. For models that include the lagged dependent variable, as these do, serial correlation confounds the disturbance term with the effect of the lagged dependent variable. When exogenous variables are correlated with the lagged dependent variable, estimates of all parameters are biased and inconsistent (see Ostrom 1978; Judge et al. 1982; Greene 1990). When models contain the lagged dependent variable and error terms are serially correlated, OLS will not yield accurate estimates of the error term and hence will not provide consistent estimates of serial correlation. To deal with this problem, the technique of instrumental variables should be used (Ostrom 1978, 53–55; Greene 1990, 440–45). This involves estimating the lagged dependent variable using variables that are *not* correlated with the error term and substituting this estimate into the earlier model. The most common suggestion is to regress the dependent variable on current and lagged independent variables (see, for example, Ostrom 1978, 55; Greene 1990, 448). The lagged values of the predictions of the independent variable are substituted into the earlier model, which then yields consistent estimates of the errors.

We corrected for first- and second-order serial correlation within each organization's time series using a pseudo-generalized–least squares estimation technique (Ostrom 1978, 53–55; Judge et al. 1982, 442–46; Greene

1990, 440–45). Estimates of the first- and second-order serial correlation parameter (constant across the industry) were derived from the AUTOREG procedure in SAS.[8]

Failure

For our analysis of organizational failure, we employed event-history methods. The dependent variable is the instantaneous rate of failure (involuntary merger or liquidation). We used the Gompertz specification, which is a monotonic function of time:

$$\gamma_{it} = \exp[\beta' X_{it} + \gamma t$$

where β is a vector of coefficients, X_{it} is a vector of time-varying variables measured at the start of each period, γ is the time-dependent coefficient, and t is the time clock (organizational age). This log-linear specification constrains the failure rate to be non-negative. We used Nancy Brandon Tuma's (1993) maximum-likelihood program RATE to estimate these models. Estimation with RATE allows right-censored observations to be used in estimating parameters, thereby avoiding biases that result from eliminating censored observations or from treating censored observations as though events occur when the observation period ends (Sørensen 1977; Tuma and Hannan 1984).

One problem with our research design must be addressed, namely, left truncation. Left truncation occurs whenever data are unavailable on the initial conditions and past history of the actors under study (Cox and Oakes 1984, 177–78). This study begins in 1977. Firms that operated in the California thrift industry before 1977 and disappeared before that date are not part of the population analyzed; only thrifts that were still alive in 1977 are included in the data. The sample of firms we study is thus unavoidably chosen contingent on their being part of the industry at the start of the observation period. This selection criterion creates bias if it is correlated with the outcome under study (Heckman 1979; Berk 1983; Tuma and Hannan 1984). If the factors that cause a firm to continue to operate until 1977 are related to the factors that cause it to survive after 1977, then there is sample-selection bias. Previous research has shown that organizational age influences organizational survival (see, for example, Freeman, Carroll, and Hannan 1983). Thus, in investigating organizational survival in this sample, we are likely to be confronted with sample-selection bias; however, sample-selection bias is attenuated to the extent that a large proportion—about half—of the firms studied entered our sample after the beginning of our observation period.

To address the issue of sample-selection bias, we controlled for the age of all organizations, including those with left-truncated life histories. Thus, we condition our estimates of survival rates on organizational age. This strategy

yields unbiased estimates because it controls for the only aspect of past history that is of interest in semi-Markov models, namely, duration in state (Yamaguchi 1991, 7–8; Guo 1993).[9] This strategy has the further advantage of using all available information, thus maximizing statistical power.

Results

Table 9.1 presents means, standard deviations, and correlations for the variables included in the analysis. Note that the measures of domain overlap and non-overlap are complements, not opposites. As we might expect, the correlation between each pair of measures is always moderately high (ranging from .63 to .86). But for three out of four pairs of variables, the correlation is positive, indicating that firms that have a high level of overlap between their domains and the domains of other thrifts also tend to have a high level of non-overlap. This result occurs for two reasons. First, we pool data on eighteen six-month periods; we do not just compare firms within any single time period. (If we did the latter, each overlap measure would be the complement to one non-overlap measure, and the correlation between each pair of measures would be minus one.) Second, our mass-based measures pool data on firms whose investments in the eight markets vary greatly in magnitude, where investment levels are not perfectly correlated with market density. Third, our size-localized measures pool data on firms of varying sizes, which are therefore calculated within varying size-based windows.

Tables 9.2 through 9.4 present multivariate analyses of the impact of domain overlap on economic performance, firm growth, and failure, respectively. In each table, models 1 and 2 assess the impact of overlap density and overlap mass, while models 3 and 4 investigate their size-localized counterparts. We discuss each outcome in turn.

Table 9.2 shows strong support for our theory: overlap density, overlap mass, and their size-localized counterparts all have negative and statistically significant effects on economic performance, congruent with hypothesis 1. As the domain overlap between any savings and loan association and other associations increases, the focal association's economic performance worsens. This pattern holds whether we simply count the number of investment markets or measure the dollar value of investments in those markets. And the pattern holds whether we measure domain overlaps with all other savings and loan associations or domain overlaps with just similarly sized ones.

Table 9.3, which presents estimates of growth in savings and loans' asset bases, demonstrates that domain overlap slows growth significantly. This finding holds regardless of how domain overlap is measured. In all models, parameter estimates for all four measures of domain overlap—overlap density, overlap mass, and their size-localized counterparts—are negative and statistically significant. These results strongly support hypothesis 2.

TABLE 9.1 *Descriptive Statistics for California Savings and Loan Associations, 1977 to 1986*

	1	2	3	4	5	6	7
Mean	1.65	587.90	0.025	5.41	183.40	48.40	61.77
Standard deviation	31.43	1674.00	0.156	12.99	23.80	11.69	12.92
1. Net income	—	0.208*	–0.018	0.448*	–0.212*	0.006	0.100*
2. Assets	—	—	–0.019	0.772*	–0.399*	0.015	0.040*
3. Firm failure	—	—	—	0.002	0.012	0.026	–0.059*
4. Overlap density	—	—	—	—	–0.626*	–0.014	–0.104*
5. Non-overlap density	—	—	—	—	—	–0.002	0.728*
6. Overlap mass	—	—	—	—	—	—	0.002
7. Non-overlap mass	—	—	—	—	—	—	—
8. Size-localized overlap density	—	—	—	—	—	—	—
9. Size-localized non-overlap density	—	—	—	—	—	—	—
10. Size localized overlap mass	—	—	—	—	—	—	—
11. Size-localized non-overlap mass	—	—	—	—	—	—	—
12. Age	—	—	—	—	—	—	—
13. Bank density	—	—	—	—	—	—	—
14. Diversification	—	—	—	—	—	—	—
15. Housing sales	—	—	—	—	—	—	—
16. Interest-rate gap	—	—	—	—	—	—	—

Source: Authors' compilation.
Note: These statistics were calculated on pooled cross-sectional and time-series data comprising 3,740 observations on 315 savings and loan associations operating in San Francisco, San Diego, or Los Angeles between 1977 and 1986.
* $p < .05$

Finally, table 9.4 shows event-history analyses of the impact of domain overlap on thrift failure rates. As with our analyses of organizational performance and growth, this table shows clearly that domain overlap decreases survival chances (that is, it increases failure rates). All parameter estimates for the theoretical variables—no matter how they are measured—are positive and statistically significant, offering consistently strong support for hypothesis 3.

A final consistency to note in our results is that the effects of the non-overlap variables on economic performance, growth, and survival are always opposite to those of the overlap variables, as anticipated by hypotheses 4, 5, and 6. These results, which hold across all three outcomes and all four measures, support the notion that organizations of the same form in non-overlapping

8	9	10	11	12	13	14	15	16
0.006	188.78	0.002	61.82	29.13	3.48	0.504	4.01	1.65
0.001	18.61	0.008	12.92	29.13	0.921	0.163	1.067	1.89
0.206*	–0.025	0.189*	0.100*	0.099*	–0.036*	0.041*	0.069*	–0.019*
0.970*	0.049*	0.932*	0.040*	0.369*	0.062*	–0.057*	–0.023	0.037*
–0.028	0.001	–0.018	–0.059*	0.007	–0.013	0.043*	–0.089*	–0.015
0.690*	–0.102*	0.690*	–0.104*	0.435*	–0.115*	0.016	0.058*	–0.065
–0.272*	0.839*	–0.339*	0.728*	–0.384*	0.679*	–0.385*	–0.304*	0.171*
0.035*	–0.013	0.067*	0.003	0.208*	–0.212*	0.507*	0.306*	–0.205*
0.150*	0.856*	0.052*	0.090*	–0.185*	0.780*	–0.540*	–0.126*	0.349*
—	0.157*	0.959*	0.149*	0.282*	0.165*	–0.084*	–0.056*	0.084*
—	—	0.072*	0.856*	–0.159*	0.775*	–0.475*	–0.313*	0.161*
—	—	—	0.052*	0.308*	0.060*	0.004	–0.004	0.024
—	—	—	—	–0.184*	0.780*	–0.539*	–0.126*	0.349*
—	—	—	—	—	–0.193*	0.142*	0.121*	–0.095*
—	—	—	—	—	—	–0.666*	–0.651*	0.544*
—	—	—	—	—	—	—	0.404*	–0.417*
—	—	—	—	—	—	—	—	–0.377*
—	—	—	—	—	—	—	—	—

niches help rather than harm each other, either through the symbiosis created by complementary differences or through the commensalism created by commonality of interests (Hawley 1950, 29–38). Further, these results indicate that the mutualistic effects of non-overlap greatly outweigh any competitive effects that may arise because the eight domain sectors are partial substitutes for each other or are similar with respect to resource requirements. Increases in the number of organizations that do *not* overlap with the focal organization's domain always improve that organization's economic performance, accelerate its growth, and lessen its chances of failure.

One important assumption we make in these analyses is that all organizations with overlapping domains create an equal amount of competition for any focal organization, so that each competitor has an equally strong negative effect

TABLE 9.2 *The Effects of Domain Overlap on the Economic Performance of California Savings and Loan Associations, 1977 to 1986: Feasible GLS Estimates*

	Model 1	Model 2	Model 3	Model 4
Net income$_{t-1}$	0.521*** (0.033)	0.555*** (0.033)	0.449*** (0.033)	0.448*** (0.032)
Overlap density	–0.184*** (0.054)	—	—	—
Non-overlap density	0.154* (0.067)	—	—	—
Overlap mass	—	–0.143* (0.070)	—	—
Non-overlap mass	—	0.013 (0.115)	—	—
Size-localized overlap density	—	—	–0.755*** (0.179)	—
Size-localized non-overlap density	—	—	0.123* (0.064)	—
Size-localized overlap mass	—	—	—	–0.046*** (0.008)
Size-localized non-overlap mass	—	—	—	0.105*** (0.031)
Asset portfolio				
Residential mortgages	–0.037*** (0.003)	–0.028*** (0.003)	–0.030*** (0.004)	–0.044*** (0.003)
Nonresidential mortgages	0.046*** (0.008)	0.046*** (0.008)	0.041*** (0.009)	0.033*** (0.008)
Mortgage-backed securities	–0.065*** (0.005)	–0.055*** (0.005)	–0.067*** (0.005)	–0.057*** (0.005)

(Table continues on p. 253.)

on organizational performance and survival, and each non-overlapping organization has an equally strong positive impact. However, some firms may exert different patterns of influence, for reasons we do not capture here. Models of multimarket contact and competition predict that firms that meet in multiple markets (multiple domain sectors) do not compete as strongly against each other as firms that meet in a single market. Instead, firms that operate in multiple markets will refrain from aggressive action against the competitors they meet in multiple markets because they fear retaliation. Ironically, because possible harm from aggressive action is greater among rivals who meet in multiple domain sec-

TABLE 9.2 *Continued*

	Model 1	Model 2	Model 3	Model 4
Consumer non-mortgage loans	0.143*** (0.018)	0.138*** (0.018)	0.144*** (0.019)	0.153*** (0.017)
Commercial non-mortgage loans	−1.151*** (0.181)	−1.203*** (0.179)	−1.197*** (0.179)	−1.267*** (0.176)
Direct investments in real estate	0.422*** (0.025)	0.318*** (0.025)	0.320*** (0.026)	0.327*** (0.025)
Cash and investment securities	0.017** (0.007)	0.019** (0.007)	0.014 (0.008)	0.014* (0.007)
Service corporation investments	0.078*** (0.013)	0.077*** (0.013)	0.085*** (0.013)	0.089*** (0.013)
Fixed assets	1.103*** (0.112)	1.111*** (0.112)	1.103*** (0.113)	1.069*** (0.109)
Other assets	−0.098*** (0.020)	−0.098*** (0.020)	−0.101*** (0.020)	−0.092*** (0.019)
Age	0.832 (1.390)	−0.764 (1.462)	0.887 (1.390)	−0.356 (1.460)
Bank density	0.191 (3.954)	2.611 (4.164)	−0.240 (3.955)	−0.888 (4.060)
Housing sales	3.075*** (0.762)	2.529 (1.453)	3.227*** (0.762)	1.270 (1.460)
Interest-rate gap	0.365 (0.392)	0.596 (0.389)	0.412 (0.392)	0.585 (0.391)
R-squared	0.23	0.22	0.22	0.23

Source: Authors' compilation.
Notes: Standard errors are in parentheses below point estimates. To procure consistent estimates in the presence of autocorrelation, we estimated the lagged dependent variables using instrumental variables and used this estimate in our analyses.
* $p < .05$; ** $p < .01$; *** $p < .001$ (two-tailed t-tests)

tors than among rivals who meet in a single domain sector, actual harm from aggression is weaker. Fear of great reciprocal harm forestalls opponents who meet in multiple domains from using their strongest weapons against each other. In this case, the competitive interaction between two organizations with overlapping domains would decrease with the number of domain sectors in which they meet. Our assumption of equal competitive pressure is consistent with past research on domain overlap, and exploring the possibility of the mutual forbearance caused by multimarket contact is beyond the scope of this chapter. Yet an extension of this model to address the nature and impact of multipoint con-

TABLE 9.3 *The Effects of Domain Overlap on the Growth of California Savings and Loan Associations, 1977 to 1986: Feasible GLS Estimates*

	Model 1	Model 2	Model 3	Model 4
Log (assets)$_{t-1}$	0.481*** (0.024)	0.412*** (0.026)	0.470*** (0.024)	0.477*** (0.024)
Overlap density	−0.003*** (0.001)	—	—	—
Non-overlap density	0.002** (0.001)	—	—	—
Overlap mass	—	−0.007*** (0.001)	—	—
Non-overlap mass	—	0.002** (0.001)	—	—
Size-localized overlap density	—	—	−0.286** (0.103)	—
Size-localized non-overlap density	—	—	0.003** (0.001)	—
Size-localized overlap mass	—	—	—	−0.001* (0.000)
Size-localized non-overlap mass	—	—	—	0.002** (0.001)
Diversification index	−0.091 (0.075)	−0.271*** (0.079)	−0.057 (0.072)	−0.061 (0.072)
Age	0.068*** (0.011)	0.076*** (0.012)	0.076*** (0.011)	0.061*** (0.012)
Bank density	0.055* (0.027)	0.024 (0.028)	0.048* (0.026)	0.043 (0.028)
Housing sales	0.024*** (0.012)	0.021* (0.012)	0.024* (0.012)	0.024* (0.012)
Interest-rate gap	0.007*** (0.002)	0.008*** (0.002)	0.007** (0.002)	0.007** (0.002)
R-squared	0.32	0.31	0.32	0.32

Source: Authors' compilation.
Notes: Standard errors are in parentheses below point estimates. To procure consistent estimates in the presence of autocorrelation, we estimated the lagged dependent variables using instrumental variables and used this estimate in our analyses.
* $p < .05$; ** $p < .01$; *** $p < .001$ (two-tailed t-tests)

TABLE 9.4 *The Effects of Domain Overlap on the Hazard Rate of Firm Failure Among California Savings and Loan Associations, 1977 to 1986: Gompertz Models*

	Model 1	Model 2	Model 3	Model 4
Constant	0.251*** (0.051)	0.267*** (0.062)	0.218*** (0.040)	0.225*** (0.024)
Overlap density	0.039*** (0.011)	—	—	—
Non-overlap density	–0.045*** (0.011)	—	—	—
Overlap mass	—	0.021** (0.010)	—	—
Non-overlap mass	—	–0.030** (0.017)	—	—
Size-localized overlap density	—	—	15.020*** (4.547)	—
Size-localized non-overlap density	—	—	–0.046*** (0.011)	—
Size-localized overlap mass	—	—	—	0.010** (0.005)
Size-localized non-overlap mass	—	—	—	–0.034* (0.017)
Age	0.006 (0.005)	0.003 (0.003)	0.003 (0.004)	0.008 (0.008)
Asset portfolio				
Residential mortgages	0.002** (0.000)	0.001** (0.000)	0.003* (0.001)	0.001* (0.000)
Nonresidential mortgages	0.002* (0.001)	0.002* (0.001)	0.004** (0.002)	0.004*** (0.001)
Mortgage-backed securities	–0.004** (0.002)	–0.004** (0.002)	0.004** (0.002)	–0.004** (0.002)
Consumer non-mortgage loans	–0.010** (0.005)	–0.008** (0.004)	–0.010* (0.006)	–0.010** (0.005)
Commercial non-mortgage loans	–0.038*** (0.007)	–0.026*** (0.005)	–0.050*** (0.009)	–0.029*** (0.008)
Direct investments in real estate	0.008 (0.006)	0.011 (0.007)	0.008 (0.006)	0.010 (0.006)
Cash and investment securities	–0.006*** (0.002)	–0.006*** (0.002)	–0.004** (0.002)	–0.006*** (0.002)

(Table continues on p. 256.)

TABLE 9.4 *Continued*

	Model 1	Model 2	Model 3	Model 4
Service corporation investments	0.008** (0.004)	0.008** (0.004)	0.007* (0.004)	0.007* (0.004)
Fixed assets	−0.030 (0.023)	−0.025 (0.022)	−0.047 (0.026)	−0.027 (0.022)
Other assets	−0.008 (0.007)	−0.005 (0.007)	−0.008 (0.007)	−0.007 (0.007)
Bank density	−2.717*** (0.461)	−3.487*** (1.112)	−2.217*** (0.487)	−3.507*** (1.107)
Housing sales	−15.120*** (2.458)	−19.020*** (4.255)	−13.030*** (2.472)	−18.400*** (4.288)
Interest-rate gap	0.118*** (0.061)	0.007 (0.055)	0.117*** (0.060)	0.006 (0.054)
χ^2	75.49	62.54	72.63	62.53
Degrees of freedom	16	16	16	16

Source: Authors' compilation.
Notes: Standard errors are in parentheses below point estimates. These models were estimated on 3,256 observations covering 232 thrifts and 106 failure events.
* $p < .05$; ** $p < .01$; *** $p < .001$ (two-tailed t-tests)

tact would be worthwhile. The extension could design measures of domain overlap and non-overlap that are sensitive to the system of mutual forbearance that develops among multipoint rivals. This would involve weighting the competitive effect of rival *j* by a declining function of the number of markets in which *j* and the focal firm i meet.

Conclusion

A fundamental concern of organizational theory is relationships between organizations and their environments, which are largely composed of other organizations. Organizations interact with each other in many ways, but their interactions can usually be classified as either competitive or cooperative (mutualistic). In this chapter, we have examined interactions among organizations in a single industry whose domains overlap. That is, we focused on organizations that sell similar products and target the same pool of clients. Because their products and prospective clients are similar, these organizations have similar resource requirements. We argued that domain overlap increases competition for scarce resources, while non-overlap (the absence of domain overlap) facilitates mutualistic, cooperative outcomes. We explored empirically how the nature of the relations between organizations affects organizational financial performance, growth, and failure. We argued that competitive interactions worsen performance

and growth and increase the chance of failure, while cooperative, mutualistic interactions improve performance and growth and reduce the chance of failure.

Our results provide strong evidence that domain overlap and non-overlap have the predicted effects. We found remarkable consistency in results across all three outcomes. Moreover, these results proved robust to the way domain overlap and non-overlap are measured. We counted the number of markets in which a focal organization meets its competitors (overlap density), we weighted this count by the magnitude of organizational investments in those markets (overlap mass), and we constrained domain overlap to weight most heavily firms of similar size to the focal organization (size-localized overlap density and size-localized overlap mass). No matter what measure we used, we found domain overlap to have deleterious effects on organizational performance, growth, and survival, and domain non-overlap to have beneficial effects.

This study demonstrates the importance of examining the differences among an industry's participants. Our findings are fundamental to the literature on diversification, which to this point has focused almost exclusively on within-organization sources of competitive advantages. Here we show how diversification strategies can affect between-organization patterns of competition and cooperation, and thus how an organization's position relative to its rivals can generate competitive advantages and disadvantages. Moreover, the prescriptive implications of this research are clear: managers and entrepreneurs should not seek markets that are devoid of competitors, but rather markets where many incumbents are engaged in activities different from or complementary to those of their own venture. Finally, our results suggest that organizational decision-makers may want to focus their attention on more fine-grained differentiation of their competitors in terms of market presence, the importance of that market presence to those competitors (the degree of investment by competitors), and whether those competitors are similar or different in size to their own firm.

Appendix

Cities Included in the Three California Metropolitan Areas Studied

Los Angeles

Alhambra
Altadena
Anaheim
Bellflower
Beverly Hills
Brea
Buena Park
Camarillo
Colton
Compton
Costa Mesa
Covina
Culver City
Encino

Fillmore
Fontana
Fountain Valley
Fullerton
Gardena
Garden Grove
Glendale
Hawthorne
Hollywood
Huntington Beach
Inglewood
Irvine
Laguna Beach
Long Beach
Los Angeles
Malibu
Manhattan Beach
Marina Del Rey
Mission Viejo
Montebello
Monterey Park
Newport Beach
Northridge
Ontario
Orange
Oxnard
Pacific Palisades
Pasadena
Placentia
Pomona
Redlands
Redondo Beach
Riverside
Rosemead
San Bernadino
San Clemente
San Fernando
San Gabriel
San Marino
Santa Ana
Santa Monica
Santa Paula
Signal Hill
South Pasadena
Torrance
Upland
Van Nuys
West Covina
Westlake Village
Westminster
Whittier
Wilmington

San Diego

Carlsbad
Chula Vista
Encinitas
Escondido
La Jolla
La Mesa
Oceanside
Rancho Santa Fe
San Diego

San Francisco

Alameda
Berkeley
Burlingame
Campbell

Concord
Danville
El Cerrito
Hayward
Lafayette
Mill Valley
Oakland
Pacifica
Palo Alto
Pleasanton
Redwood City
San Carlos
San Francisco
San Jose
San Leandro
San Mateo
San Rafael
San Ramon
Santa Clara
South San Francisco
Sunnyvale
Vallejo
Walnut Creek

TABLE 9A.1 *Example Calculations for Domain Overlap and Non-Overlap Measures*

Domain Sector (Market)	Thrift A	Thrift B	Thrift C	Thrift D	Thrift E	Thrift F
Residential mortgages	23	4	10	12	4	22
Nonresidential mortgages	8	5	3	0	0	3
Mortgage-backed securities	15	8	1	0	0	0
Consumer nonmortgage loans	9	2	1	0	1.5	0
Commercial loans	4	1	1	0	0	0
Direct investments in real estate	8	0	0	0	0	10
Corporate and government securities	9	0	1	0	0	0
Service corporation subsidiaries	4	0	1	0	0.5	0
Overall firm size (millions of dollars)	80	20	18	12	6	35
Overlap density	2.38	3.00	2.86	5.00	3.33	3.00
Non-overlap density	2.63	2.00	2.14	0.00	1.67	2.00
Overlap mass	21.03	26.01	45.42	67.00	52.96	38.81
Non-overlap mass	69.97	124.99	107.58	92.00	112.04	97.19

Source: Authors' compilation.
Note: Rows 1 through 8 show the dollar value of investments by each thrift in each domain sector. Row 9 shows the total size of each thrift (total investments across all eight domain sectors). Rows 10 through 13 show the values for four measures of domain overlap and non-overlap, which are calculated using the formulas provided in the text.

We thank seminar participants at the University of California at Berkeley, the University of Chicago, the University of Alberta, Cornell University, Carnegie-Mellon University, and the University of Utah for their constructive comments. We also thank Joel Baum for his collaboration on an earlier version of this chapter.

Notes

1. We use the terms "domain" and "niche" interchangeably, and in this chapter we study the actual behavior patterns of organizations. Thus, the organizational domains we study correspond to realized niches, not fundamental niches. For a discussion of fundamental versus realized niches, see Hannan and Freeman (1989, 95–98).
2. A third dimension of interorganizational relations, direct versus diffuse, is of less importance to our analysis. Direct relations involve small numbers (often pairs) of organizations whose fates are intimately linked in conflict or cooperation. In contrast, diffuse relations involve larger numbers of organizations, and the fate of any organization in a system of diffuse relations is only indirectly linked with the fate of any other single organization through congestion or cognitive legitimation (see Hannan and Freeman 1989). Here we note whether the particular relations we are discussing are direct or diffuse, but we do not dwell on these differences.
3. For reasons of conceptual clarity, we do not examine in this study either of the types of asymmetric symbiotic relation, predation and parasitism. Instead, we focus on all three symmetric relations: commensalistic competition, commensalistic mutualism, and symbiotic mutualism.
4. In support of this speculation, there is anecdotal evidence of price increases by generalists (mass producers) in the wake of price increases by specialists (microbrewers) in the U.S. brewing industry (Glenn Carroll, personal communication, 1997).
5. Thrifts also have investments that are not directly related to any product or client market: fixed assets (primarily buildings and equipment) and other assets (a small residual category).
6. When we calculated overlap density, we actually used the following formula, which is algebraically equivalent to the definitional formula:

$$\text{overlap density}_{it} = \sum_{m}\left(D_{imt} \times \sum_{j \neq i} D_{jmt}\right) \Big/ \sum_{m} D_{imt}.$$

7. Conversations with accounting researchers who study the thrift industry confirm that the 5 percent threshold is a reasonable one (Christopher Stinson and Frederick Lindahl, personal communications, 1993).
8. Time series varied in length across the firms in our data. Hence, we could not use the TSCS procedure, which estimates autoregressive models on balanced, pooled, time-series data (data in which there are n firms and all n firms have t records). The AUTOREG procedure assumes a single time series. To prevent the program from estimating autoregressive parameters across different firms' time series, we inserted two blank records at the end of each firm's time series. Conversations with SAS technical consultants indicate that padding the data this way yields correct within-firm estimates for the first- and second-order serial correlation parameters. Conversations with SAS technical consultants also reveal that the TSCS procedure does not function if the data contain any missing values, so

we could not use that procedure even if we inserted enough blank records to make all firms' time series the same length. We thank Andrew Henderson for suggesting this technique.

9. Semi-Markov models assume that hazard rates are independent of previous history, but they allow these rates to depend on duration in a state; see Tuma and Hannan (1984, 92–95) or Guo (1993).

References

Aldrich, Howard E. 1999. *Organizations Evolving.* Thousand Oaks, Calif.: Sage Publications.

Aldrich, Howard E., and Marlene Fiol. 1994. "Fools Rush In? The Institutional Context of Industry Creation." *Academy of Management Review* 19(4): 645–70.

Amburgey, Terry L., Tina Dacin, and Dawn Kelly. 1994. "Disruptive Selection and Population Segmentation: Interpopulation Competition as a Segregating Process." In *Evolutionary Dynamics of Organizations,* edited by Joel A. C. Baum and Jitendra V. Singh. New York: Oxford University Press.

Barnett, William P. 1993. "Strategic Deterrence Among Multipoint Competitors." *Industrial and Corporate Change* 2: 249–78.

Barnett, William P., and Glenn R. Carroll. 1987. "Competition and Mutualism Among Early Telephone Companies." *Administrative Science Quarterly* 32: 400–21.

Baum, Joel A. C., and Heather A. Haveman. 1997. "Love Thy Neighbor? Differentiation and Spatial Agglomeration in the Manhattan Hotel Industry." *Administrative Science Quarterly* 41: 304–38.

Baum, Joel A. C., and Stephen J. Mezias. 1992. "Localized Competition and Organizational Failure in the Manhattan Hotel Industry." *Administrative Science Quarterly* 37: 580–604.

Baum, Joel A. C., and Jitendra V. Singh. 1994a. "Organizational Niche Overlap and the Dynamics of Organizational Mortality." *American Journal of Sociology* 100: 346–80.

———. 1994b. "Organizational Niche Overlap and the Dynamics of Organizational Founding." *Organization Science* 5: 483–501.

Berk, Richard A. 1983. "An Introduction to Sample Selection Bias in Sociological Data." *American Sociological Review* 48: 386–98.

Berry, Charles H. 1974. *Corporate Growth and Diversification.* Princeton, N.J.: Princeton University Press.

Bigelow, Lyda S., Glenn R. Carroll, Marc-David Seidel, and Lucia Tsai. 1997. "Legitimation, Geographical Scale, and Organizational Density." *Social Science Research* 26(4): 377–98.

Blau, Peter M. 1977. *Inequality and Heterogeneity.* New York: Free Press.

Boeker, Warren. 1991. "Organizational Strategy: An Ecological Perspective." *Academy of Management Journal* 34(3): 613–35.

Carroll, Glenn R. 1985. "Concentration and Specialization: Dynamics of Niche Width in Populations of Organizations." *American Journal of Sociology* 90(6, May): 1262–83.

Carroll, Glenn R., and Michael T. Hannan. 2000. *The Demography of Corporations and Industries.* Princeton, N.J.: Princeton University Press.

Carroll, Glenn R., and Anand Swaminathan. 1992. "The Organizational Ecology of Strategic Groups in the American Brewing Industry from 1975 to 1990." *Industrial and Corporate Change* 1: 65–97.

———. 2000. "Why the Microbrewery Movement? Organizational Dynamics of Resource Partitioning in the American Brewing Industry After Prohibition." *American Journal of Sociology* 106: 715–62.

Carroll, Glenn R., and James B. Wade. 1991. "Density Dependence in the Evolution of the American Brewing Industry Across Different Levels of Analysis." *Social Science Research* 20: 271–302.

Cole, David W. 1971. "Measuring Savings and Loan Profitability." *Federal Home Loan Bank Journal* (October): 1–7.

Cox, David Roxbee, and D. Oakes. 1984. *Analysis of Survival Data.* London: Chapman and Hall.

Freeman, John, Glenn R. Carroll, and Michael T. Hannan. 1983. "The Liability of Newness: Age Dependence in Organizational Death Rates." *American Sociological Review* 48: 692–710.

Friend, Irwin, ed. 1969. *Study of the Savings and Loan Industry.* Washington, D.C.: Federal Home Loan Bank Board.

Gart, Alan. 1989. *An Analysis of the New Financial Institutions: Changing Technologies, Financial Structures, Distribution Systems, and Deregulation.* New York: Quorum.

Greene, William H. 1990. *Econometric Analysis.* New York: Macmillan.

Guo, Guang. 1993. "Event-History Analysis for Left-Truncated Data." In *Sociological Methodology 1993,* edited by Peter Marsden. Oxford: Basil Blackwell.

Han, Joon. 1998. "The Evolution of the Japanese Banking Industry: An Ecological Analysis, 1783 to 1945." Ph.D. diss., Stanford University.

Hannan, Michael T., and Glenn R. Carroll. 1992. *Dynamics of Organizational Populations: Density, Competition, and Legitimation.* New York: Oxford University Press.

Hannan, Michael T., Glenn R. Carroll, Elizabeth A. Dundon, and John Charles Torres. 1995. "Organizational Evolution in a Multinational Context: Entries of Automobile Manufacturers in Belgium, Britain, France, Germany, and Italy." *American Sociological Review* 60(4): 509–28.

Hannan, Michael T., and John Freeman. 1977. "The Population Ecology of Organizations." *American Journal of Sociology* 83: 929–84.

———. 1987. "The Ecology of Organizational Founding: American Labor Unions, 1836 to 1985." *American Journal of Sociology* 92(4, January): 910–43.

———. 1988. "The Ecology of Organizational Mortality: American Labor Unions, 1836 to 1985." *American Journal of Sociology* 94(1, July): 25–42.

———. 1989. *Organizational Ecology.* Cambridge, Mass.: Harvard University Press.

Hannan, Michael T., and James R. Ranger-Moore. 1990. "The Ecology of Organizational Size Distributions: A Microsimulation Approach." *Journal of Mathematical Sociology* 15: 65–89.

Hannan, Michael T., James R. Ranger-Moore, and Jane C. Banaszak-Holl. 1990. "Competition and the Evolution of Organizational Size Distributions." In *Organi-*

zational Evolution: New Directions, edited by Jitendra V. Singh. Newbury Park, Calif.: Sage Publications.

Haveman, Heather A. 1992. "Between a Rock and a Hard Place: Organizational Change and Performance Under Conditions of Fundamental Environmental Transformation." *Administrative Science Quarterly* 37(1): 48–75.

———. 1993. "Follow the Leader: Mimetic Isomorphism and Entry into New Markets." *Administrative Science Quarterly* 38(4): 593–627.

Haveman, Heather A., and Lynn Nonnemaker. 2000. "Competition in Multiple Geographic Markets: The Impact on Market Entry and Growth." *Administrative Science Quarterly* 45(2): 232–67.

Hawley, Amos H. 1950. *Human Ecology: A Theory of Community Structure.* New York: Ronald Press.

———. 1968. *Human Ecology: A Theoretical Essay.* Chicago: University of Chicago Press.

Heckman, James J. 1979. "Sample Selection Bias as Specification Error." *Econometrica* 47(1, January): 153–61.

Ijiri, Yuji, and Herbert A. Simon. 1977. *Skew Distributions and the Sizes of Business Firms.* New York: North Holland.

Judge, George G., G. Carter Hill, William E. Griffiths, Helmut Lütkepohl, and Tsoung-Chao Lee. 1982. *Introduction to the Theory and Practice of Econometrics.* New York: John Wiley.

Keister, Lisa A. 1998. "Engineering Growth: Business Group Structure and Firm Performance in China's Transition Economy." *American Journal of Sociology* 104(2): 404–40.

———. 2000. *Chinese Business Groups: The Structure and Impact of Interfirm Relations During Economic Development.* New York: Oxford University Press.

Levine, Sol, and Paul E. White. 1961. "Exchange as a Conceptual Framework for the Study of Interorganizational Relationships." *Administrative Science Quarterly* 5(4): 583–601.

Lincoln, James R., Michael L. Gerlach, and Christina L. Ahmadjian. 1996. "Keiretsu Networks and Corporate Performance in Japan." *American Sociological Review* 61(1): 67–88.

McGee, John, and Howard Thomas. 1986. "Strategic Groups: Theory, Research, and Taxonomy." *Strategic Management Journal* 7: 141–60.

McPherson, J. Miller. 1983. "An Ecology of Affiliation." *American Sociological Review* 48(4, August): 519–32.

McPherson, J. Miller, Pamela A. Popielarz, and Sonia Drobnic. 1992. "Social Networks and Organizational Dynamics." *American Sociological Review* 57: 153–70.

McPherson, J. Miller, and James R. Ranger-Moore. 1991. "Evolution on a Dancing Landscape: Organizations and Networks in Dynamic Blau Space." *Social Forces* 70(1, September): 19–42.

McPherson, J. Miller, and Thomas Rotolo. 1996. "Testing a Dynamic Model of Social Composition: Diversity and Change in Voluntary Groups." *American Sociological Review* 61(2): 179–202.

Meyer, Marshall W. 1975. "Organizational Domains." *American Sociological Review* 40(5, October): 599–615.

Ostrom, Charles W. 1978. *Time-Series Analysis: Regression Techniques.* Beverly Hills, Calif.: Sage Publications.

Perrow, Charles. 2002. *Organizing America: Wealth, Power, and the Origins of Corporate Capitalism.* Princeton, N.J.: Princeton University Press.

Podolny, Joel M., Toby E. Stuart, and Michael T. Hannan. 1996. "Networks, Knowledge, and Niches." *American Journal of Sociology* 102(3): 659–89.

Ranger-Moore, James, Robert S. Breckenridge, and Daniel L. Jones. 1995. "Patterns of Growth and Size-Localized Competition in the New York Life Insurance Industry, 1860 to 1985." *Social Forces* 73(3): 1027–49.

Scott, W. Richard, Martin Ruef, Peter J. Mendel, and Carol A. Caronna. 2000. *Institutional Change and Health Care Organizations: From Professional Dominance to Managed Care.* Chicago: University of Chicago Press.

Sørensen, Åage B. 1977. "Estimating Rates from Retrospective Questionnaires." In *Sociological Methodology 1977,* edited by David Heise. San Francisco: Jossey-Bass.

Suchman, Mark C. 1995. "Managing Legitimacy: Strategic and Institutional Approaches." *Academy of Management Review* 20: 571–610.

Swaminathan, Anand, and Gabriele Wiedenmayer. 1991. "Does the Pattern of Density Dependence in Organizational Mortality Rates Vary Across Levels of Analysis? Evidence from the German Brewing Industry." *Social Science Research* 20(1): 45–73.

Thompson, James D. 1967. *Organizations in Action.* New York: Harper & Row.

Tuma, Nancy Brandon. 1993. *Invoking RATE.* Palo Alto, Calif.: DMA Corp.

Tuma, Nancy Brandon, and Michael T. Hannan. 1984. *Social Dynamics: Models and Methods.* Orlando, Fla.: Academic Press.

U.S. General Accounting Office. 1991. *Thrifts and Housing Finance: Implications of a Stricter Qualified Thrift Lender Test.* Washington: U.S. Government Printing Office.

Wade, James. 1996. "A Community-Level Analysis of Sources and Rates of Technological Variation in the Microprocessor Market." *Academy of Management Journal* 36: 1218–44.

White, Harrison C. 1981. "Where Do Markets Come From?" *American Journal of Sociology* 87(3, November): 517–47.

———. 2002. *Markets from Networks: Socioeconomic Models of Production.* Princeton, N.J.: Princeton University Press.

Wholey, Douglas R., Jon B. Christianson, and Susan M. Sanchez. 1992. "Organizational Size and Failure Among Health Maintenance Organizations." *American Sociological Review* 57(6): 829–42.

Winship, Christopher. 1988. "Thoughts About Roles and Relations: An Old Document Revisited." *Social Networks* 10: 209–31.

Winship, Christopher, and Michael Mandel. 1983. "Roles and Positions: A Critique and Extension of the Blockmodeling Approach." *Sociological Methodology,* edited by Samuel Leinhardt. San Francisco: Jossey-Bass.

Woerheide, Walter J. 1984. *The Savings and Loan Industry: Current Problems and Possible Solutions.* Westport, Conn.: Quorum Books.

Yamaguchi, Kazuo. 1991. *Event-History Analysis.* Newbury Park, Calif.: Sage Publications.