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Localized Competition and Organizational Failure in the Manhattan Hotel Industry, 1898–1990

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This study examines the impact of localized competition on rates of failure in the Manhattan hotel industry from 1898 to 1990. The study investigates whether the organizations in a population with more similar resource requirements compete more intensely. This approach builds on existing density-based models of interorganizational competition by including variation at the organizational level directly in both the model and measures of competition. A dynamic analysis shows that hotels located in densely populated regions of the distributions of organizational size, geographic location, and price experienced significantly higher failure rates. The findings show how an ecological approach to competition that incorporates intrapopulation variation can provide a more detailed understanding of the competitive dynamics and evolution of organizational populations.

INTRODUCTION

Investigations of density dependence in founding and failure rates have devoted primary attention to populations and less to exploring differences among organizations within populations (Barnett and Carroll, 1987; Hannan and Freeman, 1989; Hannan and Carroll, 1992). This has led some critics to charge that the model treats all members of a population as more or less equivalent, with each member assumed to compete for the same scarce resources and to contribute to and experience competition equally (Winter, 1990: 286). Although existing research demonstrates that the assumption of equivalence may be a reasonable starting approximation, studies of population and industry substructures (Hatten and Schendel, 1977; Ulrich and McKelvey, 1990), strategic groups (McGee and Thomas, 1986; Boeker, 1991), geographically segmented environments (Carroll and Wade, 1991), and organizational size distributions (Hannan, Ranger-Moore, and Banaszak-Holl, 1990) suggest that all organizations in a population may not compete for the same scarce resources or contribute to and experience competition equally. If all organizations in a population are not equal competitors, then population density, a count of the number of organizations, may not provide the most precise measure of the competition faced by different organizations in a population. Considering organizational differences more explicitly may therefore facilitate understanding the competitive dynamics within organizational populations.

Investigating localized competitive processes within organizational populations may provide a useful point of departure for the development of an ecological approach to competitive dynamics that is sensitive to differences among individual organizations. In addition, this approach has the potential to provide a point of contact between researchers in organizational ecology and those in strategy and organization interested primarily in the organization level. In the study of localized competition, organizational differences are quantified and organizations allowed to compete at different levels of intensity according to the extent of their differences. Attending to organizational variation in this way

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builds on existing density-based approaches to competitive dynamics by incorporating differences among individual organizations directly into measures of competition. Understanding the role of variation among organizations within populations is central to an ecological-evolutionary theory of organizations. Differences in the adaptive capacities of organizations within a population provide the basis for competitive selection processes and population change. As a result, research on localized competitive processes in organizational populations may help clarify how the characteristics of organizations interact with the characteristics of populations in shaping the competitive dynamics and evolution of organizational populations.

Localized Competition

In organizational ecology, the intensity of competition among organizations is predicted to be mostly a function of the similarity in organizational resource requirements: the more similar the resource requirements, the greater the potential for intense competition (Hannan and Freeman, 1977, 1989). At one extreme, organizations with identical resource requirements are perfect competitors. At the other, organizations with distinct resource requirements do not compete. More formally, the potential intensity of competition between organizations is proportional to the overlap or intersection of their resource requirements. This argument yields the basic localized competition hypothesis: The more similar a focal organization is to its competitors, the greater the intensity of competition it will experience.

Several recent extensions of the density-dependence framework capture some of the effects of organizational differences on the intensity of competition, providing empirical support for the localized competition hypothesis. In one approach, population density is disaggregated to examine how specific, theoretically discerned subpopulations of organizations interact. Barnett (1991), for example, disaggregated the density of multipoint (i.e., rivals that meet in more than one market segment or business) and single-point competitors in different strategic groups to model competition among single and multipoint competitors within and between different strategic groups. The results showed that patterns of competitive interaction between single and multipoint competitors differ depending on whether they are members of the same or different strategic groups. He showed that the competitive effects of increases in the density of single and multipoint rivals on the market exit rate were localized within strategic groups, i.e., among firms with similar pricing and product policies as well as common customers, suppliers, and distribution channels (Barnett, 1991: 7).

In a second approach, population density is disaggregated according to geographic proximity. In a study of the U.S. brewing industry, Carroll and Wade (1991) disaggregated density according to geographic location to investigate whether the effects of competition are stronger for the population defined at a local geographic level than for a national population. They found that the addition of an organization to a population had a greater competitive impact.
on the failure rate at the local level. Swaminathan and Wiedenmayer (1991) reported similar findings in a study of the German brewing industry. In two studies of a population of licensed day care centers, Baum and Singh (1992, 1993) combined these approaches by disaggregating density according to the similarity in the ages of the children served by individual centers and in geographic location. The results of analyses of rates of day care center founding and failure showed that the intensity of competition between centers increased with both the extent of overlap in the ages of children served and geographic proximity.

More specific models of localized competition have been advanced in the organizational ecology literature. In their seminal paper, Hannan and Freeman (1977) discussed a model in which intrapopulation competition is localized along the organizational size axis. They proposed the idea that organizations of different sizes in a population use different strategies and structures and, therefore, that large and small-sized organizations, though engaged in similar activities, depend on different mixes of resources. This conjecture implies that organizations will compete most intensely with organizations of similar size. In populations in which this pattern of size-localized competition occurs, changes in the size distribution of organizations indicate changes in the intensity of competition that are different for organizations of different sizes. Consequently, the intensity of competition faced by organizations in a population may depend not only on the number of other organizations in the population but also on the sizes of the other organizations (Hannan and Freeman, 1977: 946). Thus, if large and small organizations depend on different resource mixes, then patterns of resource use will be specialized to segments of the size distribution, and similarly sized organizations will compete most intensely. As a result, large organizations will pose a threat to medium-sized but not small organizations. Whatever strategy medium-sized organizations adopt to compete with large organizations will make them more vulnerable to competition from small organizations and vice versa. Therefore, the emergence of large organizations should be accompanied by a decline in the number of medium-sized organizations, while small ones flourish as their most intense competitors are removed from the environment.

While available empirical evidence of size-localized competition is limited, Hannan and his colleagues (Hannan and Ranger-Moore, 1990; Hannan, Ranger-Moore, and Banaszak-Holl, 1990) have used simulation techniques to explore how size-localized competition would affect organizational survival and growth. They showed that size-localized competition would produce a gap in the middle of an organizational size distribution consistent with Hannan and Freeman's model by reducing the number of medium-sized organizations and increasing the number of small organizations. Hannan, Ranger-Moore, and Banaszak-Holl (1990) have also presented historical data on New York City banks and life insurance companies operating in New York State that showed evidence of gaps in the size distributions broadly parallel to the simulation results. Additionally, Baum

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and Meziar (1992) used a variety of measures of size-localized competition to analyze organizational growth in a population of licensed day care centers. Their study found that size-localized competition reduced growth rates.

In work related closely to Hannan and Freeman’s size-localized competition model, Carroll (1985) proposed that competition among large generalist organizations in a population to occupy the center of the market frees peripheral resources that are most likely to be used by small specialist members of the population. This hypothesis implies that, in concentrated markets with few large generalists, specialists may be able to exploit more of the available resources without engaging in direct competition with larger generalist organizations. Carroll (1985) referred to the process generating this outcome as resource partitioning. The resource-partitioning model yields the prediction that increased concentration among generalist organizations increases the failure rate of generalists and decreases the failure rate of small specialist organizations. Thus, Carroll’s (1985) resource-partitioning model suggests one possible basis for Hannan and Freeman’s specification of size-localized competition: Large organizations capture the advantages of generalism, small organizations the advantages of specialism, and middle-sized organizations the liabilities of both (Meyer, 1990). Although empirical evidence in support of the resource-partitioning model is limited, in a study of newspaper organizations, Carroll (1985) found that during the process of concentration, the failure rate of generalist newspapers increased while the failure rate of small specialist newspaper organizations decreased, providing evidence that resource partitioning was at work.

Localized competition among similar organizations has substantive implications for the evolution of organizational populations. According to Hawley (1950: 201–203), localized competition between like entities for finite resources eventually leads to differentiation. As competition proceeds, selective pressures push less-fit competitors out of the market. Market niches become differentiated as entrepreneurs seek out distinct functions in which they hold a competitive advantage. In this, Hawley followed Durkheim (1947), who argued that sociological differentiation in general proceeds from increases in social density, or the number of units sharing a given set of resources. Hannan and Freeman’s size-localized competition model and Carroll’s (1985) resource-partitioning model both have many similarities to these descriptions of competitive social processes. The difference is that while Hawley’s model predicts that losing competitors are transformed either through territorial or functional differentiation, the size-localized competition and resource-partitioning models predict that these organizations will die and that differentiated organizations will come from new sources. Recently, both these views received empirical support in two studies of the California wine industry by Delacroix, Swaminathan, and Solt (1989) and Swaminathan and Delacroix (1991) that showed that differentiation occurred in response to competition. Also, functional differentiation at the time of founding and lateral migration into a neighboring
market niche both lowered the competitive pressures faced by California wineries. These arguments and findings suggest a pattern of disruptive or segregating selection (Baum, 1990; Amburgey, Dacin, and Kelly, 1993). In general, this mode of selection, which has not been emphasized in the ecological literature, tends to increase organizational differentiation by producing gaps rather than smooth, continuous variation in the distribution of the members of a population along some organizational dimension.

The ecological focus on localized competitive processes provides an interesting contrast with discussions of spatial competition in the economics literature. Economic models generally predict a clustering rather than a dispersion of firms. The classic analysis by Hotelling (1929) described a simple duopoly model of pure spatial competition along a linear market, e.g., two food vendors at a beach. In this model, consumers have inelastic demand but buy from the nearest seller. Sellers are able to relocate freely, and they assume that their rival will not react to any such relocation. Hotelling demonstrated that this model had a single equilibrium in which the two vendors would be located back-to-back in the middle of the beach. While extensive clustering of the type predicted by Hotelling’s model contrasts with the ecological view that localized competition between like organizations eventually leads to differentiation, several extensions of Hotelling’s original analysis suggest that this famous result is sensitive to the particular assumptions that are made (for a review, see Graitson, 1982). First, extending the analysis to a larger number of organizations introduces difficulties with the uniqueness and sometimes the existence of equilibrium. Nevertheless, the tendency to cluster does not necessarily disappear (Lerner and Singer, 1937; Eaton and Lipsey, 1975; Shaked, 1975).

Second, extending the analysis to location in two-dimensional space has proven problematic. Here, any equilibrium must be robust not only to movements up and down a line but also to diagonal movements. In many cases equilibrium does not exist or is not unique, although firms still tend to cluster, especially when they have open spaces on one side, so that there is no market loss from moving toward the cluster (Eaton and Lipsey, 1975; Shaked, 1975).

Third, Hotelling’s clustering result is sensitive to assumptions made regarding the cost of relocation; depending on the assumptions made, either clustering or dispersal could be the result (Hay, 1976).

Localized Competition in the Manhattan Hotel Industry

We explored the consequences of localized competition on organizational failure rates using information on the Manhattan hotel industry during the period from 1898 to 1990. The theoretical arguments and empirical evidence presented above suggest that, because greater similarity implies greater localized competition for resources, the more similar a focal organization is to its competitors, the lower its survival chances will be. We examined the effects of localized competition on Manhattan hotel failure in terms of variation on three organizational dimensions: size, geographic location, and price. Following the earlier research on size-localized competition described above, we

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operationalized localized competition among Manhattan hotels in terms of differentiation in size and tested the following hypothesis:

**Hypothesis 1**: The intensity of size-localized competition will be positively related to the Manhattan hotel failure rate.

The location and pricing of a hotel have substantive long-term consequences for the success of the establishment (Ellerbrock and Wells, 1983; Hart and Troy, 1986). Among the most frequently mentioned criteria in a traveler’s decision to purchase accommodation are (1) location (destination or city as well as specific address within the area); (2) price; (3) services; (4) facilities; and (5) image (Wyckoff and Sasser, 1981: xxviii). Those familiar with the hotel industry often argue that the three most important factors for success, as with restaurants and real estate, are location, location, and location. Location is of primary importance for several reasons. Proximity and convenience to points of tourist interest or business activity are critical considerations because the need (i.e., demand) for hotel services is generally derived from such attractions and activities. Another issue related to location is the local competitive climate and the balance of supply (capacity) and demand in the market in which the hotel is located. Hotels compete in relatively local market areas. While some competition exists between various cities and resort destinations for convention and tourist business, the primary mode of competition is between establishments of similar class or market position (for example, luxury, mid-price, economy) within relatively compact and well-defined geographic areas or hotel districts (such as Times Square) (Hart and Troy, 1986). In combination, these factors suggest that the incentives for locating near other hotels will be traded off against geographically localized competition among neighboring hotels. Thus, under conditions of intense geographically localized competition, “good” hotel locations may not necessarily be those that are further away from other hotels.

Ellinger (1977) has proposed a model of the spatial evolution of industries consistent with these arguments. According to Ellinger’s model, the spatial evolution of industries occurs in response to the development of agglomeration economies and economies of geography. Agglomeration economies are mutual economies accruing to organizations that locate close to each other. They arise from advantages such as shared infrastructure available to organizations locating close to each other (a cluster of hotels around or forming a convention center, for example), informational externalities about the extent of demand or the feasibility of operation at a particular location, and reduction in consumer search costs, beneficial for total market demand. Economies of geography result from proximity to activities from which the need or demand for an organization’s services are derived. As a result, particular locations within Manhattan, i.e., hotel districts, may emerge as most capable of sustaining the activities of hotels. These economies provide a strong incentive for the clustering of organizations, though the incentives for clustering are different from those in
Hotelling's model. Consequently, economies of geography and agglomeration may be traded off against geographically localized competition, resulting in the formation of highly competitive hotel districts at particular geographic locations within Manhattan. Therefore, we hypothesize:

**Hypothesis 2:** The intensity of geographically localized competition will be positively related to the Manhattan hotel failure rate.

The price a hotel sets for its services provides an important measure of variation in market position within the hotel industry. Throughout its history, the Manhattan hotel industry has been characterized by many establishments selling similar but differentiated products and nonprice competition involving diverse kinds of activities to attract customers, such as variations in the quality of services and in their packaging, advertising, and marketing (Chamberlin, 1933). Such competition tends to be cumulative; over time, hotels acquire varied positions in the market as differentiated sellers. Differentiation gives hotels the ability to set prices rather than simply adjust to a market price. Closely tied to the price that a hotel sets is the service level it offers (Hart and Troy, 1986).

Hotels have traditionally positioned themselves within one of three basic service-level categories: luxury, mid-price, and economy. Economy hotels appeal to budget-minded travelers who want reasonably priced rooms with limited services. Mid-price hotels offer service that is modest but sufficient to attract a particular market segment: businesspeople on expense accounts. Luxury hotels provide upscale restaurants and lounges, concierge service, and meeting and private dining room facilities. Thus, service-level segmentation results in patterns of resource use that are specialized to regions of the price distribution. As a result, luxury and economy hotels potentially compete with mid-price hotels but not with each other, making mid-price hotels vulnerable to localized competition from both luxury and economy hotels. This suggests that growth in the number of economy and luxury hotels is likely to be accompanied by a decline in the number mid-price hotels. In support of this conjecture, in recent years industry analysts have noted that luxury hotels have continued catering to travelers seeking full and specialized services, while economy hotels have upgraded in quality and uniformity, providing high perceived value for the price. As a result, mid-price hotels have been losing market share (Hart and Troy, 1986), and there has been a polarization of the hotel industry along the dimension of price. The ability of economy and luxury hotels to outcompete mid-price hotels may be a classic case of being "stuck in the middle" (Porter, 1980: 41–44). Mid-price hotels are in an inferior cost position to economy hotels, lack the uniqueness necessary to capture the pricing advantages accruing to luxury hotels, and have not oriented themselves toward a specific, well-defined market segment (i.e., economy or luxury). The foregoing arguments and evidence suggest the following hypothesis:

**Hypothesis 3:** The intensity of price-localized competition will be positively related to the Manhattan hotel failure rate.
METHODS

Data

The data used in this study include life history information on all 614 transient hotels, those catering to short-term visitors as opposed to residential hotels that serve long-term or permanent guests, that operated in Manhattan at any time between 1898 and 1990. Single-room-occupancy hotels (SROs), which are residential hotels, were excluded from the sample. Four archival sources were used to construct these life histories. The Hotel Red Book, published annually since 1887, contains detailed information on the name, number of rooms, location, and room rates of hotels. It is the most comprehensive historical listing of Manhattan hotels in existence. The information contained in the Red Book was cross-referenced and supplemented using three additional archival sources: (1) the Manhattan Classified Directory/Yellow Pages, published since 1929; (2) the Annual Directory of the Hotel Association of New York City, published since 1940; and (3) the Hotel and Travel Index, published since 1951. Because detailed organizational data are missing for many hotels prior to 1898, the observation period for this study begins in 1898 even though the archival sources begin in 1887.

Between 1898 and 1990 the Manhattan hotel industry gradually transformed from one dominated by entrepreneurial, independent operators to one dominated by professionally managed hotels. A rapid expansion of the Manhattan hotel industry during the 1920s was followed by low growth in the 1930s and early 1940s. Since the end of World War II the industry has grown slowly, at times plagued by overcapacity, and become more concentrated as smaller hotels have been replaced by fewer and larger establishments. During the study period, 481 transient hotels were founded in Manhattan. A hotel was defined to have been founded in the year it first appeared in any archival source. Three hundred and thirty-nine (70.5 percent) of the hotels founded in Manhattan since 1898 had ceased operations by the end of 1990. Failure was defined as the cessation of hotel services for short-term visitors. Changes in name or ownership were not included as failures because the organization itself continued to provide transient-hotel services. The date of failure was defined as the year a hotel was permanently delisted from the Red Book. Whenever Red Book listings differed from those in the other archival sources, a hotel was defined to have failed in the first year it was permanently delisted from two or more of the archival sources. In 1898, 133 of the hotels in our sample were already in operation; thus, the life histories for these hotels were left-censored (i.e., they were founded before the study period). To incorporate as much of the data on hotels during the 1898–1990 period in the study as possible, we attempted to determine the founding dates for hotels existing in 1898. With the archival information available, we were able to confirm founding dates for 112 (84.2 percent) of the left-censored hotels. Because their ages were not known, the 21 hotels with unknown founding dates could not be included in the analysis, although information on these hotels was included in the measures of localized
competition, population density, and population mass described below. Therefore, the final sample for the analysis included 593 hotels, of which 394 failed.

Measuring Localized Competition

Following the work of Hannan and his colleagues (Hannan and Ranger-Moore, 1990; Hannan, Ranger-Moore, and Banaszak-Holl, 1990), we measured localized competition in this study based on the Euclidean distance of a focal organization to other organizations in the population, a measure similar to those commonly used in the networks literature (e.g., Blau, 1977; Marsden, 1987; McPherson, 1990; McPherson and Ranger-Moore, 1991). This measure serves to weight competing organizations according to their proximity to the focal organization. Thus, as operationalized in this study, the basic measure of localized competition compares the position of a focal organization in the distribution of variation on a given organizational dimension, $L_{it}$, to the positions of all others in the population, $L_{jt}, i \neq j$, at time $t$. The differences between the focal organization and all others are converted to a Euclidean distance, as follows:

$$D_{it} = \sqrt{\sum_{j \neq i} (L_{it} - L_{jt})^2}.$$  (1)

$D_{it}$ increases with the magnitude of the distance between the focal organization and all others on dimension $L$. Thus, large values for $D_{it}$ imply less intense competition. If localized competition is associated with greater mortality, $D_{it}$ would be expected to have a negative relationship with failure.

The measure $D_{it}$ has a potential limitation. Although $D_{it}$ takes account of the argument that organizations that are different compete less intensely, it assumes that all organizations, no matter how different, compete. Under such circumstances, once an organization distances itself from its competitors, the intensity of competition it faces declines, and the process is self-accelerating. Therefore, localized competition of the type represented by $D_{it}$ would strongly favor organizations that break away from the pack, potentially resulting in extreme monopolies that do not seem empirically plausible (Hannan, Ranger-Moore, and Banaszak-Holl, 1990).

This limitation can be overcome by modifying the assumption that all organizations compete with all other organizations simply as a function of the extent of their differences. Following Hannan and Freeman’s (1977) original argument that organizations of different sizes draw on different resources, Hannan, Ranger-Moore, and Banaszak-Holl (1990) suggested a solution: Focal organizations are assumed to compete with organizations within a certain range of their own position in the distribution of variation, a competitive window. Conversely, organizations outside the competitive window of the focal organization are assumed not to contribute to competitive pressures. Consistent with this assumption is Carroll’s (1985) finding that large mass-market generalist newspapers and small specialist newspapers competed among themselves but not...
with one another. While Hannan, Ranger-Moore, and Banaszak-Holl (1990) advanced this suggestion in the context of size-localized competition, the assumption seems germane to localized competitive processes on any dimensions that cause organizations in a population to depend on different mixes of resources, which, for the Manhattan hotel industry, would include both price and geographic location.

Organization $i$'s competitive window is defined to be determined by some width $\mu$ such that it competes with only those organizations whose position in the distribution of variation is within $\mu$ units of its own position:

$$D_{it}^{\mu} = \sqrt{\sum_{|L_i - L_j| < \mu} (L_i - L_j)^2}.$$  \hspace{1cm} (2)

Like $D_{it}^\mu$, $D_{it}^{\mu}$ increases with the average difference between the focal organization and other organizations, while the distances to organizations not within $\mu$ units of the focal organization have no effect on the intensity of competition. Thus, similar to $D_{it}^\mu$, an increase in $D_{it}^{\mu}$ is predicted to decrease the likelihood of failure. As described earlier, in their simulation studies of size-localized competition, Hannan, Ranger-Moore, and Banaszak-Holl (1990) found that localized competition of the form described by $D_{it}^{\mu}$ tended to produce gaps in the size distribution broadly consistent with Hannan and Freeman’s (1977) speculations.

Independent Variables

Localized competition. We examined the effects of localized competition on Manhattan hotel failure in terms of size, geographic location, and price. The size of each hotel was measured in each year as the number of rooms operated, the standard measure of size used in the hotel industry (Wyckoff and Sasser, 1981). The geographic location of a hotel was measured using its position within the Manhattan street-avenue grid. This grid covers approximately 90 percent of Manhattan’s total area. The avenues of the grid are set approximately four-tenths of a mile apart, and the streets are separated by approximately one-tenth of a mile (Rand McNally, 1989). For hotels located in parts of Manhattan not included in the grid scheme (the southern and eastern regions of the city), grid positions were determined by extrapolating the existing street-avenue grid to cover these areas. This permitted us to assign grid positions to hotels located anywhere within Manhattan using an identical metric. Since the physical distance between avenues is approximately four times the distance between streets, we divided street number by four to equalize the physical distance scales of the street and avenue location measures.\(^1\)

The price of each hotel was measured in each year as the average advertised daily room rate (in constant dollars). For years in which size or price data were missing for a hotel, linear interpolation was used to assign values for these variables.

We used two sets of measures of localized competition, one based on equation (1) and the other on equation (2). First, we computed three separate measures of localized

\(^1\) While Manhattan’s grid of streets and avenues provides a convenient basis for measuring actual distance between hotels, the existence of such a grid is not required. In cities where no grid exists (for example, Washington, D.C., which has a “hub and spoke” layout), a grid can be superimposed over the existing street pattern and grid locations assigned to organizations.
competition based on equation (1) using the archival data on the size, constant-dollar price, and geographic location of Manhattan hotels. To accommodate the two-dimensional nature of geographic location, equation (1) was modified as follows to derive the measure of $D_{it}$ for geographically localized competition:

$$D_{it}^{\text{location}} = \sqrt{\sum_{j \neq i} (A_{it} - A_{ij})^2 + (S_{it} - S_{ij})^2},$$  \hspace{1cm} (3)

where, $A_{it}$ is the avenue location of a focal hotel, $S_{it}$ is the street location of a focal hotel, and $A_{ij}$ and $S_{ij}$ are the avenue and street locations of all other hotels. We refer to these measures as $D_{it}^{\text{size}}$, $D_{it}^{\text{location}}$ and $D_{it}^{\text{price}}$ in the analysis.

Second, we computed window-based measures for localized competition using equation (2). Although many specifications of $D_{it}^{\mu}$ are possible, because our interest in this study was to compare unrestricted measures of the form $D_{it}^{\mu}$ and segmented measures of the form $D_{it}^{\mu}$, we focused on a single window-based measure of localized competition for each dimension of organizational variation. While these measures clearly do not exhaust all relevant competitive-window specifications, they are directly comparable to earlier work on localized competition (Hannan, Ranger-Moore, and Banaszak-Holl, 1990; Baum and Mezias, 1992), and the properties of the chosen specifications serve to explicate the competitive-window measures well, as discussed in Results.

For size, following Hannan, Ranger-Moore, and Banaszak-Holl (1990) and Baum and Mezias (1992), we made the window a function of the size of the focal organization divided by 2, such that $\mu_{\text{size}} = \pm \text{size}_i / 2$. This variable is called $D_{it}^{\text{size}/2}$ in the analysis. This window limits the range of sizes over which organizations compete and takes into account that the competitive reach of large organizations is wider than the competitive reach of small organizations. For example, $\mu_{\text{size}} = \pm \text{size}_i / 2$ implies that a 100-room hotel competes with hotels ranging in size from 50 to 150 rooms, while a 1,000-room hotel competes with hotels ranging in size from 500 to 1,500 rooms. We set the window for price-localized competition in the same way. Setting $\mu_{\text{price}} = \pm \text{price}_i / 2$ is consistent with evidence that competition among economy hotels is more price sensitive than competition among higher-priced, luxury hotels (Ellerbrock and Wells, 1983; Hart and Troy, 1986). This value for $\mu_{\text{price}}$ means that a luxury hotel with a $300 room rate competes with hotels priced between $150 and $450, while an economy hotel charging $50 per night competes with hotels ranging in price from $25 to $75. This variable is called $D_{it}^{\text{price}/2}$ in the analysis.

We constructed the geographic competitive window somewhat differently. First, we defined the geographic competitive window on the avenue dimension to be equal to a maximum of one-half of Manhattan’s 12 avenue width. To do this we set $\mu_{\text{avenue}} = \text{avenue}_i \pm 3 \text{ avenues}$. On the street dimension, we defined the window to be equal to a maximum of one-third of the observed range in street location of approximately 150 streets. Therefore we set $\mu_{\text{street}} = \text{street}_i \pm 25 \text{ streets}$. Combined, these measures
create geographic competition windows approximately consistent with the east-side–west-side and uptown-midtown-downtown distinctions commonly used to characterize the geographic regions of Manhattan (e.g., Manhattan Company, 1929: Metropolitan Transportation Authority, 1989). It is also consistent with the geographic proximities of hotels identified in an analysis of competitors for a major Manhattan hotel (Lewis, 1989). This variable is called $D_{it}^{\text{location}=w}$ in the analysis.

In addition to these inside competitive-window measures, we also constructed counterpart outside competitive-window measures to examine the separate effects of organizations located beyond the specified competitive windows. This allowed us to compare estimates for the effects of local competition among organizations within competitive windows with indirect or diffuse competition from organizations residing outside the competitive window. This disaggregation of the $D_{it}^{\text{size}}$, $D_{it}^{\text{location}}$, and $D_{it}^{\text{price}}$ measures into component inside and outside competitive-window measures also provided one basis on which to assess the appropriateness of our choice of cutoff points for the competitive windows. In the analysis, these variables are called $D_{it}^{\text{outside}(size/2)}$, $D_{it}^{\text{outside}(location)=w}$, and $D_{it}^{\text{outside}(price/2)}$.

We calculated each localized competition measure as of the beginning of each calendar year. Each measure was divided by 100 for rescaling.

Figures 1, 2, and 3 present the historical trajectories of the average Euclidean distance of a focal hotel from all other hotels in terms of size, price, and location, which we derived by dividing the Euclidean distance measures by the number of hotels in each year. The historical patterns for average size and price differences among Manhattan hotels are broadly consistent with the theoretical expectation that localized competition among like entities eventually leads to differentiation (Hawley, 1950; Hannan and Freeman, 1977). As illustrated in Figure 1, the trajectory for average size differences increased between 1898 and 1927, declined sharply with the completion of a large number of new hotels built during the late 1920s, and then remained relatively constant until 1960. After 1960, size differentiation increased steadily during a period in which the Manhattan hotel industry became increasingly populated by fewer and larger establishments. In Figure 2, after declining slightly between 1898 and 1947, average differences in constant-dollar prices increased consistently and dramatically for the remainder of the observation period. Figures 1 and 2 somewhat overstate the increases in size and price differentiation, however, because of increases in the range of size (as the development of construction techniques permitted larger structures to be built) and constant-dollar price (in response to increasing socioeconomic stratification) between 1898 and 1990.

The trajectory for average Euclidean distance in terms of geographic location, given in Figure 3, differs markedly from those for size and price. As the number of hotels in Manhattan grew from 133 in 1898 to a maximum of 353 in 1931, the average geographic Euclidean distance between Manhattan hotels declined sharply and then remained low,
increasing only moderately between 1960 and 1990, even though the number of hotels operating in Manhattan fell from 312 to 156 during this period. Thus, although the Manhattan hotel industry became populated by fewer and larger establishments after 1960, it also remained concentrated spatially. This historical pattern is consistent with the arguments presented above that, in the spatial evolution of the Manhattan hotel industry, the advantages of economies of geography and agglomeration would be balanced against the effects of localized competition among neighboring hotels, resulting in the formation of hotel clusters or districts at particular geographic locations within Manhattan.

*Population density and mass.* We controlled for two additional sources of intrapopulation competition: population

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density (Hannan and Freeman, 1989) and population mass (Barnett and Amburgey, 1990). In the density-dependence model, the intensity of competition varies according to the number or density of organizations in a population. If an increase in population density increases organizational failure rates, this indicates competition. Conversely, if an increase lowers organizational failure rates, this indicates mutualism. Population density was measured as the total number of hotels existing at the start of each year. To allow for a nonmonotonic effect, density was modeled as a quadratic by including both population density and population density squared, with the squared term divided by 1,000 for rescaling (Hannan and Freeman, 1989). Barnett and Amburgey (1990) elaborated the density-dependence model to account for the possibility that larger organizations are stronger, more powerful competitors by modeling the effects of population mass, measured as the aggregate of the sizes of all organizations in the population, or population density weighted by organizational size. If larger organizations have disproportionate competitive effects, then, after accounting for the effects of population density, increases in population mass should significantly increase failure rates. For hotels, the number of rooms operated captures the differential burden large organizations place on the environmental carrying capacity. Therefore, population mass was measured as the total number of rooms in all hotels (i.e., the total productive capacity of the industry) existing at the start of each year. Following Barnett and Amburgey (1990), each hotel’s number of rooms was subtracted from the total mass, so the mass variable reflected the number of rooms operated by other hotels. The natural logarithm of population mass was used to reduce the skewness of the variable’s distribution.

Organizational control variables. The study also controlled for several organizational characteristics, including age, size, price, and geographic location. Organizational age was
defined as the number of years since the date of a hotel’s founding. Organizational size and price were measured as defined above. In all models the natural logarithms of age, size, and price were used to reduce the skewness of the variables’ distributions. To control for possible variation in hotel failure resulting from differences in geographic location, a set of five location dummy variables was created to compare the failure rate of hotels located in the following commonly distinguished (e.g., Manhattan Company, 1929; Metropolitan Transportation Authority, 1989) regions of the city: Uptown, above 110th Street; Upper East Side, 59th to 110th streets, east of Central Park; Upper West Side, 59th to 110th streets, west of Central Park; Midtown, 23rd to 59th streets; and Downtown, below 23rd Street. The Midtown location was excluded as a comparison group. Finally, a left-censored dummy variable, coded 1 for hotels founded before 1898 and 0 otherwise, was included to examine whether the hotels founded prior to the start of the observation period had systematically different failure rates.

Environmental control variables. To rule out plausible alternative environmental explanations for the patterns of Manhattan hotel failures, the study controlled for several factors influencing the carrying capacity of the environment for transient-hotel services in Manhattan. The first variable captured the demand for hotel services using a measure of the yearly number of visitors to New York City. Because the hotel industry is vulnerable to the state of the economy (Wyckoff and Sasser, 1981), the annual gross national product growth rate was the second control variable. These variables were constructed using information contained in the Historical Statistics of the United States, Colonial Times to 1970 (U.S. Department of Commerce, Bureau of the Census, 1975), Historical Abstracts of the United States (U.S. Department of Commerce, Bureau of the Census, 1970–1990), and Port of New York and New Jersey Authority annual reports (1930–1990). The visitors-to-New-York-City variable includes arrivals by sea, rail, and air. Linear interpolation was used to estimate values for these variables in years in which data were missing. The remaining environmental controls were period-effect dummy variables representing key environmental shocks. The first two environmental shock variables were World War I (1914–1918) and World War II (1938–1945), periods during which New York City served as a major port for both the embarkation of American soldiers and the arrival of European war refugees. The final environmental shock dummy variable represented the effects of the Great Depression years (1930–1938).

Model and Analysis

We estimated the effects of localized competition and the control variables using \( r(t) \), the instantaneous rate of failure as the dependent variable. The hazard rate was modeled using the following specification:

\[
  r(t) = \exp(\alpha X(\tau)), \quad \tau_j - 1 < t \leq \tau_j,
\]

where \( X(\tau) \) is a vector of covariate values at time \( \tau \), and \( \alpha \) is a vector of coefficients. In this exponential model, transition rates are postulated to be log-linear functions of the
variables in $X$. To incorporate the time variation in the
covariates, we used a multiple-spells formulation. In the
multiple-spells formulation of the model, each hotel's history
is broken down into one-year spells in which the hotel is at
risk of failure. Each spell is treated as right-censored unless
the hotel fails. This allows the values of the time-varying
independent variables to be updated annually. RATE (Tuma,
1980) was used to estimate the vector of parameter
estimates $\alpha$ by the method of maximum likelihood.

RESULTS

Localized Competition and Manhattan Hotel Failure Rates

Means, standard deviations, and bivariate correlations among
the independent variables are presented in the Appendix.
Table 1 reports the maximum-likelihood estimates for the
analysis of localized competition in the Manhattan hotel
industry. Model 1 estimates a baseline model of density and
mass dependence, controlling for the effects of
organizational characteristics and environmental variables.
The quadratic specification for Manhattan hotel density is
insignificant. Removing density squared in model 2 did not
significantly reduce the fit of the model ($x^2$ difference =
0.12, 1 d.f., n.s.). In model 2, the estimate for density is
significant and negative, indicating a mutualistic effect.
Manhattan hotel mass, by comparison, is significant and
positive. With population density controlled, the estimate for
mass indicates that increases in the average size of other
hotels have a competitive effect, increasing the failure rate.
Thus, increases in the number of hotels lowered the failure
rate, while increases in the average size of other hotels
increased it. Taken together, this suggests that Manhattan
hotel failure rates increased with the concentration level of
the population.

The organizational characteristics and environmental control
variables also had several significant influences on hotel
failure rates. In contrast to the commonly observed
age-dependent decline in organizational failure rates, the
significant positive estimate for organizational age indicates
that hotel failure rates increased with age. Thus, hotels
appear to suffer from a liability of obsolescence (Baum,
1989; Brittain, 1989) or maturity (Aldrich et al., 1990) rather
than a liability of newness. In capital-intensive industries like
the hotel industry, where the investment is in a system that
is not easily broken up or sold off piecemeal, there is an
implicit endowment that takes the form of a sunk cost, and
consequently, liability of newness arguments may not hold.
Thus, a hotel is an expensive physical asset that may be
subject to obsolescence independent of the organization
operating it. Consistent with prior research, however, hotel
failure rates did exhibit negative size dependence. Failure
rates were also lower among luxury hotels. The insignificant
estimates for geographic location indicate that failure rates
were generally comparable in the different regions of
Manhattan when averaged across time. The estimate for the
left-censored dummy variable is also insignificant. Thus,
although they were already “survivors,” hotels founded
before the start of the observation period did not exhibit a
survival advantage. Among the environmental factors, World
<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
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<td>Constant</td>
<td>-26.56*</td>
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<td>-35.54*</td>
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<td>-38.83*</td>
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<td>(12.18)</td>
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<td>(7.135)</td>
<td>(7.193)</td>
<td>(7.317)</td>
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<tr>
<td>In(age)</td>
<td>.216*</td>
<td>.211*</td>
<td>.183*</td>
<td>.176*</td>
<td>.151*</td>
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<tr>
<td>(.080)</td>
<td>(.079)</td>
<td>(.079)</td>
<td>(.079)</td>
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</tr>
<tr>
<td>In(size)</td>
<td>-.439*</td>
<td>-.437*</td>
<td>-.394*</td>
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<tr>
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<td>-.387*</td>
<td>-.364*</td>
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<td>-.287</td>
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<td>(.299)</td>
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<tr>
<td>Uptown</td>
<td>.086</td>
<td>.087</td>
<td>-.140</td>
<td>-.186</td>
<td>-.153</td>
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<td>.138</td>
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<td>.104</td>
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<td>(.229)</td>
<td>(.229)</td>
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<td>(.243)</td>
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<tr>
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<td>-.028</td>
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<td>(.337)</td>
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<td>-.836*</td>
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<td>(.317)</td>
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<td>.112</td>
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<td>(.226)</td>
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<tr>
<td>Visitors/1,000,000</td>
<td>-.017*</td>
<td>-.019*</td>
<td>-.026*</td>
<td>-.017*</td>
<td>-.025*</td>
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<tr>
<td>(0.008)</td>
<td>(0.06)</td>
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<tr>
<td>GNP growth rate</td>
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<td>-.018*</td>
<td>-.015*</td>
<td>-.017*</td>
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<tr>
<td>(.009)</td>
<td>(.009)</td>
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<td>Density</td>
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<td>-.021*</td>
<td>-.013*</td>
<td>-.021*</td>
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<tr>
<td>(.022)</td>
<td>(.003)</td>
<td>(.003)</td>
<td>(.004)</td>
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<tr>
<td>Density²/1,000</td>
<td>-.012</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(.035)</td>
<td>(       )</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In(mass)</td>
<td>2.629*</td>
<td>3.047*</td>
<td>3.579*</td>
<td>3.100*</td>
<td>3.555*</td>
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<tr>
<td>(1.389)</td>
<td>(.708)</td>
<td>(.727)</td>
<td>(.714)</td>
<td>(.728)</td>
<td></td>
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</tbody>
</table>

\[
\begin{align*}
D_h^{size/100} & = -0.09^* \\
D_h^{location/100} & = 0.64^* \\
D_h^{price/100} & = 0.134 \\
D_h^{size2/100} & = -0.072^* \\
D_h^{location2/100} & = 0.024 \\
D_h^{price2/100} & = -0.91^* \\
D_h^{outside(size2/100)} & = -1.551^* \\
D_h^{outside(location2/100)} & = -0.007^* \\
D_h^{outside(price2/100)} & = 0.624^* \\
\end{align*}

\[
\begin{align*}
\chi^2 & = 201.69 \\
d.f. & = 16
\end{align*}
\]

\[
\begin{align*}
\chi^2 & = 201.57 \\
d.f. & = 15
\end{align*}
\]

\[
\begin{align*}
\chi^2 & = 221.25 \\
d.f. & = 18
\end{align*}
\]

\[
\begin{align*}
\chi^2 & = 224.43 \\
d.f. & = 18
\end{align*}
\]

\[
\begin{align*}
\chi^2 & = 232.36 \\
d.f. & = 21
\end{align*}
\]

\* p < .05.

- Standard errors are in parentheses. The sample contained 22,042 yearly spells and 394 failure events.

Wär I and II significantly lowered Manhattan hotel failure rates. Increases in the number of visitors to Manhattan also lowered the hotel failure rate. In addition, the survival chances of Manhattan hotels were tied to the state of the

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U.S. economy, with failure rates decreasing during periods of economic growth and increasing during periods of decline.

Model 3 introduces the three $D_{it}$ measures of localized competition. Supporting hypothesis 1, $D_{it}^{size/2}$ is significant in the predicted negative direction, indicating that hotels in less densely occupied regions of the organizational size distribution had significantly lower failure rates. In contrast to our prediction in hypothesis 2, the estimate for $D_{it}^{location}$ is significant and positive. Thus, hotels located in regions of Manhattan that were densely populated by other hotels had significantly lower failure rates. This suggests that the competitive effects of geographic crowding were weaker than the benefits of occupying a popular location close to tourist attractions and business activities. Finally, the insignificant estimate for $D_{it}^{price}$ does not support hypothesis 3.

Model 4 introduces the window-based measures of localized competition. The estimates for these restricted localized competition measures provide support for all three hypotheses. In support of hypothesis 1, $D_{it}^{size/2}$ is significant and negative, indicating that hotels with larger average Euclidean distances from others in their size windows exhibited lower failure rates. This finding supports Hannan and Freeman’s (1977) idea that competition is localized to particular segments of the size distribution. The estimate for $D_{it}^{location:w}$ is also significant and negative, providing support for hypothesis 2, indicating that the effects of geographic similarity had the predicted competitive effects within local geographically based market segments in Manhattan. This suggests that the mutualistic effect of geographic proximity in model 3 (i.e., the positive estimate for $D_{it}^{location}$) resulted from the specification of the geographic bounds within which localized competition was operationalized: While being located closer to other hotels in Manhattan increased a hotel’s survival chances, this benefit of proximity was traded off against localized competition among neighboring hotels within more closely bounded geographic locales, i.e., within particular hotel districts. $D_{it}^{price/2}$ is also significant and negative in model 4, as predicted by hypothesis 3. Combined with the insignificant estimate for $D_{it}^{price}$ in model 3, this provides evidence that price competition occurred among Manhattan hotels within particular segments of the price distribution but not among all hotels as an increasing function of their similarity in price. These effects of localized competition on the Manhattan hotel failure rate are also large. An increase in $D_{it}^{size/2}$ equal to 10 percent of the variable’s range translates into a 23.9 percent reduction in the failure rate. Equivalent increases in $D_{it}^{location:w}$ and $D_{it}^{price/2}$ lower the failure rate 13.7 percent and 20.7 percent, respectively.

In order to check our results on localized competition, we performed a separate analysis to examine the sensitivity of estimates for the window-based measures of localized competition to the particular window specifications selected for each organizational dimension. We examined the following alternative specifications to those reported in Table 1: $\mu_{size} = \pm size, /3; \mu_{size} = \pm size, /3; \mu_{price} = \pm price, /3; \mu_{price} = \pm price; \mu_{avenue} = avenue, \pm 4 avenues; \mu_{avenue} =$
avenue, ± 2 avenues; \( \mu_{\text{street}} = \text{street}, \pm 30 \text{ streets} \); and 
\( \mu_{\text{street}} = \text{street}, \pm 20 \text{ streets} \). The estimates for these 
alternatives did not differ substantively from the estimates in 
Table 1. The estimate for the price-localized competition 
measure based on \( \mu_{\text{price}} = \pm \text{price}, \) however, was 
significant only at the \( p < .10 \) level.

Model 5 introduces the outside competitive-window 
measures to examine the separate effects of hotels located 
within and beyond the competitive boundaries specified for 
the window-based measures of localized competition. In 
model 5 the estimates for \( D_{it}^{\text{size/2}} \) and \( D_{it}^{\text{outside(size/2)}} \) are both 
significant and negative. This indicates that Manhattan hotels 
experienced local competition from similar-sized 
organizations (i.e., those within the size/2 range) as well as 
indirect or diffuse competition from larger and smaller 
organizations. In support of the size/2 window specification, 
the coefficient estimates indicate that the local effect of 
increases in \( D_{it}^{\text{size/2}} \) was ten times larger than the diffuse 
effect of equivalent increases in \( D_{it}^{\text{outside(size/2)}} \). In contrast, 
the estimate for \( D_{it}^{\text{outside(location=2)}} \) is significant and positive, 
while the estimate for \( D_{it}^{\text{location=w}} \) remains significant and 
positive. Combined, these estimates suggest that the 
survival advantage of operating in a popular location (e.g., 
close to tourist attractions and business activities) was 
traded off against localized competition with neighboring 
hotels operating in the same popular location. Overall, the 
estimates for \( D_{it}^{\text{location}}, D_{it}^{\text{location=w}}, \) and \( D_{it}^{\text{outside(location=w)}} \) 
support the idea that the spatial evolution of the Manhattan 
hotel industry was influenced jointly by the development of 
agglomeration economies and economies of geography and 
geographically localized competition. These forces combined 
to create intensely competitive clusters of hotels at particular 
locations within Manhattan. Finally, the estimate for 
\( D_{it}^{\text{outside(price/2)}} \) is insignificant, while the estimate for \( D_{it}^{\text{price/2}} \) 
remains significant and negative. This provides further 
evidence that price competition among Manhattan hotels 
ocurred within particular segments of the price distribution 
and not among all hotels as an increasing function of their 
similarity in price.

The table also shows that introducing the competitive-
window measures in models 4 and 5 causes the main 
effects for size and price to become insignificant. Combined 
with the insignificant estimates for the geographic location 
dummy variables, this suggests that the effects of size, 
geographic location, and price on hotel survival may result 
etirely from the position of the values in the distribution of 
Manhattan hotels in terms of size, geographic location, and 
price. The inflated standard errors for the size and price 
coefficients, however, suggest multicolinearity as an 
alternative explanation. (Correlations among these variables 
are given in the Appendix.)

DISCUSSION AND CONCLUSION

Understanding the role of organizational variation in the 
evolution of organizational populations is central to ecological 
theory, because variation in the adaptive capacities of 
organizations within a population forms the basis for 
competitive selection processes and population change. This
study was prompted in part by the growing empirical attention to the relationship between organizational differences and population dynamics. We attempted to build on the existing literature by systematically examining localized competitive processes in the Manhattan hotel industry. The findings of this study demonstrate the promise of models of localized competition for the development of an ecological approach to competitive dynamics that is sensitive to differences among individual organizations and, more generally, to the significance of organization-level variation in the competitive dynamics and evolution of organizational populations.

The results of this research provide direct empirical evidence of the effects of localized competitive processes on failure rates. In particular, the results show that the intensity of competition among Manhattan hotels depends on similarity in terms of size, geographic location, and price; the more similar a focal hotel was to its competitors, the greater the intensity of competition it experienced. The findings also support the idea that competitors are localized within particular segments of the distribution of variation. The predicted effects of localized competition in terms of geographic location and price (hypotheses 2 and 3) were supported only when we used measures of localized competition based on the competitive-window restrictions.

This study also illustrates the complexity of localized competitive processes. Most notably, the pattern of geographically localized competition appears to have resulted from factors specific to the Manhattan hotel industry. As described earlier, location is of primary importance in the hotel industry because it determines proximity and convenience to points of tourist interest or business activity and proximity to competitors in highly localized competitive arenas. Consequently, incentives for locating near other hotels (i.e., economies of agglomeration and geography) must be traded off against localized competition with neighboring hotels. Thus, “good” hotel locations for Manhattan hotels were not necessarily those that were further away from other hotels. This implies that some of the results reported here are not necessarily generalizable to other populations of organizations and points to the need for similar studies in diverse populations. Future replications and extensions of this study could help to establish the generalizability and broader significance of localized competition for the evolution of organizational populations. These results also highlight the need to elaborate the ecological view of localized competition by incorporating ideas from economic models of spatial competition, especially as they pertain to the study of localized competition in segmented environments.

Several future research directions follow from the results of this study. First, there is a need for research examining the relationship between localized competition and the dynamics of organizational founding, growth, and transformation. Such research would help to specify more fully the significance of localized competitive processes for population dynamics and organizational evolution. Second, there is need for research that examines the relative explanatory power and different
substantive implications of alternative competitive-window formulations that embody different theoretical assumptions about the nature of localized competition. The development and testing of these alternative formulations should proceed in the context of a variety of organizational dimensions and across diverse organizational populations. Third, explorations of more complex, multidimensional models and measures of localized competition are needed. For example, in highly segmented geographic environments, such as the Manhattan hotel industry, it may be useful to examine specifications in which localized competition on organizational dimensions such as size and price is treated as nested within a competitive window based on geographic location. Such hierarchically nested competitive windows may prove germane to other organizational dimensions on which the resource mix is highly specialized to particular segments of the distribution of variation. Alternatively, Winter (1990: 288) has speculated that the geographic reach of competitors is an increasing function of their size. This suggests that future research should examine geographically localized competitive windows that are an increasing function of the focal organization's size.

Fourth, future research should be designed to improve our ability to specify the conditions under which different forms and patterns of localized competition operate. In the Manhattan hotel industry, localized competition tended to operate most intensely within particular segments of the distributions of organizational variation studied. Are there other populations in which localized competitive processes operate very differently or not at all? In this regard, Barnett and Amburgey's (1990) conjecture that the competitive reach of the large-sized organizations in a population is reduced by the heterogeneity of the population's environmental niche suggests two research questions for future studies. The first question concerns whether the relevant competitive window for measuring size-localized competition depends on the level of niche heterogeneity. The second and related question concerns whether changes in the level of niche heterogeneity alter the dynamics of size-localized competition. These questions may be equally relevant to other dimensions of organizational variation.

Fifth, this research highlights potential linkages between organizational ecology and economic theories of industry structure. Economic theories usually characterize industrial structure as arising from the differential growth of firms within an industry (e.g., Ijiri and Simon, 1977). In contrast, organizational ecology emphasizes processes of founding and failure as essential components of economic competition. This suggests the need for studies of industry evolution in which the growth and decline of individual organizations as well as the dynamics of founding and failure are considered simultaneously. Ecological and economic theories of industry structure also appear to yield competing predictions. In traditional economic models, large firms are predicted to use their market power, which results from such factors as scale economies, cost advantages, product differentiation, and capital availability, to reduce entry rates of new firms and protect the profitability of the industry.
(Bain, 1956). In contrast, Hannan and Freeman’s localized competition model and Carroll’s resource-partitioning model suggest that localized competition among large organizations may generate market opportunities for smaller organizations. Supporting the predictions of both ecological and economic models, the effects of size-localized and mass-dependent competition in this study indicate that large hotels both competed intensely with other large hotels and generated stronger competition for existing small hotels. Combining ideas from economic and ecological approaches to competitive dynamics may provide new insights into processes of industry structuration.

Finally, while this paper provides preliminary evidence of the effects of localized competition on organizational failure, why organizations located at the tails of the distributions of organizational variation tend to outcompete those in the middle has not yet been explored. Earlier, we suggested that one possible basis for such a pattern of localized competition in terms of size is that large organizations capture the advantages of generalism, small organizations the advantages of specialization, and mid-sized organizations the liabilities of both (Carroll, 1985; Meyer, 1990). In terms of price, we suggested that the ability of economy and luxury hotels to outcompete mid-price hotels may represent a classic case of being stuck in the middle (Porter, 1980): Mid-price hotels are in an inferior cost position to economy hotels, lack the uniqueness required to capture the pricing advantages of luxury hotels, and have not oriented themselves toward a specific, well-defined market segment (i.e., economy or luxury). These observations suggest the need for future research investigating the interaction of competitive strategy and localized competition. Such research could inform strategic management by helping to specify mechanisms underlying the mobility barriers that deter organizations from shifting between strategic groups and by establishing empirically the risks associated with movement between strategic groups.

We have provided an empirical demonstration of the value of studying organizational and population-level phenomena simultaneously. Our understanding of the Manhattan hotel industry is richer because we have incorporated the characteristics of organizations directly into measures of competition rather than counting the organizations in the population and measuring only their density. This answers those critics of ecological theory who have argued against treating all organizations in a population as equivalent. Our research also provides a bridge between strategic management and population ecology. Firm and industry in strategy research have clear analogs with organization and population in ecological research. Strategic management research on competition and organizational strategy can thus inform ecological models that incorporate organization-level variation. By the same token, an ecological approach that is sensitive to both organization and population levels can inform research in strategic management by providing a model of the effects of organizational differentiation in dynamic populations. It is time to expand the boundaries of
both research areas to understand the strategies of organizations as they struggle to survive in a changing world.

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### APPENDIX

**Table A.1**

**Means, Standard Deviations and Pearson Correlations among Independent Variables**

| Variable                  | Mean  | S.D. | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    |
|---------------------------|-------|------|------|------|------|------|------|------|------|------|------|------|
| 1. In(age)                | 3.07  | .98  |      |      |      |      |      |      |      |      |      |      |
| 2. In(size)               | 5.63  | .74  | .068 |      |      |      |      |      |      |      |      |      |
| 3. In(price)              | 1.62  | .66  | .106 | .270 |      |      |      |      |      |      |      |      |
| 4. Left-censored†         | .06   | .201 | .005 | .166 |      |      |      |      |      |      |      |      |
| 5. World War II†          | .03   | .090 | .029 | .089 | .037 |      |      |      |      |      |      |      |
| 6. World War II†          | .12   | .051 | .004 | .121 | .035 | .063 |      |      |      |      |      |      |
| 7. Depression†            | .14   | .275 | .015 | .078 | .039 | .068 | .017 |      |      |      |      |      |
| 8. Visitors/1,000,000     | 5.38  | 1.67 | .525 | .096 | .382 | .198 | .241 | .050 | .346 |      |      |      |
| 9. GNP growth rate        | 3.29  | 6.19 | .059 | .001 | .016 | .018 | .049 | .252 | .229 | .094 |      |      |
| 10. Density               | 284.8 | 74.23| .055 | .014 | .317 | .168 | .243 | .356 | .385 | .098 | .000 |      |
| 11. ln(mass)              | 11.44 | .37  | .224 | .043 | .155 | .230 | .289 | .297 | .310 | .314 | .003 |      |
| 12. Distance           | 70.12 | 38.14| .067 | .442 | .017 | .113 | .115 | .114 | .141 | .158 | .010 |      |
| 13. Price                | .70   | .41  | .270 | .076 | .688 | .044 | .123 | .133 | .102 | .540 | .043 |      |
| 14. Location             | 1.40  | .48  | .133 | .342 | .090 | .089 | .173 | .193 | .143 | .001 |      |      |
| 15. Size                 | 11.15 | 7.84 | .069 | .922 | .164 | .048 | .075 | .067 | .063 | .101 | .002 |      |
| 16. Price                | .22   | .17  | .097 | .247 | .901 | .125 | .105 | .054 | .017 | .421 | .016 |      |
| 17. Location             | .48   | .10  | .033 | .107 | .134 | .208 | .205 | .229 | .272 | .110 | .016 |      |
| 18. Distance             | 68.86 | 37.98| .066 | .418 | .013 | .113 | .114 | .114 | .141 | .157 | .010 |      |
| 19. Price                | .65   | .39  | .039 | .090 | .049 | .619 | .029 | .117 | .139 | .111 | .523 | .044 |
| 20. Distance             | 1.30  | .51  | .280 | .139 | .335 | .103 | .074 | .158 | .176 | .164 | .000 |      |
| 21. Uptown†              | .07   | .005 | .059 | .056 | .021 | .009 | .004 | .004 | .026 | .002 |      |      |
| 22. Upper East Side†     | .09   | .028 | .012 | .206 | .062 | .027 | .007 | .006 | .057 | .003 |      |      |
| 23. Upper West Side†     | .23   | .002 | .021 | .087 | .127 | .019 | .026 | .027 | .006 | .002 |      |      |
| 24. Midtown†             | .50   | .031 | .082 | .063 | .029 | .027 | .023 | .023 | .000 | .001 |      |      |
| 25. Downtown†            | .11   | .049 | .138 | .106 | .386 | .027 | .008 | .056 | .129 | .007 |      |      |

Variable: 10 11 12 13 14 15 16 17 18 19 20

10. Density
11. ln(mass)
12. Distance
13. Price
14. Location
15. Size
16. Price
17. Location
18. Distance
19. Price
20. Distance
21. Uptown†
22. Upper East Side†
23. Upper West Side†
24. Midtown†
25. Downtown†

*The sample contained 22,042 hotel/years. Correlation coefficients > 0.13 are significant at p < 0.05.
†Correlations among these geographic location dummy variables are not given because they are not meaningful.