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ORGANIZATIONAL CHANGE IN THE
ARIZONA FUNERAL HOME INDUSTRY, 1968–1999:
DENSITY, CONCENTRATION, AND VITAL RATES IN
A MEASURED RESOURCE SPACE

by

Robert Saylor Breckenridge

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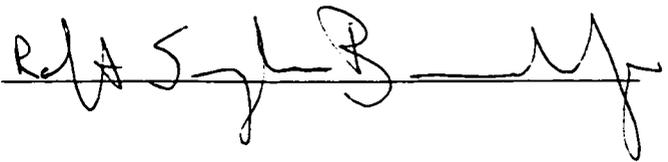
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A handwritten signature in black ink, written over a horizontal line. The signature is cursive and appears to read 'R. A. S. B. M.'.

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ABSTRACT

In this dissertation, I examine organizational density and ownership relations in the Funeral Home Industry in the state of Arizona between 1968 and 1999. I incorporate the theories of organizational ecology and resource dependence alongside institutional theory to analyze changing numbers and concentrations of organizations. In pursuit of this research, I distinguish between establishments, the actual funeral home storefront building operation, and firms, the organizations that own and manage one or more establishments.

Focus is placed on two particular institutions in the funeral home industry: 1) the tight social linkage between the industry and human deaths, and 2) the traditions that limited growth among funeral home organizations. I use these institutional forces along with the size of the resource space and organizational variables to examine competition and concentration as forces affecting the numbers, relationships, and vital rates of organizations via time-series cross-sectional methods.

My findings indicate that hyper-legitimacy of the industry relative to resources plays a key role in population change by promoting organizational growth under conditions of a growing resources space, leading to economies of scale. In general, my results show that establishments develop in localized competitive markets in manners compatible with theories of density and resource dependence; and firms operate at the aggregated state level – across multiple county markets – in manners compatible with the theories of resource partitioning.

CHAPTER 1 – INTRODUCTION

The funeral home industry¹ presents itself as a particularly fascinating arena of study, keyed by its direct relation to the unavoidable human condition of death. The industry has been approached within the context of the sociology of death and dying and labor issues², but it has been relatively neglected from the viewpoint of organizational sociology³. In this dissertation, I pursue research precisely from the organizational perspective, examining the roles of institutions, resources, and patterns of ownership in the changing size and structure of the population of funeral home organizations operating in the state of Arizona between 1968 and 1999.

My research stems from the idea that the funeral home industry in the United States during the 20th century has been embedded in powerful social institutions that affect its operations (Torres 1983; Torres 1988). First, at the intersection of funeral operations with consumers, rigid institutions direct people to use funeral homes for the formal processing of human deaths, and create strong expectations of propriety in the services rendered; second, among funeral homes themselves, institutions established via industry associations determine the manner in which businesses should be structured and managed, and affect how organizations engage in the competitive marketplace; and third,

¹ The industry as bounded here includes business commonly referred to as funeral homes and mortuaries, interacting directly with consumers, providing services (e.g. embalming or cremation) and sales (e.g. caskets), but neither interment, which is the realm of cemeteries and mausoleums, nor exclusively secondary service – doing business exclusively with other funeral organizations.

² See, for example, Kears 1996 or Reynolds and Kalish 1974.

external, state-based legislation has imposed boundaries on the operation of funeral homes by requiring licensing of both businesses and employees, and creating laws that force the complete revelation of available service options and their prices (Torres 1983; Torres 1988; Iserson 1994; Smith 1996; Roberts 1997; Mitford 1998; Arizona State Board of Funeral Directors 2000). Broadly, these institutional forces have two important consequences: they tightly link the industry and human deaths; and they place limitations on variation in organizational form and behavior.

From the 1940s through the 1960s these institutions remained relatively stable. The traditions of the industry encouraged funeral homes to operate primarily as “mom and pop” businesses, remaining small in size and servicing geographically or socially determined locales such as neighborhoods or specific religious groups. Further, funeral directors were linked to these communities as professionals, akin to doctors, lawyers, or clergy; and the industry operated without specific state or federal regulation (Habenstein and Lamers 1955; Farrell 1980; Torres 1988; Smith 1997). For their part, the general population depended on the services of funeral homes – typically pursuing embalming as the method of final preparation of human deaths – and placed great trust in funeral directors, in part as a function of the industry’s professional nature (Farrell 1980; Iserson 1994; Smith 1997; Mitford 1998). David Torres (1988) has shown that these institutional patterns, along with a relatively stable numbers of deaths (around 1.5 million per year during the 1940s and 50s, rising steadily to just under 2 million in the 1970s) discouraged

³ See Torres (1988) for a notable exception that directly informs this dissertation; and Parsons (1999) for an example from the UK.

fierce competition among businesses and resulted in a stable number of funeral homes (around 18,000) operating in the U.S. during this time frame.

However, starting the 1960s and continuing through the 1990s, these institutions have experienced flex: the “mom and pop” standard of operation has been augmented with the acceptance of chain-form funeral homes that operate across county, state, and national borders, and promote “business models” of profit maximization and fierce competition; Federal regulation has come into existence, specifically directing methods of operating funeral business; and the attitudes and choices of consumers, though not their dependence on the services provided, have been altered via increasing suspicions of price-gouging by the industry and increasing rates of cremation (Torres 1983; Torres 1988; Smith 1997; Mitford 1998). Thus, while the industry and human deaths have remained firmly tied to one another, the manner in which they are linked has changed, as has the acceptable range of organizational forms and modes of operation.

In this dissertation, I use these conditions to answer the question “How has the history of institutions in the industry affected the numbers and forms of funeral home organizations?” In particular, I take advantage of the tight linkage of the industry to the resource of human deaths to answer the question “How have changing resources in conjunction with changing institutions affected the numbers and forms of funeral home organizations?” In pursuing this question, I draw on the theories of organizational ecology and the logic of carrying capacity; developing the idea that these changing

institutions and resources affect the legitimacy of organizational forms and the ferocity and consequences of competition⁴ for limited resources.

Carrying capacity is a term taken from bio-ecology, where it has been used to describe the set of possible combinations of numbers, types, and sizes of a specified animal population (e.g. mammals, primates, or gorillas) that can be supported by the conditions and resources (e.g. temperature, food, water, and other animals) found in a given environment⁵ (Kingsland 1985). This same notion has been applied to populations of organizations and the environments in which they operate, forming a basis for the field of organizational ecology (Hannan and Freeman 1977; Hannan and Freeman 1989; Carroll and Hannan 2000). In either case, carrying capacity is particularly important as an indicator of competition and selection: as a population approaches the limits of the

⁴ See, for example, Baum and Oliver (1992) and Dobbin and Dowd (1997) for exemplary studies of the effects of institutions on competitive processes.

⁵ Consider a hypothetical biological example: a population of gorillas living on a mountainside. The gorilla-carrying capacity of this environment is determined by a wide range of factors, some of which describe gorillas themselves and others their external environment. Characterizing the target population, for example, the social structures common to gorillas limits the distribution of sex and age among the population (e.g. only one silverback “alpha-male” can live in a group, with fiercely competitive battles arising among multiple contenders to that status); the genetic structure of gorillas limits their size, preventing the need to consider the possibility of King Kong-like growth; and their biology determines them to be vegetarians, focused on a limited food source (Napier 1972). External to the target population, the volume of vegetation limits the number of gorillas that can exist without the occurrence of famine (and resultant deaths); and the set of other animal populations, in particular possible food competitors (e.g. chimpanzees but not bats) and predators (e.g. human-poachers but not Great White Sharks), further limits the set of possible gorilla populations that can exist on the given mountainside. If we were to suddenly alter these rules such that, say, gorillas followed an alpha-female, or King Kong-like growth were possible, or gorillas were no longer vegetarians, then the set of conceivable gorilla populations that could live on the mountain would change dramatically, as gorillas themselves changed. Similarly, if a drought were to wipe away

resource space (perhaps by growing in numbers or having some members grow particularly large), competitive forces increase in ferocity; and dramatic changes in the environment can act as selective forces against population characteristics.

It is particularly important to recognize that carrying capacity refers to neither an infinitely large, nor a constant set of hypothetical populations. Further, if a population exists at all, then it must be being “carried” and is operating within carrying capacity. The issue at hand is determining how close a population is to some boundary of carrying capacity – this will reflect the extent of competitive and selective pressure being felt by that population⁶.

Though it is very difficult, if not impossible, to precisely measure carrying capacity, it is nonetheless determined by characteristics of the target population and features of the environment, both of which are flexible and possibly measurable (see, for example, McPherson 1983). Thus, carrying capacity is bounded by, and varies in accordance with, many contingencies; for organizations these might include, say for example, the volume of raw materials, demand for services, and legal constraints against certain business practices. As such, measuring these types of features provides some definition to carrying capacity; and more importantly for the ecological perspective, these conditions combined with measures of the organizational mass itself provide indicators of

food sources or a band of poachers did move onto the mountain, then additional changes to carrying capacity would occur.

⁶ If a hundred additional gorillas are placed on the aforementioned mountaintop, then competitive pressure will increase dramatically, resulting in the death of some portion of the population. Alternately, a Great White Shark *can* exist on the African mountaintop (or on a dune in the Sahara desert or in my kitchen), however environmental pressures combined with the creature’s biology will quickly “select against” the shark.

competitive and selective pressures being experienced in organizational populations, and can be used to model the vitality of organizational populations (Hannan and Freeman 1989; Hannan and Carroll 1992; Carroll and Hannan 2000).

Institutionally informed ecological research, the project at hand included, often focuses on the following conditions as key to understanding populations of organizations and the competitive and selective pressures they face: the amount of resources available to organizations (Stinchcombe 1965; Hannan and Freeman 1977; see Baum and Oliver (1992) for example); the number of organizations in the population (Hannan and Freeman 1989; Hannan and Carroll 1992; see Hannan and Freeman (1987) for example); the sizes of these organizations or the size distribution of a population of organizations (see Barnett and Amburgey (1990) for example); and social institutions – which can be envisioned as both constraints (see Barnett and Carroll (1993) for an example on formal regulation) and encouragements (see Tucker, Singh, and Meinhard (1990) for an example on endorsement) to the manners in which organizations are structured, how they interact with each other, and how they approach the environment (Fligstein 1990; DiMaggio and Powell 1991; Scott and Meyer 1994; Scott 1995). As played out in terms of the logic of carrying capacity, these institutions can be forces of both selection, as might be the case if regulation suddenly forbids a certain type of operation (e.g. the effect of Prohibition laws on beer breweries), or competition, as might be the case when social arrangements between actors change (e.g. the effect of de-regulation on the telephone industry).

With this in mind, the story of institutional change in the funeral home industry links to changing populations and ideas of carrying capacity: as institutions change so do

the structures, behaviors, and relationships of funeral homes, affecting the relative positioning of the population and the boundary of carrying capacity. At the same time, the stable institutions that produce a tight linkage to the external resource of deaths afford another identifiable feature of carrying capacity. I propose to use these conditions, as indicators of variation in competitive and selective pressure felt within the population, alongside measures of the size of organizational populations, thus allowing me to answer more detailed questions of the form “How do institutions, resources, and numbers of organizations combine to affect the founding and failure of funeral home organizations?”

As presented above, relationships between organizations are also features of carrying capacity and, in turn, components of organizational populations affecting competition and selection. In the funeral home industry, the change in institutional structure which allowed for the rise of “chain-form” organizations is specifically describing such a relationship: the ties between establishments and the firms that own them⁷. Historically, the industry consisted predominantly of independent, family owned, single-establishment firms. However, since the early 1970s local, interstate, and international chains of funeral homes – with a single firm owning multiple establishments, perhaps in multiple markets – have developed as large and powerful entities (Smith 1996; Roberts 1997; Mitford 1998). This concentration of ownership is, at least in part, a consequence of institutional change, but it has also dramatically altered the nature of the industry, affecting competition and cooperation among firms and

⁷ “Establishment” refers to an actual place-of-business (e.g. the hypothetical Peaceful Funeral Home) and “firm” refers to an entity, such as a corporation (e.g. the hypothetical Mortuary Services Inc.), that owns and operates one or more such establishments.

establishments, channeling business between funeral homes and cemeteries with common owners, and constraining the options available to consumers (Smith 1996; Mitford 1998). As a consequence, including a measure of concentration of ownership will further delineate carrying capacity and allow for a more detailed picture of the competitive landscape.

Consider the specifics of the case at hand. In the state of Arizona between 1968 and 1999, the number of human deaths per year increased from 13,681 to 39,673; the number of funeral establishments increased from 85 to 145; and the number of funeral firms initially increased from 72 to 103 in 1984, then declined to 76 in 1999 (see Figure 1). One possible set of relations among this set of firms and establishments is an equal distribution of ownership, where each firm owns an equal number of establishments. However, this was certainly not the case in Arizona. Instead, the ownership of establishments became increasingly concentrated (i.e. unequally distributed) within a subset of multi-unit firms, such that in 1968, 24% of establishments were owned by 12% of firms within the context of multi-unit operations; and by 1999, 60% of the establishments were linked with 24% of the firms in such organizations.

Unwrapping the forces behind these changes within the industry forms the basis of my dissertation. Reformulating those presented above, I pursue answers to two broad questions: 1) “How have changing industry institutions and resources affected the numbers of organizations and concentration of ownership in the industry?” and 2) “How have changing institutions, resources, numbers of organizations and organizational concentration combined to affect the vital rates of the population of organizations?”

TOPICAL, THEORETICAL, AND METHODOLOGICAL PUZZLES

While the funeral home industry may be substantively intriguing, it presents as uniquely suited for approaching several important theoretical and methodological issues of organizational studies. Foremost to my dissertation, the industry's orientation to a single resource affords an insightful foray into the study of institutional forces. Specifically, I can compare the effects of the stable and strong institutions that tie deaths to the industry against time-varying institutions that affect organizational and inter-organizational structure and operations: by measuring deaths I can compare the effects of changing elements within secure institutions against institutions that, themselves, change over time. Organizational institutions are constructed in a variety of ways, including habituation, associations among organizations, and/or regulations (Scott 1995); and they can have powerful effects on organizational goals, structures, and relationships (Meyer and Rowan 1977; DiMaggio and Powell 1983; North 1991; Scott 1995). In the funeral home industry, previous research (Torres 1988) has focused on stability in association-based institutions as the explanation for the historic structuring of the industry, however this research was pursued during a period, and at a level of aggregation, that featured a stable number of deaths as well. In contrast, the case I examine presents changes in both the resources space, associational guidelines, and federal regulation, allowing for a more detailed examination of these forces. These institutions together identify a duality of institutions in the industry – those affecting the structuring of organizations and those operating at the level of the resources. These linkages of institutional and organizational

changes encourage the incorporation of time-varying period effects and the measurement of the resources to which institutions are oriented in statistical models to account for changing institutions and institutional forces (see, for example, Baum and Oliver (1992)), enabling the pursuit of an understanding of how institutions affect organizational densities and concentration in the industry.

A second puzzle relates precisely to resources. As indicated above, theories of industrial development and organizational cooperation and competition often emphasize the importance of resources. Two theoretical traditions which inform my dissertation, organizational ecology (Hannan and Freeman 1977; Carroll and Hannan 2000) and resource dependence (Pfeffer and Salancik 1978), specifically present competition for limited resources as a force driving the vital organizational processes of founding, failure, and consolidation. However, ambiguity in the identification and definition of resources, unreliable measures of their availability, and difficulty in measuring the changing economic force of demand can prove problematic to this area. For example, Carroll and Swaminathan (1991; 1992; 2000) study the population of U.S. breweries, but would have great difficulty measuring either raw materials or, perhaps more importantly, consumers in order to control for the size of the resource space as a feature affecting these organizations. Measuring, say, hops production would likely be ineffective at establishing a constraint on the density of breweries, as breweries can have influence on the production of hops flowers, and these flowers are resources for other industries as well. Similarly, measuring beer drinkers, or potential drinkers, is extremely difficult. Everyone is a potential consumer, but people can conceivably drink nothing or a great

deal from many different breweries in any given time period and consumptive tastes may well be affected by the organizations themselves. These brewery studies, and other similar ecological research, assume an unmeasured, but finite, level of resources upon which the population of organizations depends. To explicate this basic theoretical assumption, I am examining an industry in which the primary resource is unambiguous, reliably documented, fully exploited, and exists prior to, and unaffected by, the industry itself (Iserson 1994; Smith 1996). The funeral home industry's minimalist orientation toward the singular resource of dead bodies allows for this measure to be readily incorporated into statistical models of organizational processes as a measure of raw materials, an indicator of demand for the industry's services, and a feature of the competitive landscape.

A third puzzle has faced the examination of the development of organizational populations: what is the appropriate unit of analysis (Hannan and Freeman 1977, Carroll and Hannan 2000)? The ecological tradition of organizational analysis focuses on the study of some geographically, temporally, and topically bounded population of organizations – for example, California wineries between 1940 and 1985 (Delacroix et al. 1989), Pennsylvania telephone companies between 1879 and 1934 (Barnett and Amburgey 1990) or Toronto day care centers between 1971 and 1989 (Baum and Oliver 1992). However within populations, distinctions between firm- and establishment-form organizations may not be clearly drawn and are rarely examined separately, despite the fact that these are different organizational structures and may well respond differently to identical environmental conditions. To return to breweries, Carroll and Swaminathan

(2000: 716) point to disconnections in their research precisely because some data is collected at the level of the brewery and other data at the level of the brewing firm. If we follow the tack of the importance of raw materials and consumers as resources, the resource environment and process of competition is likely to be different for establishments from the firms that own them – i.e. the brewing firm operating many different breweries and beer labels is a different organization from one of its individual brewery-labels, and the two entities relate to the resource environment in decidedly different manners. Carroll and Swaminathan (2000) address this by identifying the population of organizations as “identities, based on their socially coded properties rather than on only official classifications or structural architecture” (p. 719) – specifically avoiding this distinction in form which might affect the competitive process and focusing on perception to identify the unique organizational players. I approach this puzzle from a different, and perhaps simpler, perspective. I use formal identification of legal entities and physical operations to separately analyze the complete populations of both firm- and establishment-form organizations operating in the industry, allowing me to compare how ecological forces differently affect organizations by form.

A fourth puzzle is that studies of organizational populations have not fully approached the notion of relationships between organizations (Haveman 2000). In particular, I consider that organizational relationships might mitigate or enhance the competitive effect of organizational densities. By considering the dual populations of firms and establishments, I telegraph the discussion of the ownership relations between the two, leading to the dynamic issue of organizational concentration.

Concentration in organizational studies typically references the frequency distribution of organizational size based on sales or market share among a population of organizations (Carroll and Hannan 2000). In the aforementioned brewery study (Carroll and Swaminathan 2000), organizational concentration is measured in terms of the distribution of market shares of beer sales (the proportion of the market held by the five largest organizations) and is shown to have a positive effect on organizational foundings. I propose to extend the idea of concentration to one of ties between organizations, adding a peculiar social quality to what is often a measure of financial fortitude. In my case, I consider the ownership ties among the population of firm- and establishment-form organizations, so that concentration describes the distribution of the “market share” of control over existing establishments, not of total sales in the industry. This perspective affords insight into two conceptualizations of concentration, determined by unit of analysis. First, from the perspective of firms, the concentration of ownership ties is also a measure of the concentration of the size distribution, where size is measured in number of firms owned. Second, from the perspective of establishments, common ownership implies a “sibling” relationship that might buffer, or otherwise affect, the effects of competition between those establishments. By measuring concentration via this set of ownership ties, I help to develop theories about how the distribution of organizational sizes affects industrial development by attaching the ideas power and social relationships (e.g. ownership) to that of size. Concentration in my case reflects not only size as organizational mass, instead of the more typical sales mass, but as an actual “bounded-togetherness,” or integration, of organizations.

FUNDAMENTALS OF ORGANIZATIONAL CONCENTRATION

A straightforward conceptualization from the case at hand can provide a dynamic understanding of concentration. Consider an organizational environment consisting of ownership relations between establishments and firms. For establishments, concentration reveals ties binding potential competitors together; for firms, concentration refers to the distribution of the total size of population – where size is measured in establishments owned by each firm in the population. A low concentration means that each existing firm owns one and only one establishment (see Figure 2). Concentration increases as one or more firms own disproportionately large numbers of existing establishments – perhaps as a function of firm merger or failure that results in changing ownership of establishments, or via the founding of new establishments by existing firms (see Figure 3). If a single firm owns all existing establishments, then total concentration exists (see Figure 4). Concentration can thus be seen as the outcome of three vital processes of organizations: founding and failure for both establishments and firms, and changing ownership of establishments.

The practical implications of concentration can be illustrated via the different organizational forms being studied. From the perspective of the firms, concentration enables economies of scale. A multi-unit firm may be able to centralize services and benefit from reduced costs of operation. Further, these firms can own establishments in multiple geographic markets and thus shelter themselves from fluctuations occurring in isolated areas (i.e. multi-unit firms can operate in coarsely grained resource environment

by dispersing their units such that they increase the likelihood of having establishments in resource-rich areas). Additionally, these firms are larger in size and thus have a reduced likelihood of failure (Ranger-Moore 1997). As such, high concentration may reveal a small subset of firms with a particular competitive advantage in a given market, and across multiple markets. The population of establishments is affected by concentration via common bonds to these firms. If a firm has dispersed establishments, then any establishment can be sheltered from local resource deficiencies by the firm's robust holdings in other areas.

Operationalizing concentration can occur in a variety of ways. Two common methods are the gini coefficient of inequality, and the identification of the percent of total size (in this case number of establishments) captured by the largest, say, five firms⁸. However, these measures can be problematic and imprecise. Equal gini scores can be established within populations featuring very different resource distributions and, thus, inequality profiles; and, for the case at hand, the number of firms and establishments determines the possible range of gini scores (i.e. a population of firms and establishments might have maximal ownership concentration, but still have a low gini coefficient). It is thus problematic to compare scores over time and space featuring different organizational populations. In the case of measuring concentration exclusively via the five largest firms, a great deal of detail in the profile of the population is lost (Hannan, Ranger-Moore and Banaszak-Holl 1990); in my case, that would be information regarding the particularly at-

⁸ See Carroll (1985) for example.

risk population of single-establishment firms (the smallest possible firm size thus never a part of the top five).

I propose the use of a modified version of the Herfindahl index (Herfindahl 1974, Tirole 1988), to measure concentration. Often used in legal studies to measure market share (Finkelstein and Levin 1990), it has been used successfully in organizational studies as a feature of the organizational landscape (Dobbin and Dowd 1997). This is an aggregate score, like the gini, based on the sum of the proportion of the total market size captured by each individual firm. The advantage to its use here is twofold: first it captures at least some information from every firm and establishment operating in a market; and, second, it can be adjusted to control for the total number of firms and establishments operating at any one time, thus creating a standardized score.

Examining the case at hand, I find that the percentage of establishments operating singularly during 1968, 1984, and 1999 decreased from 76%, to 62%, to 40%; and the percentage of firms owning only one establishment decreased from 88%, to 84%, to 74%. By using the Herfindahl-based method (described thoroughly in Chapter 4), this trend can be measured with a single score to reveal the changing level of concentration of ownership in the industry (Figure 5).

FORMALIZING THE DISSERTATION

Size of organizational populations, competition for limited resources, and concentration of organizations are core, long-lived topics of interest to sociology: Emile Durkheim, in *The Division of Labor in Society* (1984), identifies increasing population

size as the source of competition which, in turn, drives the division of labor, producing specialization in effort and resource orientation (Turner 1998); and Karl Marx, in *The Communist Manifesto* (1978), presented the rise of the bourgeoisie leading to the concentration of industry in the hands of a few owners and to the centralization of power. In the twentieth century, the study of organizational populations has often focused precisely on their competition for limited resources, the concentration of organizations, and the domination of large, consolidated firms⁹. I study precisely these features as they develop in the Arizona funeral home industry between 1968 and 1999.

From the perspective of the organizational environment, competition and concentration, and the linkage between the two, have been developed in a variety of ways. Institutional theory provides a schema by which to contextualize organizational operations, enabling the identification of associational and regulatory forces as determinants of limitations on variation in organizational structure, size, and operations (Scott 1995). Such institutional forces have been specifically shown to impact the process of competition (Baum and Oliver 1991; Dobbin and Dowd 1997) and the rise of multi-unit organizations (Morris 2000). I use this platform to test the effects of changes in three separate institutions – located at the levels of consumers, the industry and the state, as presented above – on changes in the population of funeral homes. As is often the case¹⁰, I pursue this by incorporating institutions into the logic of organizational ecology.

⁹ See Perrow (1986) or Scott (1987) for general overviews of these, and other, topics in organizational studies; see Scott, et al. (2000) for a specific analysis of these concepts among healthcare organizations.

¹⁰ See again, for example, Torres' (1988) previous, limited study of funeral homes; Baum and Oliver (1991) on day care centers; and Dobbin and Dowd (1997) on railroads.

One of the most robust and testable traditions in organizational studies, organizational ecology focuses precisely on competition for limited resources as a key force shaping organizational populations (Hannan and Freeman 1977; Hannan and Freeman 1989; Carroll and Hannan 2000), in turn affecting vital rates of organizational founding, growth, and failure¹¹. As forces of legitimation increase the social acceptance and economic viability of an organizational form, the numbers and size of organizations increase until the population approaches carrying capacity and competition increases, leading to demographic changes that reduce the pressure of competition by altering the size of the population. As presented above, resources and institutions serve here to adjust carrying capacity and affect the timing and ferocity of competition. I test ecological theories by taking advantage of the institutions which tightly link funeral homes and human deaths, assuring me of the legitimacy of the industry and its overwhelming orientation towards a single resource. Thus, I incorporate the size of the resource space and organizational densities into quantitative models of organizational founding and failure in order to capture the force of competition; and further examine how this force changes under varying institutional regimes.

The notion of organizational concentration is developed in organizational ecology from three perspectives: 1) highly competitive markets lead to concentrated industries, dominated by large, generalist organizations, but this allows for the rise of small

¹¹ See Baum (1996) for an extensive review of results in this area.

specialist organizations¹² (Peli and Nooteboom 1999); 2) the size distribution of organizations is a measure of concentration and is a feature of the population affecting competition¹³ (Ranger-Moore, Breckenridge, and Jones 1995); and 3) organizational mergers are a form of failure event affected by competition (Hannan et al. 1998). I approach all three perspectives in this dissertation: first, by examining concentration as a dependent variable; second by including concentration as an independent variable in analyses of founding and failure rates; and third, by examining change of ownership as a dependent variable.

Concentration has also been studied from the perspective of the active organization itself. Resource dependence theory presents competition between organizations for limited resources as a condition producing uncertainty, to which organizations might actively respond with horizontal integration¹⁴, thus concentrating ownership (Aldrich and Pfeffer 1976; Pfeffer and Salancik 1978). Similarly, transaction cost economics ties the cost of operation in a market to the action of integrating competitors into the organization in order to reduce the expense of contracting (Williamson 1975, 1985). I use both of these logics to enhance the story of competition as an ecological force affecting concentration.

¹² This refers to resource partitioning – a condition describing the rise of large generalist organizations in the dense centers of a resource space, and allowing for small specialists in the areas outside of the mass market.

¹³ This refers to size-localized competition – a condition describing the increased intensity of competition between organizations of similar size.

¹⁴ Horizontal integration refers to merger or consolidation of organizations. In the case at hand this could be envisioned as one firm being purchased outright by another, so that the ownership of establishments changed hands, reducing competition.

Hence, my dissertation is an analysis of dual organizational populations, firms and establishments, within the same industry being differentially affected by ecological and institutional forces; augmented by the use of the logics of resource dependence and transaction cost economics to inform my ecological hypotheses about concentration of ownership ties between the forms, and the effect of concentration on organizational processes.

Specifically, I provide answers to the following linked set of questions: 1) How do changes in social institutions and the size of the resource space differently affect the populations of firm- and establishment form organizations operating in the same industry? 2) How do competition for limited resources and changing institutions, along with diverging populations of firms and establishments, affect concentration in a population of organizations? And 3) how do resources, institutions, and organizational concentration combine to affect the vital rates of founding, failure, and changing ownership in population of firm- and establishment-form organizations? I pursue this via a quantitative analysis of the Arizona Funeral Home Industry between 1968 and 1999. Using time-series cross-sectional statistics, I examine the complete population of funeral home firms and establishments operating in Arizona during this time period – taking particular advantage of the industry’s orientation toward the singular resource of human deaths; the strong industrial and secular institutions surrounding the services it provides; and my primary-source data revealing the complete history of ownership ties between establishments and the firms that own them.

In the process of the addressing these questions, I approach an additional set of theoretical and methodological puzzles: 1) How is the concentration of ownership ties within a population of organizations related to the concentration of size in that population? 2) How can organizational concentration be measured consistently over time and compared across the different markets within which organizations operate? 3) How do the resource space and organizational population interact to affect competition? And 4) how is this competition mediated by changing institutional constraints? Finally, I engage this dissertation via topical data that answers the substantively interesting question: How has the funeral home industry developed over time as a function of institutional and ecological processes?

THE PLAN OF THE DISSERTATION

This project is an examination of the demography of the population of funeral home organizations operating in Arizona between 1968 and 1999. Precisely, this is a two-population¹⁵ demography of funeral home establishments and funeral home firms incorporating measures of changing carrying capacity to explain organizational densities, the ownership relationships between firms and establishments, and the vital rates of market entry, market exit, and consolidation of ownership in order to test theories of density- and resource-dependence. I model these conditions and processes, in part, as functions of changes in resources and the institutional environment through the use of

¹⁵ The notion of "two-population" demography has been used when studying, say, both organizations and their employees (Stewman 1988). Here, this term is used to similarly capture the interactive features of the two linked organizational forms.

time-series cross-sectional multivariate analyses. In this dissertation, I develop a historical and methodological background for analyzing the funeral home industry, then proceeds to the specific set of proposed questions.

Chapter two presents a history of the United States funeral home industry in the latter half of 20th century. This portion of the dissertation outlines the institutional changes and economic structuring of the industry, focusing on their correspondence with the rise of city, state, and national organizational consolidation. I provide a timeline that identifies the key events that have shaped the industry, both nationally and at the state level; I describe the secular institutions surrounding human death that affect industry-consumer relations; I identify the changes in industry institutions that opened the door for consolidation; and I describe the state-based regulations that constrain funeral home operation. In particular, I examine the waning of the traditional “professional” period in the industry and changing orientations of consumers that enable consolidation as organizational behavior.

Chapter three establishes the theoretical bases for this undertaking, considering organizational ecology and demography, resource dependence, and institutional theories of organizational change. I focus on the features of these theories that concern competition and its effects on organizational vitality and ownership relations. I use this review to create general sets of hypotheses that will lead to the quantitative examination of the data describing the development of the Arizona funeral home industry (recall Figures 1 and 5).

Chapter four covers data, methods, and modeling in the project. I briefly describe my primary data collection from state regulatory agencies and the coding and quantification used to produce the four distinct, time-series data sets used in the dissertation: each has a market-year unit of analysis and is based on one of the organizational populations (firms or establishments) and market boundaries (by county or aggregated to the state level). I detail the construction of the standardized Herfindahl index, the key variable measuring concentration; and I describe the range of statistical methods used in the analytical chapters. Specifically, via the STATA (StataCorp 2001) statistical software package, I use Prais-Winsten time-series analysis, generalized least-squares time-series cross-sectional analysis, and/or negative-binomial general estimation time-series depending on the dependent variable and level of aggregation of the data. To supplement these time-series cross-sectional methods, I incorporate techniques of discrete-time event history analysis (Allison 1984; Yamaguchi 1991) in modeling to enhance understanding of time-dependency and the patterns it produces in changing industry structures.

Chapter five focuses my empirical analyses. I disentangle organizational forms and the resource space by separately analyzing the size of the population of funeral home establishments and that of funeral home firms as functions of the resource and institutional environments. Playing on the singular resource-of-emphasis in the funeral home industry, I use the number of human deaths as a basis from which to model the density of organizations by form (firm or establishment) and by market boundary (state or county) – for a total of four modeling efforts. I consider both period- and continuous

time effects to account for institutional changes that have affected the competitive and structural nature of the industry; and interaction effects to further examine the importance of institutional forces on organizational densities. In doing so, I separate the notions of density and resource space, explicate ideas of carrying capacity as a function of institutions and resources, and develop ideas about the differences between firms and establishments as *organizational forms*.

Chapter six pursues concentration as dependent on the previously considered densities of organizational forms. The divergence of firm and establishment populations focuses attention on the relationship between them. I use resources, densities, and institutional effects to model levels of concentration of ownership at both the state and county level. Using time series techniques, I predict concentration based on features affecting carrying capacity, which captures the market feature of competition – a critical component of many theories of concentration. This reveals an increasing concentration of ownership and hints at the importance of change in ownership and consolidation as important vital rates of organizations.

Chapter seven then pursues the vital rates of organizational founding, failure, and changes in ownership. Here, I separately model counts of foundings and failures, at both the state and county level, for the populations of firm- and establishment-form organizations. In addition to the consideration of institutions and resources, I develop the idea of ownership linkages as mediators of competition among tied establishments, thus mitigating failures; and propose that this concentration has a negative effect on founding as well, via increasing organizational efficiencies. For firm-form organizations,

concentration allows testing of relative size distribution as a population characteristic affecting vital rates. Considering the establishment population as that which is capable of changing owners, I propose that increasing competition promotes change in ownership, where competition is directly related to establishment density and inversely related to the size of the resource space and level of concentration.

Chapter eight concludes the dissertation. I specifically recount answers to the questions offered at the beginning of this chapter, presenting the contribution of my dissertation broadly to sociology, and specifically to the study of organizations and the ecological perspective. I also outline future research to which these findings, and this project in particular, extend.

CHAPTER 2 – THE CASE OF THE FUNERAL HOME INDUSTRY

In this chapter, I describe the funeral home industry, paying special attention to its economy relative to resources and changing institutions regarding formal structuring and normal business operations. I identify the distinctions between funeral home firms and establishments, their varied economies and modes of operation, and provide a brief overview of cultural changes in the approach to death and death care that have affected the industry.

The organizational field of death care¹⁶ constitutes an essential part of the United States' economy and culture: approximately 2.3 million deaths and over seven billion dollars went into the U.S. death care industry in 1996 (Newman 1997); and Smith (1996) points out that, accounting for inflation and fluctuating death rates, these numbers are similar for the past century if not longer. This industry provides culturally essential services, based on biologically unavoidable conditions, allowing the living to have dead human bodies removed, processed (embalmed, cremated, or otherwise treated in preparation for interment), disposed of (buried, scattered, placed in a mausoleum), and memorialized (given a headstone or marker) – enabling dead bodies to be treated in such a way as to be neither bacteriologically nor culturally offensive (Iserson 1994). This industry is active almost exclusively in small local markets, has no name-brand

¹⁶ The boundaries of the Death Care field (Smith 1996) include a wide range of businesses, including funeral homes, crematories, cemeteries, mausoleums, casket production, gravestones and memorial markers, and even florists. However, the research presented here focuses exclusively on funeral homes, which includes all embalming

recognition, incorporates little price competition (Harmer 1963; Torres 1988; Smith 1996; Roberts 1997; Mitford 1998), and has only recently become home to large vertically and horizontally integrated organizations (Torres 1988; Iserson 1994; Smith 1998).

The conception of funeral homes as private locations outside of the home where the servicing of death takes place has existed in the United States since the early 1800s – when cabinet makers first began to specialize in caskets (Farrell 1980; Smith 1996; Mitford 1998). Embalming rose to great prominence in the United States during the U.S. Civil War (Iserson 1994) and by the time of the creation of the National Funeral Directors' Association in 1882, the funeral industry had organized itself as a set of profit-making, service-oriented businesses (Farrell 1980; Torres 1983; Smith 1996). Funeral homes have become a part of the traditional process of disposal of the dead in the United States, and some sort of funeral home service has been incorporated into most deaths since the early 20th Century, with these formal organizations becoming almost a certain part of final disposition by the 1950s (Habenstein and Lamers 1955; Farrell 1980; Larson 1996; Smith 1996; Newman 1997; Service Corporation International 1998; Loewen Group 1998). This despite the fact that the services and processes provided by funeral homes are not required by any state or federal law, except in specific cases with causes of death that can affect public health (Iserson 1994)

Since the mid-20th century, the funeral home industry in the U.S. has undergone dynamic changes in ownership structures. Through the first half of the 1900s, almost

facilities and crematoriums that are open to the public and not solely contractors with

all¹⁷ funeral homes in the United States were singular operations, where a firm (a corporation, partnership, or proprietorship) owned and operated one establishment (a physical building service site); and when chains did exist, they were small, local, and family-owned (Bowman 1959; Torres 1988; Smith 1996). The most primary and fully enrolled funeral home association – the National Funeral Directors Association (NFDA), with members from over 75% of active organizations in the United States (Torres 1988; Smith 1996) – has served, in part, to organize the professional efforts of the industry, promoting an organizational model that promoted small organizational sizes and intimate community relations, and minimized competition in pursuit of professionalism (Torres 1988). However, by the end of the 1960s, the Association began to release pressure against advertising, consolidation, and marketing, and promoted a more business like atmosphere in the industry – this in response to the petitions of a few already growing businesses, and the need to account for problems in succession among small-business owners, when family heirs did not choose to continue the business, that were necessarily resulting, against the traditional guidelines, in local consolidations (Torres 1988; Iserson 1994; Smith 1996). By 1992, the U.S. featured 15,647 funeral establishments owned by 12,423 different funeral firms; 68% of these establishments and 88% of the firms were linked in singular businesses, where the remaining organizations (4714 establishments and 1490 firms) were players in multi-unit systems – with the twenty largest firms owning a total of 973 establishments across the country (Smith 1996). And by 1997,

other businesses.

¹⁷ Bowman (1959) claims that, at his date of writing, around 90% of all funeral homes were operating individually, outside of chains.

almost 2000 of the active funeral establishments in the U.S. were run by the three largest death care firms in the United States: Service Corporation International, The Loewen Group, and Stewart Enterprises¹⁸ (Newman 1997; Stewart Enterprises 1998; Service Corporation International 1998; Loewen Group 1998; Horn 1998).

In the state of Arizona, numbers and relations in the funeral industry changed in manner similar to that of the nation as a whole. Between 1968 and 1999, while the number of human deaths increased monotonically, the number of funeral establishments increased at a decreasing rate; and the number of funeral firms initially increased, only to decrease in the latter third of the time span (recall Figure 1). During this time, the ownership of establishments became increasingly concentrated, with large proportions of establishments being owned by relatively few firms (recall Figure 5). Similar to what has occurred in the rest of the country, large corporations, such as Service Corporation International and Stewart Enterprises, entered the state and bought or founded a large number of establishments. By 1999, some individual firms owned almost 50% of the establishment in county-level markets.

FUNERAL ORGANIZATIONS AND HUMAN DEATH

Despite the changing structures of ownership, this industry is noteworthy not for volatility, but for stability. Since the early 20th Century, the funeral home industry has

¹⁸ Note that there have been upheavals in the operation of these large organizations since 1997, so that the names of operating corporations have changed along with ownership.

been nearly perfectly legitimated,¹⁹ so that it services virtually all possible demand – and does so in an inelastic fashion: it is primarily oriented toward that single, measurable resource of human deaths; and nearly every human death is processed, in some way, via the industry (Iseron 1994; Smith 1996; Mitford 1998); each death (unit of the resource space) is typically processed only once and by one establishment; and the industry has no reasonable way to affect the size of this resource space²⁰. Consumers have few, if any, other desirable options than to utilize the services of the industry when deaths occur. Even with modern trends in cremation and direct disposal (where bodies are sent directly to a crematorium, usually as part of membership in a group that pre-purchases a bulk of services at a discount rate) bodies are processed through, and profits are obtained by, funeral homes (Iseron 1994; Smith 1996; Roberts 1997). Still, it is possible, though rare, to completely avoid funeral home operations (and cemeteries) via home-based preparation and interment (Mitford 1998), through alternate facilities such as cryonics (freezing the dead in hopes of future revival) (Iseron 1994), or through medical donation (which often results in direct cremation at the medical institution). Nonetheless, choices

¹⁹ This refers to legitimation in the “taken-for-granted” sense of Meyer and Rowan (1977) and Meyer and Scott (1983); and the “desired and accepted” sense of Suchman (1995).

²⁰ Note, however morbidly, that in mid 1997, the Loewens Group, an international death care chain owning cemeteries, crematoriums and the second largest number of funeral homes of any firm in the U.S., began the purchasing of almost a dozen children’s and elderly hospice centers for the terminally ill (Loewens Group 1998). And do recall the foreboding claim “Soylent Green is people!” according to Police Detective Thorn (played by Charlton Heston), upon discovering that the popular food made by the ubiquitous mega-monopoly The Soylent Corporation is made from dead bodies processed through the Soylent Corporation’s funeral service branch, in the MGM motion picture “Soylent Green” (Harrison and Greenberg, 1973).

beyond the realm of funeral homes are an exception to typical cultural patterns in the United States and were rarely pursued in the sample examined in this dissertation²¹.

So, the nature of consumption in death care is very constrained: nearly every consumer who has a dead body needs to have it processed and interred in a very timely manner, and only people who are responsible for dead bodies have any need to use the industry. Further, there is no realistic way for death care providers as a whole to increase demand for their services from consumers: while the tobacco industry might try to convince more people to smoke (because many possible smokers are not doing so), death care providers have no one to appeal to for increased business – almost everyone who could possibly use their services most certainly does. Here, it is important to note that consumer choice, then, does not play a grand role in the existence of the industry itself, but instead factors into the services provided by funeral businesses (say, cremation as opposed to embalming) and the relative success and failure of the particular operations in any competitive market (Iserson 1994; Smith 1996).

The carrying capacity of any death care market is, thus, bound tightly with the number of dead bodies available. Just as the carrying capacity of rabbits might be measured by the amount of grass available to eat, the mass of funeral home organizations that can survive in a market is determined by the number of dead bodies available – though, of course, there are a wide range of possible configurations of numbers and sizes of firms and establishments that could make up this mass. Additionally, the fully legitimated state of the industry has a second implication relative to human deaths: it

²¹ Evidence from Arizona indicates that less than 0.3% of deaths are processed

requires that all dead bodies be processed by funeral homes. As a result, the size of the resource space will almost perfectly correspond to the mass of the industry.

INSTITUTIONS AND REGULATION

Tradition and culture are important factors when studying death care. The mere thought of death conjures up varieties of cultural and possibly quite strong religious implications in many people's minds. In America, death is often associated with sorrow and loss, and the industry and businesses associated with this event must somehow reflect this cultural pattern. Funeral directors and cemeterians fought against morbid imagery of their jobs by becoming civic leaders and upstanding citizens in their communities and by creating educational requirements that limited practitioners – creating a professional nature that was pursued in their endeavors and promoted by industry associations (Farrell 1980; Torres 1988; Iserson 1994; Smith 1996). Further, this professionalism played a key role in structuring operations towards the traditional form of small business operation that would more clearly represent the professional image and be more easily controlled by the profession-promoting bodies themselves (Torres 1988). As mentioned above, while this professionalism is still a valuable part of the culture of the industry (Smith 1996; Newman 1997), the notion of pursuing more standard business practices has begun to dominate the field.

A stable number of deaths in the U.S. – resulting from an increasing population and decreasing death rates – along with the described linkage between resources and the

completely outside of the industry.

industry, allowed for a reasonable equilibrium to come into existence, wherein the number of funeral home establishments in the US remained stable, at around 18,000 businesses, from the middle to the end of the 20th Century (Torres 1988; Smith 1996; Newman 1997). But this stability is dependent on some minimization of competition to prevent the growth of some organizations that would then lead to the fatal shrinkage of others. Torres (1988) points directly to the institution of professionalism, as promoted by the NFDA, as the force behind this stability.

Institutional forces within the industry are undeniably strong. Throughout various histories of the industry (Habenstein and Lamers 1955; Farrell 1980; Torres 1988; Smith 1996), the pursuit of a traditional, professionalized structure has been an important feature of operations, in particular as evidenced by the efforts of the NFDA, and the criticism of chain-form structuring that occurred from members of the industry (Torres 1988). The industry has primarily operated in a self-governing manner, with rules and standards of operation created and enforced via the NFDA and other associations, including state-localized, though not state-based, funeral boards (Torres 1988). This institutional governance was primarily focused on issues of education and regulating the “expertise” associated with services funeral homes provide – embalming, cremation, and grief counseling (Torres 1988). For example Torres (1988, p. 383) points out that the American Board of Funeral Service Education has existed since the turn of the 20th century to accredit funeral and embalming educational operations, only receiving any formal license by U.S. Office of education to do so in 1972. Nonetheless, this body is able to control the educational process by which the industry is staffed.

For the purposes of my dissertation, the key feature of professional institutions has been to limit the size and structure of organizations in the industry. Despite the potential economic advantage of economies of scale, being an integrator and being integrated, only a small proportion of firms have done so. Instead, organizations have frequently been condemnatory of the integrators and attempts at integration as being both antithetical to the purpose of the industry and predatorily competitive (Torres 1988; Smith 1996; Horn 1998). In particular, Torres (1988) points to the inability of associational regulations to efficiently control large corporations as a source of anti-corporate sentiment in the industry. In the past, attempts at integration were often considered to be not in the best interest of the image of the industry and antithetical to the tradition and professionalism of the field, particularly as promoted by the NFDA (Torres 1988; Smith 1996). However, in coincidence with the rise of integration in the 1960s, evidence shows that the NFDA changed its stance relative to issues of advertising, marketing, pre-need sales, and integration. At this time the NFDA altered its designs on the industry towards business enterprise as opposed to the more constrained ideals of “professionalism” (Torres 1988; Smith 1996). Further, Torres (1988) and Smith (1996) both point to issues of succession in family owned business as a force behind changing organizational structure and institutional guidelines. Family ownership has been a long-standing tradition in the death care industry. The small local funeral parlor was a staple of both urban and rural communities and was steadfastly run by a particular family and was typically branded with that family name. Even the first local consolidations were under the auspices of family names. However, problems with succession can easily

arise in these situations: and the death care industry might be a prime candidate for dissention by heir. Starting in the 1960s, and continuing even now, this problem has become quite significant. Increasingly fewer heirs are taking over the family death care business (Smith 1996). This change in the tradition of the industry is key factor in increasing sales of establishments to multi-unit firms, and to the rise of chain-form business-modeled operations.

There is little history of federal regulation of the funeral home industry: in 1920 a federal regulation banned the use of arsenic as an embalming agent (Iserson 1994); and in 1984, despite much opposition from industry associations, the Federal Trade Commission passed the Funeral Law,²² establishing guidelines forcing death care establishments to reveal, but in no way limit, the pricing of particular services to consumers (Torres 1988; Smith 1996). Further, several forays into anti-trust violation lawsuits by the competing chains, most notably in 1996 during SCI's attempted buy out of the Loewen Group, have been pursued, but to no avail. State regulation is more pervasive, but primarily via the pursuit of licensing which is used to enforce minimum operating conditions such as cleanliness and the ability to provide the services claimed in the price lists.

ORGANIZATIONAL STRUCTURES

As Smith (1996, p.270) reveals, the dispersed, non-centralized funeral system of the United States, with many small establishments scattered across the country, is not an essential condition of the industry: he points to an industry journal (The American

²² This is alternately referred to as the Funeral Rule, Funerary Rule, or Funerary Law.

Funeral Director 1993) presenting that in China, only 1376 death care establishments operate for a population ten times that of the United States; all are state run and centrally organized; funeral homes are almost saturated; crematoriums run constantly in urban areas, where there is a near one hundred percent cremation rate; and cemeteries have full schedules every day to bury the dead in rural areas.

In the United States, economic, cultural, and institutional forces all appear to be at play during the cusp decade where change in structure towards integration occurs in the industry. The most classic economic argument supporting the integration of complementary elements of an industry, in this case cemeteries and mortuaries, is at play in death care (Smith 1996). As Chandler (1990) would argue, the increased throughput and reduction in operating costs associated with running these two industry elements at the same location is a powerful force towards integration. The suburban sprawl centered on the 1960s brought consumers closer to the cemeteries, which had once been on the outskirts of town. Because of local purchasing trends in the death care industry, and the traditional association of consumers with a successful cemetery, a funeral home added to that cemetery would face none of the typical disadvantages of a new entrant to the market, and be able to reap the benefits of consumers attracted by confidence in the cemetery and the convenience of one-stop death care shopping.

Consolidation of funeral homes (or cemeteries) also increases potential profits. In a local market, the consolidation of homes could allow for the centralization of facilities: the use of a common embalming facility, crematorium, set of skilled death care technicians (embalmers) and/or fleet of hearses could significantly cut overhead costs;

and the maintenance of original family home names could help to insure the return of trusted clientele-families (Smith 1996). Managerial reform could help turn the non-business oriented homes of the past, into profit making machines of the present. Yet if these integrations are so profitable, why do they only incorporate a small percentage of establishments in the industry? One possible answer here concerns the reticence of owners to sell stand-alone firms.

Funeral home establishments operate at geographically fixed positions and take part in local markets such as neighborhoods, cities, or counties and often specialize even further by catering to ethnic or religious sub-markets (Smith 1996; Newman 1997; Loewen Group 1998; Service Corporation International 1998). This elemental organization is focused directly on the resource space as a source for profits and success. Funeral home firms, on the other hand, are the corporate or proprietary organizations that own establishments, and can possibly operate simultaneously in multiple geographic and cultural markets. The single-establishment firm, a “mom-and-pop” style operation that is independent and unintegrated, is at the time of this writing, and has been for the history of the industry, the most common type of organizational actor (Horn 1998, Newman 1997, Smith 1996, Larson 1996).

Funeral establishments in a given market are at the heart of competition in the industry. The limited number of existing resources must be distributed among the market actors; and new businesses entering the market must compete by taking part of this limited resource. From the perspective of consumers, the most common characteristics by which a choice among alternative establishments in this industry is made are

geography, family tradition, and specialization in procedure and service²³ – price is not a characteristic that determines the choice of funeral home (though it may affect choice of casket, embalming, interment, and other details) (Iserson 1994; Larsen 1996; Smith 1996; Newman 1997; Roberts 1997; Horn 1998)²⁴.

The total of the death care industry consists of establishments as stand alone firms; multi-unit sets of establishments that are horizontally integrated at the local, regional, or national level under a single firm; and multi-unit sets of establishments that are vertically integrated to include both cemeteries and funeral homes. Regarding funeral homes, before 1960 virtually all establishments were independent firms in the industry, with the small remainder being members of local or regional family-owned, non-vertically integrated, chains (e.g. Simpson Funeral of Springfield East - on the east side of town - and Simpson Funeral of Springfield West - on the west side of town) (Torres 1988; Smith 1996; Robert 1997; Mitford 1998). These simple, multi-unit firms were merely localized extensions of successful funeral homes and were very rare before the late 1960s (Habenstein and Lamers 1955; Bowman 1959; Smith 1996; Service Corporation International 1998). Nonetheless, this growth in firms via the opening of new establishments points to the possibility of pursuit of economies of scale despite NFDA guidelines against such operation. During the 1960s, regionally oriented chains of horizontally integrated firms in the industry became a reality and by the 1990s, these were powerful players – owning large proportions of funeral operations in many large

²³ None of this organizational level variation was consistently accessible for the sample included in this project and, as such, cannot be included in the research presented here.

cities – with both financial and competitive advantages in the markets in which they operated (Smith 1996).

Funeral establishments operate with notable size flexibility – there is great variation in the number of cases handled by funeral homes. In the United States in 1987, the number of cases handled per funeral home ranged from two to 2,427 with the mean, median, and modal number of cases hovering around 100 (Smith 1996); in 1993, this number had not notably changed (Newman 1997). In Arizona, one particular firm operated continuously for almost ten years (until the end of my time period) with an average of less than one case per month, while another in the same city handles close to 100 cases per month. This flexibility is due, in part, to low overhead and operating costs once sunk costs have been recouped, and the multiple responsibilities that can be handled by a single funeral director (for example, in Arizona a funeral director must be a licensed embalmer as well) reduces the necessary number of employees required by establishments (Habenstein and Lamers 1955; Smith 1996). This average size is far below the scale at which funeral homes could operate (Torres 1988; Smith 1996), but a large number of establishments – enabled by institutional structures that promote small size and minimize competition – widely distributes raw materials (dead bodies) and promotes such operation.

While establishments were traditionally and remain predominantly “small,” and operate in competitive markets, firms have grown and responded to resources in different ways. Specifically, firms have grown by opening new “branch” establishments and

²⁴ This topic is not presented further in the dissertation, though is surely worthy of further

consolidating (“buying out”) existing firms and their establishments. Through this competition can be minimized between establishments in the same market, and firms can operate simultaneously in multiple geographic markets. Such multi-unit firms have evidenced much higher profit margins than the traditional stand-alone firms by pursuing economies of scale (Smith 1996).

This horizontal integration and pursuit of firm growth is, for the most part, a recent advent in the funeral home industry. While one large multi-unit, multi-market firm, Memorial Gardens Association memorial parks, lasted through most of the 1930s (Smith 1996) and the aforementioned local family chain combinations are evidence that the ideas of economies of scale and chain-formation were not foreign to the industry before 1930, it was extremely rare. In rural settings, several mortuaries and/or cemeteries within a county might be run as separate establishments with one owner, and in the urban setting a cluster of homes with centralized embalming, bookkeeping, and transportation might be run by one owner; though these cases were exceptions to the standard of fragmented specialized firms (Smith 1996). But, as evidenced above, by the 1990s the number of multi-unit firms in death care and the percentage of establishments maintained by consolidators and integrators had grown dramatically.

In the death care industries, consolidation of funeral homes or cemeteries began to occur non-anecdotally in the 1960s (Smith 1996; Loewen Group 1998; Service Corporation International 1998; Stewart Enterprises 1998). In almost all cases the consolidation process was virtually invisible to consumers, neither the names of firms nor

research.

the individual workers changed; but the benefits of centralized supply resources, local centralized processing, and centralized bookkeeping and management were established and the lack of name change retains long standing community consumers who may have grown to trust the firm. This process helps maximize both economy of scope by allowing one firm to own different fragments and specialized firms in one or more markets; and economy of scale by allowing services to be centralized. By owning several firms in one market, they can broaden services into a variety of specialized sub-markets (ethnic and/or religious), centralize their services, and perhaps, gain a preponderance of business in the market by owning the most, or the most successful establishments.

Regarding scope and scale, there is a wide range of possible organizational operations. The scope of the funeral industry necessarily includes the processing of dead bodies (via embalming, cremation, or other methods) but may extend to include the sale of caskets, memorial markers, and in some cases cemetery plots as well (Torres 1988; Smith 1996). Widening scope certainly widens the range of resources sought by these organizations, yet it is still the singular resource of deaths that identifies the key feature of organizations in the industry²⁵. However, it is economy of scale that most relates to the questions at hand in this dissertation.

The industry response to these changes has been mixed, despite the evidence of potential, and realized actual, profit (Horn 1998, Newman 1997, Smith 1996).

Establishments within the integrated firms tend to profit from the integration, reaping the

²⁵ I do not include analyses of scope conditions of firms and establishments (e.g. histories of the sale of grave markers or combinations of funeral homes and cemeteries) in the data analyzed in this dissertation.

rewards of economies of scale and scope and the centralization of control. The detrimental affects of competition on firms is quite visible, as single-establishment firms try to stay afloat against the multi-unit firms whose increasing profits, and profit share as a result of integration make success more and more difficult (Smith 1996).

CHAPTER 3 – THEORETICAL OVERVIEW AND GENERAL HYPOTHESES

When considering organizational change, both structure and strategy are key forces to consider (Chandler 1977). The theoretical traditions informing this work approach both perspectives: the strategic orientation of resource dependency and the pursuit of economies of scale, and the structural orientation of organizational ecology and institutional perspectives. I will provide a general overview of each theory, and consider its specific application to the case at hand. I will also establish general hypotheses from each tradition as applied to the funeral industry – these will be unfolded into specific, variable oriented hypothesis in the following analytical chapters.

Simply stated, the tradition of organizational ecology makes an analogy to bio-ecology such that the number of organizations in a population, referred to as density, is dependent on the environment's carrying capacity – the total mass of organizations that can be supported by the material and social conditions of the environment. Further, from the inception of the industry the process of legitimation – developing recognition and acceptance of the particular industry or organizational structure – increases the number of organizations until carrying capacity is met, after which the process of competition for limited resources in the environment selects against certain organizations, reducing the size of the population. Social institutions affect the form and structure of the organizations themselves and serve to alter the timing, intensity, and form of the aforementioned processes. A wealth of research has been pursued in the testing and development of this tradition, and the importance of the number of organizations

operating in a population has been well established as a strong predictor of organizational founding, growth, and failure rates (Hannan and Freeman 1989; Carroll and Hannan 2000; see Baum 1996 for a general review of findings).

The two key forces within the ecology of organizations are legitimation and competition, which affect organizational densities via founding and failure rates (Hannan and Freeman 1989; Hannan and Carroll 2000). Legitimacy operates both within and outside of organizational populations, describing the social and political acceptance and economic viability of the organizational form - as Suchman (1995) presents, it can be seen as the social acceptance and desirability of an organizational form's operation. This can result in increasing availability of resources and demand for services (Scott et. al. 2000); and an increase in the founding of new organizations and minimization of organizational failures at low levels of organizational density (Carroll and Hannan 2000). Competitive processes operate between organizations, distributing both access to resources, and the resources themselves, among the competitors. As competition for limited resources increases, failures rise and foundings are minimized - thus negatively affecting organizational densities (Hannan and Freeman 1977, 1989; Carroll and Hannan 2000). Legitimation and competition are not mutually exclusive processes, but instead are countervailing forces, each with varying strengths: in early parts of the history of industries, the effects of legitimation tend to be more powerful; and as the industry ages and stabilizes relative to resources and demand, the effects of competition tend to be dominant.

In general, these processes produce an inverted-u pattern of organizational density over the course of an industrial history. Extensive research has shown that this pattern is a function of density dependence: the founding and failure rates of organizations are dependent on the number of organizations in operation (see Baum 1996 for a thorough review). Organizational density is directly related both to legitimacy and to competition. Increasing density presents robustness of the organizational form, leading to positive trends in foundings; and it also raises the number of organizations in the environment increasing competition for limited resources, resulting in increased failures. The traditional density pattern occurs as a result of the power of legitimation early in industry's history, while competition gains strength in the latter stages.

This typical pattern is conditioned on features of the organizational environment that affect the point at which population growth turns to population decline. An environment's carrying capacity, determined, in part, by raw materials and social institutions, is the set of possible organizational populations that can operate without experiencing this fatalistic competition (Kingsland 1985; Hannan and Freeman 1989). It is precisely the meeting of this capacity that triggers the tipping point to the dominance of competitive processes, producing the typical history of organizational populations. As a consequence, growth in the size of the resource space (e.g. raw materials or demand for services) minimizes competition.

Changes in organizational density²⁶ and concentration of ownership occur, in part, via the dynamic organizational processes of founding, failure, and changing ownership. Precisely, density will have a positive first-order and negative second-order affect on foundings; and a negative first-order and positive second-order affect on failures (see Baum 1996 for a review of these findings). Similarly, the changing distribution of ownership is dependent on variation in numbers of organizations of each form (firms and establishments developing as in formula (1)) as well as changes in ownership (e.g. a firm fails and the one establishment it owns changes ownership and continues to exist under the control of another firm). As such, posing questions about this sort of industrial development should tack towards variables that affect numbers and relations among organizations. Specifically, I focus on competition for limited resources as a feature of the environment affecting the density of organizations and the concentration of ownership.

Populations of organizations are affected by the environments within which they operate. In particular, demographic characteristics of these populations are closely linked to elements external to the organizations themselves²⁷. Precisely, the tradition of organizational ecology has focused on the numbers of organizations, the characteristics of material and social resources, and social institutions as important elements that significantly affect the founding and failure of organizations and, thus, features of the

²⁶ “Density” refers to the number of organizations in a population, as used by Hannan and Freeman (1977).

²⁷ While the focal forces I pursue in this research are ecological in nature, they are used to describe features of the demography of organizations. This terminology is well justified (Carroll and Hannan 2000) and is the perspective that directly informs this work.

population of organizations (Hannan and Freeman 1977, Hannan and Freeman 1989, Carroll and Hannan 2000). I address this tradition by considering the feature of concentration of ownership among organizations as a feature of the population that is both directly affected by competition and mediates the effects of competition on organizational founding and failure.

As presented in Chapter 1, this dissertation will address three puzzles within the field of ecological analysis and the demography of organizations. Primarily, I will address the issue of inter-organizational relationships as a feature mediating the effect of density on organizational foundings and failures. This telegraphs to a consideration of changing relations between organizations as a vital organizational event, itself dependent on ecological processes.

General hypothesis: The fully legitimate state indicates that organizational densities will be directly related to the size of the resources space. Further, it will be operating primarily in the “competitive” phase of industrial development. As such densities, mitigated by resources, will be inversely related to foundings and directly related to failures and changing ownership. From the perspective of resource partitioning, growth among firms should not be equal and increasing resources should lead to concentration via inequality in numbers of establishments owned.

This theoretical traditions associated with organizational consolidation focus on the importance of concentration as a feature of the organizational environment. From the resource dependence and transaction cost perspectives, rational action and the need to control uncertainty in access to resources and relationships with competitors and

suppliers, merger, consolidation and integration of organizations is an efficiency/profit enhancing response to uncertainty and competition (Pfeffer and Salancik 1978; Williamson 1981).

Incorporating ideas from economic and organizational sociology, this project will highlight the peculiarly social forces that can drive organizational and industrial development. Considering some major theories in this arena reveals the perspective from which this study will proceed. Alfred Chandler (1977, 1990) claims that the consolidation of firms that represent successive steps in a process – such as rubber growers and tire manufacturers or funeral homes and cemeteries – is pursued to maximize efficiency and increase throughput speed by replacing the "invisible hand" of the market with the "visible hand" of hierarchy. Here rational action by organizations is used to pursue economies of scale and scope. Similarly, Oliver Williamson's ideas of transaction cost economics (1985) propose that multi-level combinations (referred to as vertical integration) serve to minimize the cost of economic transactions between elements of the process. Both of these logics serve to illustrate a change from market exchange between elements to a hierarchy of the elements that benefits profit maximization.

The theories of resource dependence (Pfeffer and Salancik 1978) are more oriented toward social process of minimizing uncertainty relative to the environment external to the organization – and are readily applicable to the death care industry. Here, horizontal integration (the consolidation of establishments, organizations at the same stage of an industrial process) is pursued to minimize competition for limited resources,

where pursuit of economy of scale is merely an additional outcome of the process, not the intent.

General Hypotheses: Competition among organizations for limited resources will have a positive effect on the concentration via the process of merger/consolidation. This concentration, in turn, will decrease competition and negatively effect failure rates of organizations.

Institutional theories make arguments for the dependence of organizational and industrial structure on the social environment of formal and informal regulations and relationships in which they operate. My goal is to identify not only the effect of changing legislative policy on the structure of the funeral home industry, but the effect changes in non-formalized professional guidelines as well. I am asking questions about the manner in which changes in institutions affect ownership relationships among organizations and their access to resources.

Informal institutions provide guidelines for the accepted ways of structuring organizations (DiMaggio and Powell 1991). In particular, the process of imitation produces isomorphic organizational populations – sets of organizations with similar design and operational techniques. on the other hand, externally imposed constraints establish rules and regulations that determine organizational operations via penalty on non-conformity. Legislation is a key source of these policy changes, providing rules that govern organizational behavior by affecting both the adoption and creation of specific practices and operating techniques (Meyer and Rowan 1977; DiMaggio and Powell 1983; Dobbin and Dowd 1997).

In particular for the pursuit of this project, institutions can be seen as features affecting both competition and selection. With respect to competition, a wealth of research (see Baum and Oliver (1991) or Dobbin and Dowd (1997) for example) has show the policy and changes in institutional guidelines can shape organizational competition by affect the manner in which organizations relate to one another and the resources space. Further, following the logic of carrying capacity, legislation against certain operations can act as a selective force preventing such organizations from existing.

A variety of relationships will be modeled in the empirical chapters of the dissertation in an attempt to link institutional, ecological, and resource dependence theories of organizations (see Figures 6 and 7). The multi-level, time-series, structural equation model implied by this is beyond the scope of this dissertation. Instead I examine these relationships via more simple methods as described in the following chapter.

CHAPTER 4 - DATA, MODELS, AND METHODS

In this chapter, I present the techniques and practices of data collection, modeling traditions, and statistical techniques used in this dissertation. I focus on my acquisition of primary source data from the Arizona State Board of Funeral Directors and Embalmers and the use of Arizona between 1968 and 1999 as a sample. I then turn to a discussion of traditional models of density, concentration, and vital rates, identifying key covariates and describing my use of the Herfindahl index as a measure of concentration. Finally, I review the statistical techniques pursued for each of these models.

DATA

I collected the primary, organizational data for this dissertation directly from the records of the Arizona State Board of Funeral Directors and Embalmers²⁸. Created in 1968, this body serves, in part, to license all funeral homes operating in the state of Arizona. As part of this licensing process, new establishments must be licensed before they can open for business, every existing establishment must apply for renewal of their operating license by December of the prior year, and new licenses must be obtained when an establishment changes owners. As is indicated by this last point, the licensing records include the name of the corporation, partnership, or sole-proprietor of each establishment. The whole of these records allows for the identification of the geographic location of the

²⁸ I was freely given full access to the complete stored, paper records of this board. I collected data manually through direct observation and re-recording of the pertinent information from the licensing files.

total population of establishments and firms operating in Arizona in every year beginning in 1968. This also provides complete information about the ownership relations between all firms and establishments in the population; and enables identification of the first and last year of operation of any organization being founded or failing after 1968. I identify organizational location by year and county (or counties) of operation - with 14 counties in the years 1968 through 1982, and a fifteenth county forming in the state in 1983 for a total of 465 county-year records. The counties can be aggregated to 32 state-year records.

This data is used to generate four essential variables in my analyses: density, founding, failure, and ownership change. Organizational density is measured with the number of organizations obtaining licenses in a given year. Thus, this is measured at the end of every year, after all licenses have been issued. I measure this variable for both firms and establishments, at both the county and state level.

Organizational vital events are again derived from license histories. Each establishment facility, regardless of the name under which it is operating or the owner, maintains a license; and the year in which an establishment is first issued a license is considered the founding year. Note that founding dates are not available for any establishment existing prior to 1969. The first year of licensing, 1968, cannot be considered a founding year as it is unknown whether or not those establishments were in operation prior to that date. Similarly, the first year in which a firm operates an establishment is identified as the "founding" year for that organization as an operator in Arizona funerals, regardless of any unknown prior existence in other states or industries.

Organizational failures are similarly identified. If an establishment applies for license in year $t-1$, but not in year t , then year t is coded as the failure year for an establishment (i.e. an establishment did not continue its license for the year $t+1$ and so failed in year t). Firms “fail” in the same fashion, with the year after the last licensing year being coded as the year of “failure.”

Licensing also indicates changes in ownership for establishments. These changes require immediate re-licensing and, as such, the year in which this occurs is coded as the year of change.

Another key variable in my analyses is that of organizational concentration. As described in Chapter 1 (recall Figures 2, 3, and 4) this represents the linkages between organizations operating in the population at hand. Because of this dual organizational population and my complete data about linkages, I measure concentration via the use of the Herfindahl Index, a measurement often used to describe market concentration (Tirole 1988; Finkelstein and Levin 1990) but that has been used in ecological research as well to measure the inequality of the size distribution of a population of organizations (Dobbin and Dowd 1997). A common alternative method of measuring organizational concentration is to examine the market share of the top, say, 5 largest firms (Carroll and Hannan 2000; Carroll and Sawaminathan 2000). However, this technique loses the detail of the entire size distribution, and would further limit the understanding of my funeral home case by being unable to consider establishment-from organizations for which I have no size measures.

In practice, the Herfindahl index measures the amount of concentration in the market via the sum of the squares of each organizations market share. For a set of k firms, if the i -th firm has a market share of α_i , then the index is:

$$\text{Herfindahl Index of concentration} = H = \sum_{i=1}^k [(\alpha_i)100]^2$$

In this case, a market with a single firm will have $H = 10,000$; for values of k greater than 1, the maximum and minimum values are limited such that $0 < H < 10,000$, though the specific possible range in a market is determined by the actual number of firms and any limitations that might be placed on market share.

This concentration formula can be transformed for the given case of the funeral home industry as follows. For a population of k firms and n establishments, we can envision a market of establishments, where each firm must own some portion of the establishments – the i -th firm owns x_i establishments. Thus we arrive at the equation where x_i/n is the market share of establishments for firm i . Thus we can transform the index as follows:

$$\text{Herfindahl Index of concentration} = H = \sum_{i=1}^k [(x_i/n)100]^2$$

The number of establishments and firms operating in the market determines the range of possible values for this measure. Again, if there is only one firm, then

$H = 10,000$, but with changing numbers of firms and establishments the range approaches is specifically determined by the number of firms and establishments in operation. As a consequence, in comparing scores across markets it is possible that two markets with different numbers of firms and establishments might have equal scores for H , yet one might be maximally concentrated for its organizational configuration while the other would not be. To standardize across markets, I consider two possible techniques: controlling for the number of establishments; and controlling for both number of establishments and number of firms.

By controlling for establishments, I am considering the conceivable range of firm-establishment ties that could exist for any given set of establishments, regardless of the number of firms that are operating in the market. In this case I note that the maximum value of H for any number of establishments is 10,000; and the minimum value is $(1/n)10000$. As such, any market of establishments of size n must exist at a level of concentration such that $(1/n)10000 \leq H \leq 10,000$. So, to compare across markets I consider that any particular market of establishments will have a level of concentration lying somewhere between maximum and minimum concentration. I then identify how close a market is to maximal concentration – the case where there would be only a single firm owning all the establishments – with the following formula for Concentration Measure 1:

$$C1 = [H - (1/n)10000] / [10000 - (1/n)10000]$$

Note that this measure cannot be calculated for markets with only one establishment, a case that would necessitate dividing by zero.

This measure can be interpreted as the concentration of linkages among establishments – their bonded-togetherness via linkage to a common owner. If all establishments are owned by a single firm, then they are all linked together via bonds to their common owner and concentration of linkages is maximized – in this case, $H=10,000$ and $C1 = 1$. If each establishment were to be owned by a separate firm, then they would not be linked at all and concentration is minimized – in this case $H = (1/n)10000$ and $C1 = 0$. Similarly, various values of H will fall along the continuum and represent minimal or maximal concentration of ties among establishments in the market.

By controlling for both the number of firms, k , and the number of establishments, n , I create a second measure of concentration that is quite different in both calculation and interpretation. By considering not just the size of the market, measured by n , but the number of firms operating in it as well, I constrain the set of possible configurations of firm-establishment ties compared to the conditions used to create $C1$. In this case, I note that the minimum value for H is $(1/k)10000$ if each firm were to own an equal share of the market; while the maximum value occurs when $k-1$ firms each own a single establishment and one firm owns $n-(k-1)$ establishments. Note that this maximum value decreases as k increases, furthering the need to standardize across markets with varying organizational populations. I use these limits to again produce a standardized score describing the percentage of maximal concentration that exists in any market of firms and establishments as follows:

$$C2 = [H - (1/k)10000] / \{[(n^2 + k^2 - (2nk) + (2n) - k) / n^2] 10000 - (1/n)10000\}$$

Note that this measure can only be calculated where there is a range of possible ownership configurations, when $k < n-1$.

This measure can be interpreted as the inequality of the size distribution of firms. As firm size, measured in numbers of establishments owned, is equalized, then C2 is minimized – equal distribution will result in $H = (1/k)10000$ and $C2 = 0$. However, as a single firm grows much larger than all others, then the size distribution is unequal and C2 is maximized.

There are three additional essential variables to this research: the quantity of human deaths occurring by year – the size of the resource space – and the two period effects representing institutional changes. Data regarding deaths were collected from Arizona Vital Statistics. Every death occurring in the state, whether the deceased was a resident or not, must be reported to this body. As a consequence, this provides a complete record of all deaths in the state. This information was coded by county-year so that the score represents the total number of deaths occurring in a county during a year. This data was then aggregated to determine state-year scores.

Periods of institutional change were determined via the history described in Chapter 2. The acceptance of chains was coded based on the first foray of an inter-state chain into the state in 1977. While such chains had existed nationally prior to this date, the Arizona market had been relatively devoid of anything other than intra-city chain

structures. Hence, this year marks the inception of cross-market ownership and the pursuit of such operation in the state. The passage of Federal regulation is determined by the year of this event, 1984.

Tables 1 and 2 present a complete description and interpretation of these variables and their manipulations and interactions as used in the analyses found in this dissertation. Correlation coefficients between all variables, at both the state and county levels, can be seen in Tables 3 and 4.

The use of Arizona as a sample is appropriate for several reasons. Arizona was among the first states to require licensing of funeral homes and the first adopter of an official state-run Board to oversee such licensing. As a result, Arizona affords perhaps the longest, complete record of funeral home operations of any state. Further, Arizona's 15 counties have experienced a range of changing markets – some rural counties have had consistent numbers of deaths, hovering around 500 per year, over the 32-year period being analyzed, while other urban counties have experienced the dramatically increasing numbers of deaths associated with the population growth, with numbers of deaths increasing almost 100% to over 20,000 per year. As a result, the range of possible changing markets is well represented by the counties that make up the state.

In particular, this is superior to previous research on the industry (Torres 1983, 1988) that uses only nationally aggregated organizational data obtained from the National Funeral Directors Association; considers only establishment-form organizations; and ends its time series prior to the rise of chain form funeral homes. In this case, data concerning variation in local markets is lost via aggregation, funeral homes not members

of the NFDA are not included in the sample, and the issues of organizational form examined here are lost.

MODELS

The analytical portion of this dissertation focuses on modeling five different dependent variables: organizational density, organizational concentration, and the vital rates of organizational founding, failure, and change in ownership.

Density is modeled according to the logic of carrying capacity where resources and institutions combine and interact to affect the number of organizations operating in a given environment. In a straightforward manner, density is modeled linearly on the set of county- or state-aggregated covariates using models of the form:

$$\text{Density}_t = X_t \beta + e$$

where X_t represents the vector of covariates for each year t in the time-series. The specific sets of independent variables pursued in these models will be described in the analytical chapters.

Concentration is modeled in a similar linear fashion, based on the concepts of resource dependence and partitioning as presented in Chapter 3, using models of the form:

$$\text{Concentration}_t = X_t \beta + e$$

Vital events are modeled in accordance with the traditions of organizational ecology via the use of both linear and rate-based analyses (Baum 1996; Carroll and Hannan 2000). Of particular note, the structure of the data requires that events in year t are dependent on covariates measured at both year t and year $t-1$. At the level of the state

$$\text{Foundings}_t = X_{t-1} \beta_1 + X_t \beta_2 + e$$

At the county level, the distribution of vital events is over dispersed towards zero, requiring the consideration of rate-based models (Ranger-Moore, Banazak-Holl, and Hannan 1991; StataCorp 2001) of the form:

$$\ln(\text{Foundings}_t) = X_{t-1} \beta_1 + X_t \beta_2 + e$$

Veering from traditions, foundings, failures, and ownership changes are all modeled similarly with similar methods. While event-history analysis with organization-based records including covariates describing variation in organizations is commonly used to model failures (Hannan and Freeman 1989; Baum and Oliver 1992; Carroll and Hannan 2000), and would also be appropriate for change-of-ownership models, my data has limited organizational-level data and is, instead, focused on market-level analyses. As a consequence all analyses presented in this dissertation are at a level of aggregation above that of the organization itself.

METHODS

The data I utilize in this dissertation are time-series in nature – tracking the development of the funeral home industry in the state of Arizona over time – and in some cases cross-sectional as well – comparing across counties over time. Additionally, I am analyzing two types of dependent variables: the continuous, ratio variables of density and concentration; and the count-form variables of organizational foundings, failures, and changes in ownership. This leads me to consider three types of statistical methods in this dissertation: Prais-Winsten time-series analysis, time-series cross-sectional generalized least squares analysis, and negative-binomial time-series cross-sectional analysis. Each is used in context particularly suited to the data and models at hand.

In modeling density, concentration, and state aggregated vital rates, as described above, I am faced with continuous dependent variables and data organized as either a time-series, in the case of state-level aggregated data, or a set of time-series representing cross-sections of the state, in the case of county-level data. In the case of the aggregated state-level data, models are faced with the potential problem of serial autocorrelation – where the scores for variables are not independent over time, producing correlated residuals and altering coefficients to produce a less accurate model (Judge et. al. 1985; Allison 1999; StataCorp 2001). To detect whether or not this is a problem, traditional ordinary least squares techniques are used to examine models and produce the Durbin-Watson statistic that can identify this potential error: as values for this statistic diverge from the null-hypothesis, no autocorrelation value of 2, the use of non-OLS models is

indicated (Judge et. al. 1985; Sayrs 1989; StataCorp 2001). In all cases, pursuit of time-series models was indicated by low values of the Durbin-Watson statistic.

I considered three possible solutions to this problem: the Prais-Winsten estimator, Cochrane-Orcutt estimator (1949), and a step-wise process (Hildreth and Lu 1960; StataCorp 2001). These methods account for this serial autocorrelation when models are of the form

$$y_t = x_t \beta + u_t \quad (\text{StataCorp 2001})$$

where

$$u_t = \rho u_{t-1} + e_t$$

and the covariance matrix of the error term incorporates values of ρ (StataCorp 2001).

Further, the statistical software STATA (StataCorp 2001) can easily produce these estimators. Two features of the data are important to consider in choosing the correction method: the sample size and the order, or periodicity, of the autocorrelation. Regarding sample size, at the level of the state, I have only 32 records of data (and only 31 in the case of vital rate analysis which requires lagged independent variables). Both the Cochrane-Orcutt and step-wise methods require the elimination of the first record in the times series (StataCorp 2001) which would reduce my sample size by over three percent. Further, these methods become most useful when autocorrelation is not of the first order (i.e. when the correlations of residuals is not based on consecutive year records, but on multi-year intervals), which is not addressed by Prais-Winsten estimation. The combination of the results of the Durbin-Watson test, my small sample size, and the lack of any indication of other than first order autocorrelation indicate that the Prais-Winsten

estimator is appropriate for these time series. Nonetheless, attempts were made at using multiple methods but the alternate iterative techniques described here failed to converge, providing no usable results. Hence, reported results incorporate the Prais-Winsten first-order time-series estimator utilized via STATA (StataCorp 2001) statistical software.

Analyses of county-level data require a different tack. In these cases, there are multiple cross-sections, each of which might experience autocorrelation differently. Further, these cross-sections might be subject to spatial autocorrelation or heteroskedastic error terms between cross-sections. This is an issue when models are of the form

$$y_{it} = x_{it} \beta + \varepsilon_{it} \quad (\text{StataCorp 2001})$$

with i panels and t years.

The XTGLS procedure in STATA (StataCorp 2001) produces generalized least squares estimators for just such data; and I follow the technique for county-level analysis as described by Rabe-Hesketh and Everitt (2000) which points to the need to account for heteroskedasticity when panels vary in scale as is the case in my data – where the size of the resource space and density of organizations vary dramatically between the largest and smallest counties. Single county analyses revealed Durbin-Watson scores much below the non-autocorrelative null hypothesis value of 2, indicating the existence of autocorrelation. By visually examining residual plots for analyses from a given year across all counties, heteroskedastic patterns were evidenced. As such, I followed the

recommended technique. Specifically, I allow for separate first order autocorrelation patterns by county and account for unequal variance in error terms between counties.

A third method is required for use with counts of organizational founding, failure, and change in ownership at the county level. Here the distribution of counts-by-year of is highly skewed towards zero – as evidenced in Table 4. Such a distribution calls for the use of poison or negative-binomial techniques (Judge et. al. 1985; Allison 1999). By examination, it was determined that for each dependent variable at the county level, the conditional variance exceeded the mean number of events indicating the necessity to use negative binomial techniques to prevent underestimation of the standard errors (Ranger-Moore, Banazak-Holl, and Hannan 1991). In pursuing this technique via pooled time-series cross-sectional analysis, I follow the examples of Barron, Hannan, and Burton (2001) and Dobrev, Kim, and Hannan (2001) using STATA (StataCorp 2001) software to model such data via the XTGEE technique of general estimating equations (Liang and Zeger 1986) that can account for unspecified serial and spatial autocorrelations when approaching logit models of the form:

$$\ln \{E(y_{it})\} = x_{it} \beta + \varepsilon_{it} \quad y \sim \text{negative binomial} \quad (\text{StataCorp 2001})$$

This produces a generalized linear model with robust coefficients that can accommodate similar conditions to those necessitating XTGLS as described above.

This set of models and techniques is used in the following three chapters to answer the specific questions pursued in this dissertation.

CHAPTER 5 – DENSITY: CHANGING NUMBERS OF ORGANIZATIONS IN THE ARIZONA FUNERAL HOME INDUSTRY, 1968-1999

In this chapter, I investigate the question “How have the size of the resource space and changing industry institutions affected the density of funeral home organizations?” I address this via data that describes the complete set of establishments and firms operating in Arizona between 1968 and 1999, using time-series and time-series cross-sectional analyses to study panel data.

As graphically revealed in Figure 1, and discussed in Chapter 2, the number of funeral home organizations tracks closely with the number of human deaths, with the trajectory of resources being tracked more closely by establishments than firms. Of particular note, this graph shows that resources do not have a static affect on either density – that there is not a simple monotonic relationship between increasing deaths and increasing numbers of funeral home organizations. The history of death care indicates that this relationship is tied to four types of institutional forces: 1) the hyper-legitimated condition of funeral homes and their services, which tightly links human deaths with the industry; 2) the traditions and regulations which have affected the size and operational strategies of funeral organizations; 3) the traditions among consumers which have guided how bodies are typically processed by funeral homes and increasingly allowed and encouraged cremation; and 4) problems with succession that resulted in difficulties for small, family owned businesses (Torres 1988; Smith 1996; Roberts 1997; Mitford 1998). I examine these historical explanations via theories of organizational sociology that relate the density of organizational populations to the amount of available resources and the

institutionally structured operations of the industry. Specifically, I consider the ecological processes of legitimation and competition (Hannan and Freeman 1987; Scott 1995; Hannan and Carroll 2000); and the pursuit of efficiency and profit via economies of scale (Chandler 1977, 1990; Williamson 1975, 1985). My research in this arena has several unique dimensions: I precisely measure the resource space at each point in the time-series; I identify distinct institutional periods; I distinguish establishments from firms as organizational forms; and I am able to compare my research with that of a previous ecological study on this industry.

REVIEWING ORGANIZATIONAL DENSITY

Ecological perspectives link the density of organizational populations to the processes of legitimation and competition that affect organizational foundings and failures (Hannan and Freeman 1989; Hannan and Carroll 2000). These processes are dependent, in part, on the amount of resources available and the social forces that constrain organizational structure, operation, and relationships – conditions that manifest as a carrying capacity that provides boundaries to the number and types of organizations that can operate in a given environment. Specifically, resources serve to provide an upper boundary on the total mass (the combination of numbers and sizes) of an organizational population, while institutions provide guidelines of operation and interaction for both organizations and the extra-organizational environment (Scott 1994) that determine the configuration of the existing organizational structures and operations. Population densities grow during a period of legitimation, where increasing acceptance of

the organizational form (perhaps measured economically via demand for services) solidifies the institutions that structure the industry and its relationships with consumers, other organizations, and the state. As the institutionalized organizational population approaches the limits of carrying capacity defined by resources, competitive forces act to reduce growth or shrink population size (Hannan and Freeman 1989).

In ecological studies, the notion of legitimation is a source of great contention: whether or not it is a process or an outcome has been debate with little final reconciliation (see Hannan et. al (1995), Baum and Powell (1995), and Hannan and Carroll (1995) for a debate on this issue). Yet this is a key aspect of theories of growth in organizational populations. My research avoids this issue by independently identifying the funeral home industry as being hyper-legitimate and taken-for-granted in the eyes of consumers – the industry is the locus of the vast proportion of all activity regarding the processing and disposal of human deaths – and governed by associational institutions which regulate their operations (Torres 1988; Iserson 1994; Smith 1996; Mitford 1998). Thus, at the start of the time period of my analysis, growth in organizational density is not dependent on increasing legitimacy, but is instead keyed on resources: institutions limit organizational size, so as human deaths increase so should organizational densities.

As presented in Chapters 1 and 3, carrying capacity flexes over time as a function of changes in resources, social institutions, and other contingencies. These changes alter the point at which the process of legitimation is overpowered by the force of competition – when growth declines. As the size of the resource space increases, one parameter limiting density is extended, thus allowing for population growth; and in the case of the

funeral home industry, the number of deaths also serves to identify the minimum organizational mass: virtually all bodies must be processed by the industry so the total number of cases handled by funeral homes in a given market (one conception of the mass of organizations) must closely match, if not precisely equal, the number of deaths occurring in that county. Further, when changes in the associational and regulatory guidelines affecting organizations allow them to grow and increase efficiency via the advantages of economies of scale (Chandler 1990), they gain larger mass (in this case handling more cases) and the total numbers of organizations that can be supported by a given resource space will decline. Thus by identifying changes in resources and institutions, it should be possible to model organizational densities.

In his research, David Torres (1988) showed that the industry's strong institutional legitimacy, both at the intersection with consumers and among organizations themselves, along with a constant number of deaths in the United States, led to a constant number of funeral homes. I extend this idea by examining a set of counties in a single state where the number of deaths has not remained constant and institutions have experienced change.

HYPOTHESES AND EXPLORATIONS

In the empirical analyses of this chapter, I test the relationship between numbers of organizations and characteristics of the environment in which they operate. In particular, the hypotheses being tested link organizational density to the availability of

resources and changes in the institutions that structure organizational relationships, proposing both direct and interactive relationships.

The first hypothesis predicts the number of funeral home organizations on the number of human deaths. Increases in essential resources and demand for organizational services are theorized to be positively associated with organizational density as a part of the process of legitimation (Hannan and Freeman 1987; Hannan and Carroll 2000). However, because of social conditions that prevent the existence of large surpluses of demand (i.e. all dead bodies must be processed in some timely manner), any barriers to the entry of new funeral homes into an expanding market (e.g. a lack of capital, skilled labor, or geographic space to build) will force some funeral homes to grow in size in order to meet the increased demand for service. Hence I arrive at the following

Hypothesis 1: The number of funeral home organizations will increase at a decreasing rate as the size of the resource space increases. Thus the first order affect of the size of deaths on organizational density will be positive and the second order affect will be negative.

The second and third hypotheses predict the effect of institutional change on organizational densities. The traditional institutions of the funeral home industry have undergone two key changes: the rise of national chains and the passage of federal regulations (Torres 1988; Smith 1996). In Arizona, I identify the broad acceptance of chain-form economies of scale via the arrival of the first national chain firm, which began

operating a single establishment in the state beginning in 1977. The second change took place in 1984, with the FTC passage of the Funeral Rule requiring funeral homes to openly display all pricing and service options. These changes altered the organizational environment by relaxing informal constraints against economies of scale and promoting profit-maximizing business practices, and by inhibiting deception on the part of funeral operators and thus reducing profit from those behaviors (Torres 1988). A consequence of the first change should be that organizations will not be subjected to the risk of sanctions stemming from large size. I predict that this will have a direct positive effect on organizational densities by allowing for a new type of organization, the large establishment or the chain-form firm, to come into existence in addition to those that had previously existed. I propose the second change constrains against a specific type of organization – those dependent on the behaviors that were made illegal. As such, those organizations should no longer exist, nor could they be founded, thus further decreasing organizational densities. Hence, I arrive at:

Hypothesis 2: The acceptance of chain form organizations should have a positive effect on organizational densities.

Hypothesis 3: The passage of the Funeral Law should have a negative effect on organizational densities.

The fourth hypothesis concerns the interactive effects of these institutional changes with the size of the resources space. The acceptance of chains and their

economies of scale will allow organizations to grow as the resource space increases, where there had previously been sanctions against such development (Smith 1996). As such, this period should reduce the expected positive effect of resources on density. Similarly, the passage of the Funeral Law should serve to reduce the expected positive effect of resources as the ultra-high profits associated with misrepresentation are no longer available, minimizing the viability of new organizations being founded based on small increases in deaths. Thus I propose:

Hypothesis 4: Both period effects should reduce the effect of the resource space on organizational densities.

An additional set of exploratory considerations revolves around empirical questions concerning the distinctions between organizational forms and market aggregations. The definition of both the population of organizations and the resource space within which organizations exist is methodologically essential to ecological analyses (Hannan and Freeman 1989). Firms, as organizational forms, represent a different, legal entity in the organizational environment, while the establishment refers to the operations precisely at the intersection with resources. By separately analyzing forms, I hope to explore the notions that this simple form distinction may be a key feature of organizational mass such that ecological forces can be proposed to have different forces via these forms. Further, the over-aggregation of markets can mask differentially localized and countervailing trends in numbers of organizations and resources. Similarly,

demarcating theoretically and empirically unsound market boundaries can result in an underestimation of the resources available to organizations and, when pursuing pooled or clustered analyses, in the oversampling of organizations operating across such boundaries. While Chapter 2 points to the operation of funeral establishments in localized markets, the condition of ownership allows firms to operate multiple establishments, so that they exist both within and across local markets. By examining both levels, I consider the possibility that within market dynamics are different from those across markets.

Further, I have no direct measures of either cremation patterns or issues of family succession. As a consequence, I examine the variable “time” as a feature of institutional landscape that might be capturing these forces and be worthy of pursuit in future research.

DATA, MODELS, AND METHODS

The data used in this chapter represents the complete history of funeral home organizations operating in Arizona between 1968 and 1999: yearly records identifying the location of each funeral home establishment and the firm that owns it, and the number of deaths occurring in each of the state’s fifteen counties. I study the state of Arizona because it is an early adopter licensing for funeral homes, allowing for complete information on all operating organizations, via coding of these licensing records, across a history of changing institutional regimes and resource availability. These data enable me to identify the point at which an establishment is first open for business, not when they

service their first customer or become a member of an association; and I am able to disaggregate to the county level, the typical market area of death care. This is advantageous compared to previous studies of the industry (Torres 1983, 1988) that use voluntary membership in the National Funeral Directors Association as the basis for identifying existing organizations, thus failing to include non-member organizations; has a time-series which ends prior to the rise of large chains and the passage of federal legislation; and aggregates death and organizational data to the national level obscuring the localized distributions of human death that change over time as a function of human migration.

The dependent variables modeled in this chapter measure organizational densities. Because of the highly legitimated state of the industry, changes in these densities should correspond to features of the organizational environment that affect carrying capacity: in particular, resources and the institutions that shape organizational structure and operation. Hence, the independent variables measure just those features.

Dependent Variables:

Establishments – This variable measures the density of establishment-form organizations in operation at the end of each year in the time-series; and was coded from the records of the Arizona State Board of Funeral Directors.

Firms – This variable measures the density of firm-form organizations in operation at the end of each year in the time-series, and was coded from the records of the Arizona State Board of Funeral Directors.

Independent Variables:

Deaths – This variable measures the number of human deaths at the end of each year in the time-series; and was coded from Arizona Vital Statistics. Scores for this variable are measured in thousands-units (deaths/1000) for ease of interpretation of the results; and a squared term is included in all models to account for non-linear effects.

Period Effect 1: the existence of national-chain firms in Arizona – This is a dichotomous variable identifying the years after 1976 when national, chain firms first entered into Arizona.

Period Effect 2: the passage of the Funeral Law – This is a dichotomous variable identifying the years after 1983 when Federal regulation was enacted to enforce complete and honest presentation of pricing and service options.

Interactions – The interactions of each period with deaths identify the effects of the institutional period on the relationship between organizations and resources.

Time – This variable controls for the passage time, which can capture the effects of the unmeasured time-varying institutions and time-dependence for the effects of institutional change, by simply measuring the number of years since the start of my time-series. A squared term is included to account for non-linear effects.

I use time-series analysis of state level data and time-series cross-sectional analysis of county level data to predict organizational densities on a set of independent variables. Analyses at the state level (Tables 5 and 7) require consideration of serial autocorrelation. Models take the form:

$$y_t = x_t \beta + u_t$$

where

$$u_t = \rho u_{t-1} + e_t$$

and the covariance matrix of the error term accounts for values of ρ .

Durbin-Watson test scores via simple ordinary least squares modeling indicated the need to account for such autocorrelation (Sayrs 1989; StataCorp 2001). As a result, I pursued Prais-Winsten time series analysis - which produces a first-order autocorrelation, generalized least squares estimator (StataCorp 2001). Note that other time-series techniques were considered: attempts at Chocrane-Orcutt (1949) estimation and a step-wise process (Hildreth and Lu 1960) did not converge and require the loss of the first record in the time series, which can be inefficient with small samples as I am using here (StataCorp 2001).

Though counties are appropriate market boundaries for death care, it is possible to transport bodies across county boundaries for services. As a result, analyses at the county level must consider spatial as well as serial autocorrelative processes. I use time-series cross-sectional generalized least squares approach these models of the form:

$$y_{it} = x_{it} \beta + \varepsilon_{it} \quad (\text{StataCorp 2001})$$

This method via STATA (StataCorp 2001) allows for the consideration of correlated and heteroskedastic error terms across panels, an important issue with geographically contiguous panel-units that vary in size (Rabe-Hesketh and Everitt 2000) as is the case in this examination of counties.

Two important technical features of the models themselves are the incorporation of the variable “time” and the use of interaction effects. As shown in Chapter 4, “time” is highly correlated with “deaths” at the state level ($r > .98$). As a result, this control was eliminated from the state level models to avoid problems of multicollinearity (Allison 1999) with the key measure of the resource space. Similarly, in consecutive models within the same analysis, sets of interaction variables were progressively reduced across models via elimination based on collinearity and statistical non-significance.

DISCUSSION OF RESULTS

Overall, the results of my analyses indicate that resources are key determinants of organizational densities; and that the presented institutional changes do affect establishments, but have no effect on firm densities. Additionally, I find that the passage of time does affect both firm and establishment densities.

Tables 5²⁹ and 6 present the results of analyses of establishment density at the state and county levels, respectively (note that in Table 5, model 3 explains 97% of the variation in the dependent variable). All of the models in both of these tables reveal statistically significant first-order positive and second-order negative effects of human deaths on establishment density. This relationship supports hypothesis 1, that resources are a key determinant of organizational densities and that organizations themselves, not just populations, grow with increases in the resources space.

²⁹ Analysis at the state level for establishments is an unnecessary aggregation of markets, however I include this table for purposes of reference and general interest.

Both period effects (representing the introduction of chain-form organizations to the state and the passage of federal legislation) are shown to have positive effects on establishment density at the state level; however, these effects become non-significant at the county level where analyses control for time, indicating that these institutional changes may, in fact, have no direct effect on establishment densities, while other time-varying effects are at play. Nonetheless, these periods do interact negatively with the resource space to affect density as predicted in Hypothesis 4. Focusing on Table 6, model 3 shows that the effect of resources on density declines during after passage of the Funeral Law.

Tables 7 and 8 present the results of analyses on firm-form organizations (note that model 3 in Table 5.3 explains 81% of the variance in the dependent variable). In all cases, the first-order positive and second-order negative effect of resources that was found for establishments is found for firms as well; again providing support for hypothesis 1. Both direct and interactive institutional period effects are non-significant in all cases (though the coefficients again refute hypotheses 2 and 3 and support hypothesis 4). As with establishments, the addition of time is notable for its significant negative second-order effects, while both direct and interactive institutional effects are non-significant. This further hints, at gradual organizational change over time and additional institutional changes, perhaps those associated with increasing cremation and issues of succession, not identifiable by the individual period effects examined here.

In general, this provides evidence to suggest that the inflexible relationship between deaths and organizations leads to a non-monotonic effect of deaths on funeral

home densities: as the size of the resource space grows, either new organizations must be founded to meet increasing demand or some existing organizations must increase in size – results here indicate that the latter certainly occurs, despite the existence of other institutions that discourage such growth. Additionally, my analyses show that the rise of chain-form organization and federal regulation both directly affect establishment densities, and further interact to affect the way establishment densities respond to numbers of deaths; but, interestingly, these institutional changes do not affect firm densities. Finally, my results show that the passage of time has a positive, but declining, effect on densities, hinting at the importance of forces such as consumers' increasing preference for cremation, problems of succession in family businesses, and patterns of entrepreneurship – none of which are directly measured.

These results add interesting findings to organizational studies. Despite a constant increase in the size of the resource space, declining growth and actual decreases in organizational densities are seen in Figure 1. The analysis here points to institutions as key elements in these density patterns and indicates their importance in the determination of carrying capacity. In particular, the institutions binding the industry to the resource space have previously been thought to stabilize the population of organizations (Torres 1988), but I reveal the linkage to operate in a different fashion - when the resource space is growing, the tight linkage forces organizations to respond as well, encouraging growth of existing organizations in addition to the founding of new ones. Additionally, my analyses show that changing institutional structures external to the industry operate not just by constraining the organizations themselves, but by altering the way in which they

interact with the resource space as well. These findings highlight the importance of institutions as determinants of carrying capacity, as forces that both alter the actual structure of organizations and the manner in which they approach the environment. Further, the effect of the variable “time” suggests that a range of other institutional forces – including, perhaps, the issues of succession and changing consumer attitudes – may be at play, and that the effect of changing acceptance of chain-forms may develop over time instead of as a static event. Finally, my analyses highlight organizational form and the boundaries of the resource space as ecological issues: I reveal differing effects of particular institutions on firm- and establishment- form organizational densities.

These findings focus attention on how the forces that affect organizational densities might affect the relationships between firms and establishments, and telegraph further questions about the processes of organizational founding, failure, and consolidation that are at the heart of these changes in density - issues that I pursue in the following two chapters. Additionally, the effects of the time variable leads to questions about the forces behind institutional change and its timing: perhaps the tight linkage of the industry to resources forces the rise of large firms and requires the adjustment of associational institutions to match these structural changes. This notion is not addressed further in the dissertation, but is left as a topic for future research.

CHAPTER 6 – ORGANIZATIONAL CONCENTRATION

In this chapter, I investigate organizational concentration in the population of funeral home organizations operating in Arizona between 1968 and 1999: examining ownership ties between firms and establishments, using time-series and time-series cross-sectional analyses to study panel data. In doing so, I am pursuing an answer to the question “How have changes in components of carrying capacity – resources, organizational densities, and institutions – affected organizational concentration in the funeral home industry?” Particularly, I link theories together by comparing the notions of resource partitioning with those of resource dependence as related discussions of organizational concentration.

As shown in Figure 5, and discussed in Chapter 2, concentration of ownership in the industry has increased during the latter quarter of the 20th century – once featuring almost exclusively single-establishment firms, the industry changed to feature large national and regional chains along side traditional “mom and pop” organizations (Smith 1996; Roberts 1997). History indicates that this occurred, in part, as a function of 1) relaxation in the institutions that had traditionally promoted the small size and simple ownership structure of the industry; and 2) problems with successorship in family businesses.

The results of Chapter 5 indicate that, because of the hyper-legitimated condition of the industry, increases in resources are met with organizational growth in addition to population growth. This is illustrated by Figure 1, which reveals that the densities of establishments and the firms that own them diverge from the size of the resource space,

and from each other, over time. This presents that the average size of both establishments (in number of cases serviced) and firms (in number of establishments owned) must be growing. From the starting point in 1968 where there are almost equal numbers of firms and establishments, this divergence could imply that either all firms are growing equally, each owning a similarly increasing number of establishments, resulting in an egalitarian distribution of firm size – a state of low organizational concentration. However, Figure 5 illustrates that there is a growing inequality to the distribution of size, with a few firms owning a large proportion of those existing establishments thus producing high concentration.

I examine changing organizational concentration within the context of the specific competitive environments and institutional structures of the industry in the period of analysis. Of key importance, again, is the fully legitimated state of the industry relative to the resource space. Practically, this means that virtually all deaths are processed through the industry, and the industry is focused on deaths as its primary resource. Theoretically, this implies that the total mass of organizations (the sum of all their sizes measured in number of cases processed) will be highly correlated with the number of deaths - this stable institutional linkage establishes the resource space as a very strong boundary of carrying capacity with both maximal and minimal implications: the population of organizations must have a mass nearly equal to resources. Note, however, that there remains flexibility in the population configurations that can represent this mass (e.g. many small organizations or one very large organization). The prior chapter examines density configurations under this condition; and this chapter investigates the

size configurations and ownership relationships among existing organizations via examination of organizational concentration. Further the institutional changes that relax constraint against large establishments and chain-form firms, and the creation of regulation, affect the manners in which the industry and individual organizations operate. As revealed in the previous chapter, these features have weak affects on organizational densities, however they may play strong roles in the relationship between organizations.

I analyze organizational concentration – here, both an indicator of the size distribution of firms and the bonded-togetherness of competing establishments, as described in Chapter 4 – via theories of resource partitioning, which predicts the rise of a few, large “generalist” organizations in competitive environments and, consequently, allows for small “specialist” organizations to prosper on the margins of the market, thus producing concentrated populations where organizational size is disproportionately distributed (Carroll 1985; Peli and Nooteboom 1999; Hannan and Carroll 2000; Ruef 2000); and resource dependency, which predicts increasing concentration of ownership as organizations respond to competition and uncertainty with merger (Aldrich and Pfeffer 1976; Pfeffer and Salancik 1978; Aldrich 1979). Further, I specifically take into consideration profit maximization and economies of scale – shown to be a part of changes in organizational densities in the previous chapter – as the process behind the organizational consequences of resource partitioning (Carroll and Hannan 2000); and horizontal integration as the actual outcome of resource dependence (Pfeffer and Salancik 1978). In distinguishing between these two theories, it is important to note that the resource partitioning perspective describes conditions of organizations (their sizes and the

size distribution within a population); and the resource dependence perspective describes actions and the consequences of actions among a population (attempts to minimize uncertainty via merger within a population).

As presented below, these two theoretical traditions predict differing effects of organizational density and resources on concentration. As such, I am able to test these theories alongside one another across a range of models predicting concentration. Specifically, I consider the two, related measures of concentration derived from the same population as presented in Chapter 4: one which measures the size distribution of firms based on number of establishments owned; and another which captures the binding-together of establishments under common ownership³⁰.

REVIEWING ORGANIZATIONAL CONCENTRATION

I base my research on the typical definition that organizational concentration refers to the size distribution of organizations, such that concentration increases as a larger proportion of the total size of all organizations is held by a smaller proportion of the total number of organizations (see Figures 2 – 4 for graphical insight into this idea). Foremost to my analyses, I measure the size of a firm in terms of numbers of establishments owned. This allows me to measure concentration for any set of firms and establishments based on the ownership ties that bind them together – and enables me to measure the maximally and minimally concentrated configurations of ownership for

³⁰ In both cases, these are standardized proportional measures. I identify the minimal and maximal levels of concentration for given organizational populations, and assess the existing level of concentration along that continuum.

given numbers of organization³¹. From the perspective of firms, I can measure the distribution of ties that link them to establishments, the elements that make up their sizes, thus capturing the level of equality in the size distribution of firms; and from the perspective of establishments, I can identify the distribution of ties that represent binding relationships stemming from common ownership, thus capturing the level of bounded-togetherness among the set of organizations. I do this via the use of the Herfindahl index (Herfindahl 1974; Tirole 1988) and a method of standardization that allows me to measure the proportion of possible concentration that exists among any set of organizations. These two measures, labeled “C1” for the establishment-oriented technique and “C2” for that focused on firms, are highly correlated (see Tables 3 and 4) and distinctively determined by the same ownership ties, however they are standardized to different population parameters and can be interpreted to have different meanings: standardizing by both number of firms and number of establishments produces a percentage measure of maximal concentration representing the inequality of the distribution of firm sizes; and standardizing by the number of establishments produces a percentage measure of maximal concentration of the ties that could bind sets of establishments together under common owning firms.

The theories of organizational concentration I consider here stem from three perspectives: resource partitioning and profit maximizing notions of the economies of scale, resource dependence, and the forces of institutions. Resource partitioning indicates

³¹ Again see Figures 2 through 4, and the discussion from Chapter 4, which help illustrate that for a given set of firms and establishments, there is a wide range of possible ownership configurations, some more concentrated than others.

that large “generalist” organizations rise out of competitive markets, but allow for the simultaneous existence of many small, specialist organizations (Carroll 1985; Hannan and Carroll 2000), thus producing an increasing organizational concentration. The process here is one of expansion via economies of scale - that organizational growth, instead of population growth, is the response to increasing resource availability and that already large, general firms tend to continue that inertia growth (Carroll 1985). I also take into account that this theory corresponds well with Chandler’s (1977, 1990) ideas about the profit maximizing actions of organizations: organizational management will “choose” to grow when possible in order to take advantage of economy of scale.

Resource dependence (Pfeffer and Salancik 1978; Aldrich 1979) directly considers competition for limited resources as a force increasing the likelihood of merger among competitors. The binding together of organizations that occurs via merger buffers against competition by mitigating uncertainty; and it also increases concentration by linking together already existing organizations under common ownership. I use this theoretical lens when approaching the establishment-based notion of concentration, where concentration refers to the linkages that exist among a population of establishments. Linkages would occur as a response to competition, as the firms that own them would sell-out and merge, thus competition would lead to concentration.

This poses an interesting puzzle: the competitively oriented theories would indicate that resources should mitigate competition, allow population growth, and reduce concentration – particularly, that concentration which measures the bounded togetherness of establishments; while the economic perspective would predict increasing concentration

via organizational growth associated with expansion under conditions of increasing resources – particularly that concentration which measures the size distribution of firms.

Finally, as presented in previous chapter, institutions can play key roles in the structuring of organizations (DiMaggio and Powell 1983; Scott and Meyer 1994; Scott 1995). In the funeral home industry, the institutions that guide this structuring are those unwavering traditions which bind virtually all human deaths to the services it provides; and those changing institutions which historically limited the industry to small “mom and pop”-style operation, but have relaxed in recent decades to allow large chain-form operations, and those regulations which govern its operation. This allowance of chains reduces barriers to organizational growth by accepting economy of scale both for establishments and firms.

HYPOTHESES AND EXPLORATIONS

My conceptualizations of concentration can be interpreted in the following manners: the bonding-together of establishments is a reflection of efforts to buffer the negative effects of competition among themselves; and the concentration of firms similarly eliminates competition and minimizes uncertainty by allowing for access to a wider share of the market – such consolidation would result in an increased proportion of establishments under the ownership of a single firm. Following the theories of resource dependence theory (Pfeffer and Salancik 1978), it is expected that uncertainty and competition in a market should increase horizontal integration. However, from the ecological perspective, growing markets are likely to produce a few large firms and a

variety by small firms (Carroll 1985) – a concentrated environment. These are countervailing forces: resource partitioning would indicate that as population size increases, it will be an expansion of small organization, thus decreasing concentration; while resource dependence would identify the competitive forces among many firms as a force encouraging concentration. Similarly increasing resources will allow organizational growth and increase concentration according to resource partitioning, but will reduce competition and decrease concentration according to resource dependence.

Because the two measures of concentration approach size in different ways – concentration of firms is precisely a measure of the size distribution, while concentration of establishments references the amount of horizontal integration – these two theories should apply to these populations differently. Firms are more oriented towards the theories of resource partitioning, while establishments are oriented towards resource dependence. Hence I arrive at the following:

Hypothesis 1a: From the perspective of resource partitioning, firm density should decrease inequality in the size distribution of firms, thus decreasing concentration.

Hypothesis 1b: From the perspective of resource dependence, establishment density will increase uncertainty in ability to acquire necessary resources and lead to competition, thus the number of organizations will have a positive effect on concentration.

Hypothesis 2a: Following the logic of resource partitioning, the size of the resource space will positively affect growth of a few “generalist” organizations, thus having a positive effect on concentration.

Hypothesis 2b: Following from the logic resource dependence, the size of the resource space will negatively affect uncertainty and reduce the need for establishments to be bound together, thus decreasing concentration.

Changes from the traditional modes of operation of establishments and firms in the industry directly altered the structure of organizations. In particular, chain form organizations, by definition, involve single firms owning multiple establishments. The Funeral Law altered the operation of individual firms, but is not directly associated with concentration – the organizations most affected by the law would be those who were dependent on misrepresentation of costs and services and would, therefore, be the least likely to be involved in mergers or expansion.

Hypothesis 3: The acceptance of chain-form organizations and economies of scale will have a positive effect on both forms of concentration.

Hypothesis 4: The passage of Funeral Law will have no effect on organizational concentration.

There are three interactive relationships that can be drawn for the theories of concentration presented above:

Hypothesis 5a: The acceptance of chains should increase concentration by allowing existing firms to open new establishments, increasing both inequality in the size distribution of firms and the linkages among establishments, thus period 1 should interact positively with deaths towards an increase in concentration.

Hypothesis 5b: The acceptance of chains should increase concentration by allowing mergers in competitive markets, thus period 1 should interact positively with density towards an increase in concentration.

As in the previous chapter, these analyses allow for the exploration of market aggregation as features affecting analyses of concentration. As shown in Tables 3 and 4, both forms of concentration vary in maximum, minimum, and average values between the state- and county-level: changing the boundaries within which ownership relationships are measured changes the number of organizations that can possibly be linked and will differentially consider any ties that exist across county boundaries. As a consequence, I have high expectations that results may vary dramatically between these levels of analysis.

And again, unmeasured institutional changes, including rising cremation rates and succession issues, are captured at the county level via the variable “time.” As was found

in the previous chapter, I expect that this variable will alter the ways in which institutions affect organizational concentration.

DATA, MODELS, AND METHODS

The data used in this chapter represents the complete history of funeral home organizations operating in Arizona between 1968 and 1999: yearly records identifying the location of each funeral home establishment and the firm that owns it, and the number of deaths occurring in each of the state's fifteen counties. I study the state of Arizona because it is an early adopter licensing for funeral homes, allowing for complete information on all operating organizations, via coding of these licensing records, across a history of changing institutional regimes and resource availability. These data enable me to identify the point at which an establishment is first open for business, not when they service their first customer or become a member of an association; and I am able to disaggregate to the county level, the typical market area of death care. This is advantageous compared to previous studies of the industry (Torres 1983, 1988) that use voluntary membership in the National Funeral Directors Association as the basis for identifying existing establishments, thus failing to include non-member organizations and neglecting to consider any issues of organizational form or concentration. Further, this prior research has a time-series which ends prior to the rise of large chains and the passage of federal legislation; and aggregates death and organizational data to the national level obscuring the localized distributions of human death that change over time as a function of human migration.

The dependent variables modeled in this chapter measure organizational concentration. As implied in the previous chapter, and illustrated in Figures 1 and 5, changes in these concentrations are, in part, evident in the diverging densities of the different organizational forms. As such, they should correspond to features of the organizational environment that affect carrying capacity. In particular, resources and the institutions that shape organizational structure and operation. Hence, the independent variables measure just those features.

Dependent Variables:

Concentration Measure 1: the proportion of maximal concentration of the size distribution of firms within a given population, based on number of establishments owned. This variable considers the sizes of all operating firms and increases as a smaller proportions of firms own increasing proportions of the existing establishments.

Concentration Measure 2: the proportion of maximal concentration of ties among establishments within a given population, based ownership by a common firm. This variable considers all ties between establishments and increases as a larger proportion of the population is linked together.

Independent Variables:

Establishments. This variable measures the density of establishment-form organizations in operation at the end of each year in the time-series, capturing a key component of competition among establishments. Scores for this variable are measured in hundreds-units (establishments/1000) for ease of interpretation of the results.

Firms. This variable measures the density of firm-form organizations in operation at the end of each year in the time-series, capturing a key component of competition among firms. Scores for this variable are measured in hundreds-units (firms/1000) for ease of interpretation of the results.

Deaths. This variable measures the number of human deaths at the end of each year, capturing a second key feature of the competitive landscape. Scores for this variable are measured in thousands-units (deaths/1000) for ease of interpretation of the results; and a squared term is included in all models to account for non-linear effects.

Period Effect 1: the existence of national-chain firms in Arizona. This is a dichotomous variable identifying the years after 1976 when national, chain firms first entered into Arizona.

Period Effect 2: the passage of the Funeral Law. This is a dichotomous variable identifying the years after 1983 when Federal regulation was enacted to enforce complete and honest presentation of pricing and service options.

Interactions – Three types of interactions are included in the models of this chapter: 1) between deaths and period effects; 2) between density and period effects; and 3) between density and deaths. The coefficients of these variables indicate the following: 1) the change in the effect of deaths on concentration during the given period; 2) the change in the effect of density on concentration during the given period; and 3) the change in the effect of density on concentration for each unit increase in deaths.

Time – This variable controls for the passage time, which can capture the effects of unmeasured time-varying institutions and time-dependence for the effects of institutional

change, by simply measuring the number of years since the start of my time-series. Scores for this variable are measured in hundreds-units (time/1000) for ease of interpretation of the results; and a squared term is included in all models to account for non-linear effects.

I use time-series analysis of state level data and time-series cross-sectional analysis of county level data to predict organizational densities on a set of independent variables. Analyses at the state level (Tables 9 and 10) require consideration of serial autocorrelation. Durbin-Watson test scores via simple ordinary least squares modeling indicated the need to account for such autocorrelation (Says 1989; StataCorp 2001). As a result, I pursued Prais-Winsten time series analysis - which produces a first-order autocorrelation, generalized least squares estimator (StataCorp 2001). Note that other time-series techniques were considered: attempts at Chocrane-Orcutt (1949) estimation did not converge and the two-step process (Hildreth and Lu 1960) is inefficient with small samples as I am using here.

Though counties are appropriate market boundaries for death care, it is possible to transport bodies across county boundaries for services. As a result, analyses at the county level must consider spatial as well as serial autocorrelative processes. I use time-series cross-sectional generalized least squares approach these models. This method via STATA (StataCorp 2001) allows for the consideration of correlated and heteroskedastic error terms across panels, an important issue with geographically contiguous panel-units that vary in size (Rabe-Hesketh and Everitt 2000), as is the case in this examination of counties.

Two important technical features of the models themselves are the incorporation of the variable “time” and the use of interaction effects. As shown in Chapter 4, “time” is highly correlated with “deaths” at the state level ($r > .98$). As a result, this control was eliminated from the state level models to avoid problems of multicollinearity (Allison 1999) with the key measure of the resource space. Similarly, sets of interaction variables were progressively reduced across models via elimination based on collinearity and statistical non-significance.

DISCUSSION OF RESULTS

Overall, my results support elements of both the competition-based resource dependence and resource partitioning theories of organizational concentration, as well as theories of increasing concentration via economies of scale; and provide only weak support for the idea that institutional changes impact the organizational concentration. However, the findings presented below add interesting insight into the power of legitimacy as an institutional force operating between resources and an industry. As presented in the prior chapter, that tight linkage in the funeral home industry may force both establishments and firms to grow in size as demand for services increases. In this analysis, that same tight linkage and forced growth is indicated to impact the relationships among organizations towards concentration.

Tables 9 and 10 present analyses of firm-based organizational concentration – the proportion of maximal concentration of the size distribution of firms – at the state- and county-levels, respectively. Model 2 of Table 6.1 ($r^2 = .79$) reveals a negative effect for

density and positive effects for institutional changes. At the county level, density has a positive effect on concentration while resources have a negative effect; further the acceptance of chains interactively increases the positive effect of firms, and federal regulation minimizes the negative effect of resources.

This indicates support for Hypotheses 1a and 3 at the state level; and support for only hypothesis 5b at the county level. The one consistent finding is that the relaxation of institutional constraints against chains and economies of scale increases inequality in the size distribution of firms – these institutional changes increase concentration. Further, changing the aggregation of the market affects concentration so that at the state level there is support for the conditions of resource partitioning, while at the county level there appears to be support for the resource dependence model of operation among firms.

Tables 11 and 12 present analyses of the establishment-based organizational concentration – the proportion of maximal concentration of ownership ties among establishment-form organizations – at the state and county levels, respectively. Model 3 in Table 11 ($r^2=.95$) reveals that establishment density and resources both directly serve to decrease concentration; while institutional changes directly increase, but interactively decrease concentration. At the county level, organizational density has a positive effect on concentration; deaths have a negative effect – that further interacts positively with density.

These results provide strong evidence to support resource dependence theories to explain the concentration of linkages among establishments, particularly at the county level. Further, by controlling for time in models at the county level, institutional effects

are reduced, hinting at the strength of competitive forces as those driving concentration in the industry.

In general, I find that firm- and establishment-form concentration operate in different ways: the concentration of the size distribution of firms fits well into the theories of resource partitioning when data is aggregated at the state level; while the concentration of the distribution of linkages among establishments³² operates at the county level along the lines of resource dependence. While the operationalization and conceptualization of concentration are different for these two organizational forms, the finding that firms and establishments respond differently to elements of the organizational environment is an important indicator that organizational form has bearing on how generalized processes work. Further, that results differ between county and adds import to the manner in which data is aggregated. In this case, because firms can operate in multiple counties simultaneously, aggregation to the state level is the most appropriate level of analysis. Establishments compete in local markets, so the county is the appropriate level for their analysis. Nonetheless, the finding that firm concentration at the county level corresponds to resource dependence theories hints at the importance of market partitions as important features of the theories of organizational relations.

³² Yet, another way of conceiving of this is the concentration of the size distribution of establishments, where size is measured in the number of co-ownership ties to other establishments.

CHAPTER 7 – ORGANIZATIONAL VITAL RATES

In this chapter, I investigate founding, failure, and change in ownership in the population of funeral home organizations operating in Arizona between 1968 and 1999, using time-series and negative binomial time-series cross-sectional analyses to study panel data. I examine theories of organizational sociology that predict these vital events to be functions of competition, measured via organizational densities, resources, relationships among organizations, and the institutional environment. This develops the processes behind the changes in density and concentration presented in the previous chapters; and provides answers to the question “How do the components of competition combine to affect the vital processes of funeral home organizations?”

As presented in Figures 8 through 12, vital activities of founding, failure, and changing ownership have varied over time in my sample of the industry. Of particular note, Figures 9, 11, and 12 (showing the failures of firm- and establishment-form organizations, and changing ownership of establishments, respectively) correspond well with the information presented in Figures 1 and 5: the increasing numbers of firm and establishment failures link to declining population growth, and the increase in ownership change of establishments hints at rising concentration in the industry. Previous chapters have looked at population level characteristics of density and concentration, but this chapter looks inside processes to consider how the specific vital events that lead to changes in these features are affected by forces of competition - as manifested in organizational densities, resources, organizational concentration, and the changing institutions of the industry.

REVIEWING VITAL RATES

I pursue this examination of vital rates from two perspectives, that of competition and that of resource partitioning. In particular, from the perspective of competition, I pursue the ideas of density dependence (Hannan and Freeman 1989; Baum 1996) and resource dependence (Pfeffer and Salancik 1978). As opposed to previous chapters where process was not examined directly, here I am able to get to the heart of these theories. Theories of density dependence indicate that competition increases as density increases – specifically that as density approaches carrying capacity, competition becomes fierce. As a result, in a competitive environment, density positively affects failures and negatively affects foundings (see Baum 1996 for a review of findings in this area). With regard to resource dependence, the availability of resources dictates levels of competition inversely (Pfeffer and Salancik 1978; Aldrich 1979). While this can of course be extended to effect events of founding and failure via the logic of carrying capacity, resource dependence was specifically theorized in terms of organizational merger – pursued here more broadly as change in ownership.

Further, these competitive processes are influenced by the concentration of organizations. From the perspective of resource partitioning and size-localized competition, concentration in the size distribution of firms should increase foundings and decrease failures (Carroll 1985; Ranger-Moore et. al. 1995; Carroll and Hannan 2000; Carroll and Swaminathan 2000). Here, two forces are at play: 1) the general trend in competitive markets toward the rise of generalists who pursue economies of scale, but

allow small organizations into the specialized margins of the market; and 2) fierce competition that occurs between those small specialists or between large generalists, but not between the two different types. As a result, concentration of the size-distribution becomes inversely related to competition. Another perspective on the role of concentration comes from resource dependency. Merger is a response to minimize competition by aligning organizations cooperatively under common ownership. As a result, concentrated markets experience less powerful competition; and, again, concentration reduces competition leading to increasing foundings and decreasing failures.

HYPOTHESES AND EXPLORATIONS

The near-wholly legitimated condition of the industry relative to the resource space identifies competition as the key feature driving vital rates. I analyze those features of the environment that can relax or intensify competition in order to predict the vital rates of organizations. To this end, I focus on three key variables: organizational density, deaths, and organizational concentration. Organizational density is positively related to competition by way of placing the population closer to the limits of carrying capacity - increasing the number of organizations operating within a given resource space decreases the average amount of resources available, thus increasing competition. Resources operate in the opposite direction by expanding the limits imposed by carrying capacity and thus reducing competitive forces. The two forms of concentration approach concentration in similar ways. The first form of organizational concentration, that

describing inequality in the size distribution of firms, should also decrease competition as it represents a minimization of the equality of size that strengthens competition (Ranger-Moore et. al. 1995). The second form of concentration, that which describes relationships among establishments, should serve to decrease competition as it is describing a “bound-togetherness” among possible competitors, such that others in a network experience the success of any one establishment.

The first set of hypotheses focus on the classic ecological ideas of density dependence, which should remain a key force behind the vital processes presented here. Typically, there are opposing of first- and second-order effects (Hannan and Freeman 1989; Baum 1996; Hannan and Carroll 200) of density on vital rates across the history of an industry: low densities are operating in the realm of legitimation and high densities are operating under competition. Given the already legitimate state of the industry at the starting date of my time period, density should serve only to increase competition and should not be a force of legitimation. Hence I arrive at the following

Hypothesis 1a: Organizational density will have a negative effect on founding rates.

Hypothesis 1b: Organizational density will have a positive effect on failure rates.

Hypothesis 1c: Organizational density will have a positive effect on rates of changing ownership.

The second set of hypotheses focus on the key resource of deaths. As previously presented, increasing the size of the resources space should mitigate competition by

expanding carrying capacity. Note again that the traditional process of legitimation is not at play. Instead, as resource increases it is precisely this existing legitimacy that leads to organizational foundings in response to increasing demand under institutional conditions that limit size. As such, I arrive at:

Hypothesis 2a: Deaths will have a positive effect on founding rates.

Hypothesis 2b: Deaths will have a negative effect on failure rates.

Hypothesis 2c: Deaths will have a negative effect on rates of changing ownership.

As presented above, organizational concentration should serve as a buffer to competition among organizations. This forms the basis for my third set of hypotheses. Via quite different processes, both forms of concentration tie organizations together: in the case of establishments, concentration serves to minimize competition among members and redistribute finances so as to mitigate the negative consequences of competition (Pfeffer and Salancik 1978; Williamson 1985); in the case of firms, concentration describes variation in size which can serve to decrease the ferocity of competition among them (Ranger-Moore et al. 1995; Carroll and Hannan 2000; Carroll and Swaminathan 2000) and presents as resource partitioning – with a kind of symbiosis among organizations existing in a population with a few large generalists and many small specialists. Thus I arrive at:

Hypothesis 3a: Concentration will have a positive effect on organizational founding rates.

Hypothesis 3b: Concentration will have a negative effect on organizational failure rates.

Hypothesis 3c: Concentration will have a negative effect on rates of changing ownership of establishments.

The fourth set of hypotheses returns to the institutional history of the industry. While the institutions legitimating death care itself are stable across my time period, those that govern organizational structure are not. The acceptance of chain form organizations should allow for an increase in competition for resources. As organizations are allowed to grow through economies of scale, the institutions that had prevented the pursuit of large numbers of resources no longer exist, and competition for those resources will increase. Regarding Funeral Law, the regulation of pricing will serve to increase competition for limited resources as organizations are less able to depend on large profits from a small number of services. As such, I propose the following:

Hypothesis 4a: The period effects for institutional change should have a negative effect on organizational founding rates.

Hypothesis 4b: The period effects for institutional change should have a positive effect on organizational failure rates.

Hypothesis 4c: The period effects for institutional change will have a positive effect on the rate of change in establishment ownership.

The fifth set of hypotheses considers interactions between periods and density.

Hypothesis 5: The interaction between institutional periods and organizational density will have a positive effect on competition and affect vital rates accordingly.

As in the previous chapters, the differing populations of firms and establishments, at varying levels of market aggregation, are analyzed. This allows for consideration of organizational form as a feature that may affect the processes of competition. If the effects differ between firms and establishments, conclusions can be drawn about the possibility the ecological process discussed here are contingent on the way organizations are identified. Further, the consideration of both state- and county-level markets allows for an investigation of how drawing market boundaries may affect the study of these processes.

DATA, MODELS, AND METHODS

The data used in this chapter represents the complete history of funeral home organizations operating in Arizona between 1968 and 1999: yearly records identifying the location of each funeral home establishment and the firm that owns it, and the number of deaths occurring in each of the state's fifteen counties. I study the state of Arizona because it is an early adopter licensing for funeral homes, allowing for complete information on all operating organizations, via coding of these licensing records, across a

history of changing institutional regimes and resource availability. These data enable me to identify the point at which an establishment is first open for business, not when they service their first customer or become a member of an association; and I am able to disaggregate to the county level, the typical market area of death care.

The dependent variables modeled in this chapter measure organizational vitality. As presented above, they should correspond to features of the organizational environment that affect carrying capacity and lead to competition. Note that because data is recorded at the end of every year, the vital events occurring in year t are modeled with independent variables measured in year $t-1$.

Dependent Variables:

Organizational Foundings, failures, changes in ownership. Each of these variables is a count of the number of times these events occur in a given year.

Independent Variables: except for period effects, all are analyzed at year $t-1$.

Establishments. This variable measures the density of establishment-form organizations in operation at the end of each year in the time-series, capturing a key component of competition among establishments. Scores for this variable are measured in hundreds-units (establishments/1000) for ease of interpretation of the results.

Firms. This variable measures the density of firm-form organizations in operation at the end of each year in the time-series, capturing a key component of competition among firms. Scores for this variable are measured in hundreds-units (firms/1000) for ease of interpretation of the results.

Deaths. This variable measures the number of human deaths at the end of each year, capturing a second key feature of the competitive landscape. Scores for this variable are measured in thousands-units (deaths/1000) for ease of interpretation of the results; and a squared term is included in all models to account for non-linear effects.

Period Effect 1: the existence of national-chain firms in Arizona. This is a dichotomous variable identifying the years after 1976 when national, chain firms first entered into Arizona.

Period Effect 2: the passage of the Funeral Law. This is a dichotomous variable identifying the years after 1983 when Federal regulation was enacted to enforce complete and honest presentation of pricing and service options.

Concentration Measure 1: the proportion of maximal concentration of the size distribution of firms within a given population, based on number of establishments owned. This variable considers the sizes of all operating firms and increases as a smaller proportions of firms own increasing proportions of the existing establishments.

Concentration Measure 2: the proportion of maximal concentration of ties among establishments within a given population, based ownership by a common firm. This variable considers all ties between establishments and increases as a larger proportion of the population is linked together.

Interactions – Three types of interactions are included in the models of this chapter: 1) between deaths and period effects; 2) between density and period effects; and 3) between density and deaths. The coefficients of these variables indicate the following: 1) the change in the effect of deaths on concentration during the given period; 2) the change in

the effect of density on concentration during the given period; and 3) the change in the effect of density on concentration for each unit increase in deaths.

Time – This variable controls for the passage time, which can capture the effects of unmeasured time-varying institutions and time-dependence for the effects of institutional change, by simply measuring the number of years since the start of my time-series.

Scores for this variable are measured in hundreds-units (time/1000) for ease of interpretation of the results; and a squared term is included in all models to account for non-linear effects.

In this chapter, the dependent variables are events: organizational foundings, failures, and ownership changes. As a consequence, care must be taken in modeling to ensure proper specification of the distribution of the dependent variable. In particular, when aggregated to the state level, there are a wide range of possible value for the dependent variable – see Table 3 and Figures 8 through 12. Thus at this level of analysis, no special specification need be made, and the Prais-Winsten time-series estimator can be pursued as in previous chapters.

However, at the county level, the distribution of counts-by-year of is highly skewed towards zero – as evidenced in Table 4. Such a distribution calls for the use of Poisson or negative-binomial techniques (Judge et. al. 1985; Allison 1999). By examination, it was determined that for each dependent variable at the county level, the conditional variance exceeded the mean number of events indicating the necessity to use negative binomial techniques to prevent underestimation of the standard errors (Ranger-Moore, Banazak-Holl, and Hannan 1991). In pursuing this technique via pooled time-

series cross-sectional analysis, I follow the example of Barron, Hannan, and Burton (2001) that uses Stata (StataCorp 2001) software to model such data via the XTGEE technique of general estimating equations that can account for unspecified serial and spatial autocorrelations.

Two important technical features of the models themselves are the incorporation of the variable “time” and the use of interaction effects. As shown in Chapter 4, “time” is highly correlated with “deaths” at the state level ($r > .98$). As a result, this control was eliminated from the state level models to avoid problems of multicollinearity (Allison 1999) with the key measure of the resource space. Similarly, sets of interaction variables were progressively reduced across models via elimination based on collinearity and statistical non-significance.

DISCUSSION OF RESULTS

Overall, the results of my analysis support some basic notions of how density and resources are hypothesized to affect competition and vital rates. Further, I find support for the logics that concentration decreases competition. However, I find little support for the expected direct or interactive period effects.

Reviewing tables 13 and 14, which present the results of firm foundings and failures at the state levels, I find, unexpectedly, that density has no significant effect on these vital events; and the size of the resource space operates in a decidedly opposite direction from that predicted: increasing deaths serve to decrease foundings and increase failures. Both findings are in opposition to what is typically found in competitive

environments as represented by Hypotheses 1 and 2. Period 1, the rise of chains and acceptance of economies of scale, operates in the predicted manner by decreasing foundings and increasing failures, but federal regulation does not operate as predicted: it increases foundings and decreases failures. Interactively, period 2 continues to operate against prediction by decreasing the effect of density on competition. Finally, concentration³³ has the expected positive effect on foundings, but has no effect on failures, in support of Hypothesis 3a, but not 3b.

Briefly, the whole of these results indicates that firms are not operating in a competitive manner at the state level, instead the rise of chains themselves and active pursuit of economies of scale via merger and growth appear to be the force operating at this level. In particular, these findings support ideas of resource partitioning and the rise of large generalists, over the notions of an active competitive market.

Table 15 and 16 examine firms at the county level, modeling founding and failure rates, respectively. These models provide little support for the notion that traditional competition drives vital rates in this sample. While density does have a positive effect on firm failure rates, its effects on foundings become positive³⁴ and non-significant in full models. Further, the resource space is not a significant factor at this level of market aggregation, though the coefficients do perform as expected. As at the state level, concentration plays the key role in these models, increasing founding rates and

³³ By combining the coefficient of the direct effect with the coefficients of the interactive effects across the possible range of scores for these variables, I find that the net effect is always positive.

³⁴ Evaluation of the direct first and second order effects, and the interactive effects when appropriate, reveals the density has a consistently positive overall effect.

decreasing³⁵ failure rates as predicted in hypothesis 3. In opposition to the results found at the state level, institutional period have no direct effect on these vital rates, and interactions that do not support Hypotheses 4 or 5.

These results again indicate that simple competition for limited resources is not driven firm-based vital rates. Further, the ability to control for time at the county level removes the impact of institutional periods. This leaves concentration – in this case the size distribution of firms – as the key factor affecting vital rates: for any given population, concentration of the size distribution will increase foundings (or founding rates) of new firms and decrease failures.

In Tables 17 and 18, I turn to analyses of establishment founding and failure rates at the county level. Here evidence suggests that competition operates as expected with density having a true negative second order³⁶ effect on founding (though density has no direct effect in the final model) and positively³⁷ affecting failure rates. Further, deaths are shown to positively impact founding and decrease failure rates. Thus Hypotheses 1 and 2 find strong support. Concentration – here measured as linkages between establishments - is shown to operate against predictions made in Hypothesis 3. It has a positive effect on foundings only when density is low, while in high densities

³⁵ By combining the coefficient of the direct effect with the coefficients of the interactive effects across the possible range of scores for these variables, I find that the net effect is always negative.

³⁶ Evaluation of the direct first and second order effects, and the interactive effects when appropriate, reveals that low levels of density have a positive effect on founding but high levels have a negative effect.

³⁷ By combining the coefficient of the direct effect with the coefficients of the interactive effects across the possible range of scores for these variables, I find that the net effect is always positive.

concentration serves to decrease founding rates; comparably, concentration has a positive effect on failures. These findings refute hypotheses 3a and 3b. Regarding institutions, there is interactive evidence to show that period 1 increase foundings and period 2 decreases foundings; while regulation has a direct positive affect on failure rates, and the period of chains interacts positively with establishments to increase failure rates as well. Hence there is some evidence for hypothesis 4b but not 4a.

This duo of tables indicate that the vital process of establishments are strongly tied to traditional competitive forces of density and resources; further the institutional changes that have been a strong part of the history of the industry seem to play only a secondary role in the vital events presented here. The distribution of ownership linkages, which played a key role in the vitality of firms as presented above, operates in opposite directions here. However, while this does not support the ideas of resource dependence it does correspond well with the notion that such networks serve as barriers to entry of new firms in the market and distribute risk unequally, such that in a less concentrated market all establishments share competitive risk equally, while in concentrated markets those establishment not within networks feel competitive pressures much more strongly.

Table 19 presents the results of analyses of change in ownership among establishments. As in the analysis of establishment failures, changing ownership operates as a function of competition much as would be predicted by resource dependence and ecological theories. Density increase rates of change, while the size of the resource space decreases these rates – in accordance with Hypotheses 1 and 2. Further, concentration

again increases³⁸ the rate of the vital event (i.e. concentration of linkages increases the rate of further concentrating events).

In general, this corresponds directly with the findings concerning establishment failure. As was expected by resource dependence, this vital event occurs as a consequence of competition just as ecology focuses on failure as the consequence. Further, ecology points to merger as a type of failure event (Hannan and Freeman 1989; Hannan and Carroll 2000) and changing ownership is most often just that – an establishment merging into an already existing network of organizations. These results add particularly interesting finding to organizational studies and the understanding of this specific industry. In particular, that competition – the effects of density and resources - drives the vitality of establishments, while resource partitioning – the effects of organizational concentration and the pursuit of economies of scale – drives the vitality of firms. An important implication of this finding is that institutional change to the acceptance of chain forms may have little actual affect on the structuring of organizations – the densities and concentration illustrated in Figures 1 and 5 may well occur because of ecological and economic processes regardless of how federal regulation and associational institutions guided the industry. Finally, aggregation of markets is not shown to significantly affect the results of the analyses.

³⁸ By combining the coefficient of the direct effect with the coefficients of the interactive effects across the possible range of scores for these variables, I find that the net effect is always positive.

CHAPTER 8 - CONCLUSION

The funeral home industry in the United States has undergone a wide range of structural changes in its history. In particular, the state of Arizona, between 1968 and 1999, experienced increasing numbers of human deaths, an increasing numbers of establishments to service this growing market, and fluctuating numbers of firms (the organizations that own establishments). In turn, a diverging number of establishments and firms produced a growing concentration of organizational size – an increasing inequality of the distribution of establishments among the existing firms. Further, these changes occurred differently within the localized county-level markets of the state: some counties experienced little change in resources and organizations over time, while others grew considerably.

In this dissertation I have examined precisely these changes. Recall, that the purpose of this dissertation has been to answer the following questions: 1) How do changes in social institutions and the size of the resource space differently affect the populations of firm- and establishment form funeral home organizations? 2) How do competition for limited resources and changing institutions, along with diverging populations of firms and establishments, affect concentration in this population of organizations? And 3) how do resources, institutions, and organizational concentration combine to affect the vital rates of founding, failure, and changing ownership in population of firm- and establishment-form organizations? These in service of the

broader question “How has the funeral home industry developed over time as a function of institutional and ecological processes?”

In approaching these questions I have considered a range of theoretical traditions. From the perspective of organizational ecology, the size of the resource space and levels of legitimacy and competition are key factors affecting density via founding and failure rates; from the perspective of the economic organization, the size of the resource space affects opportunity for growth, in turn affecting concentration and the competitive landscape; resource dependence theories point to competition as a driving force behind the concentration of organizations; and institutional theorists point to regulatory policies and isomorphic processes that can affect both the form of organizational structuring and the nature of competition in the market.

A key feature of my approach to these theories is the idea of competition – multiple organizations simultaneously operating to seek out a limited and necessary resource. This is a particularly appropriate consideration here, given the institutionalized nature of funeral services that create a rigid social environment necessitating nearly every human death to be processed through the industry, and limiting the industry to focus exclusively on that resource for profits. This then enhances the notion of an organizational environment’s “carrying capacity” by describing environmental conditions that limit the minimum possible mass of organizations that can operate under a set of conditions. I have used this state of hyper-legitimacy to enhance my examination of how features of the organizational environment affect competition and the changing density,

concentration, and vital rates of funeral home organizations in Arizona between 1968 and 1999.

EXPLAINING CHANGES IN THE ARIZONA FUNERAL HOME INDUSTRY

Historic stability in the number of funeral homes establishments operating in the United States has been explained via institutions of professionalism that limited the pursuit of economies of scale and ferocious competition (Torres 1988; Smith 1996). The changes in density and concentration evidenced in the late 20th Century, and the data presented here, can be attributed to a range of forces: changes in the resources space, changing associational institutions regarding the appropriate structuring of the industry, the passage of federal legislation constraining operation, changes in the way consumers approach the industry (e.g. increasing suspicion of “price-gouging” and use of cremation), changes in the way family succession is approached by small, family-run “mom and pop” organizations, and active pursuit of economies of scale by organizations (Torres 1988; Smith 1996). I directly test the first three forces, and indirectly consider the final three, within the analyses presented in Chapter 5 through 7.

In general, I find evidence to support the idea that increases in the number of deaths in localized markets combined with the stable institutions which drive consumers to the industry are at the heart of changing densities, concentrations, and vital rates; though not in the simple “more deaths lead to more organizations” manner that might be implied by Torres’ (1988) previous research. Instead, my findings indicate that increasing resources are, themselves, a force promoting concentration of the industry net

of any effect of institutional change – that rising deaths are met with growth of establishments, the founding of new establishments by already existing firms, and the consolidation of existing firms. Further, competition for those resources by establishments, and pursuit of economies of scale by firms, play key, complementary roles in organizational concentration. The specific periods of institutional change representing the acceptance of chains and the passage of regulation are shown to have effects on organizations, but key indicators point to other time-varying changes as important forces as well – of key interest here is the possibility that succession problems in family firms drive the initial rise of concentration in the industry, a process not directly discussed in this dissertation, but left to be pursued in future research.

Organizational densities in the industry are typically directly attributed to the size of the resource space and to institutional forces that limit organizational size (Torres 1988; Smith 1996). Net of institutional forces, I find that the number of organizations does not track directly with resources. Instead establishment density grows more slowly, and firm density even declines, as the size of the resource space increases (recall Figure 1). This implies that existing organizations must be servicing more deaths, growing in size, instead of new organizations opening to service the increasing demand. I propose that this is a result of the tight linkage between deaths and the industry, a state of inelastic demand, which forces the growth of existing establishments (which increase numbers of bodies serviced) and firms (which can open new establishments with their existing capital) when there are barriers to entry by new organizations. I have no measures of

such barriers in this dissertation, indicating that research into these limitations would prove valuable in understanding the operation of the industry.

My direct institutional measures are shown to have little effect on organizational densities, the only strong finding being that the passage of the Funeral Law did decrease the density of establishment-form organizations. In this case, regulation against price deceptions may well have had a fatally detrimental effect on some small number of establishments dependent on that sort of operation. However, it is quite telling that “time” was a feature strongly affecting both establishment and firm densities. This indicates that time-varying forces are at play in the industry, perhaps additional specific institutional periods, or, as I suspect, gradually changing patterns affecting succession in family businesses and leading to a non-periodic trend towards chain-form organization. In any case, this encourages more detailed research into the time varying institutions governing the industry, and the internal operations of both firms and establishments.

The relationships between firms and establishments, and among establishments, respond to competition in apparently varied ways. For a given population of firms operating at the state-level – that is, across markets – the concentration of the size distribution responds negatively to the size of that population: more firms means a more equitable distribution of establishment ownership among them. However, at the county level, concentration responds positively to the number of firms and negatively to the number of deaths: more firms leads to a more unequal distribution of establishments among them, but large amounts of resources reduces this concentration. This difference in markets is telling: across markets, decreasing firm density along with increasing deaths

is linked to high concentration within markets (as illustrated in Figures 1 and 5) - this means an increase in size among only a small proportion of that small number of firms; while within markets the more firms there are, the more concentrated the size distribution. This can be imagined as follows: within small markets, there are a few similarly sized small firms, but as markets grow new firms are founded and a small number of firms grow by opening new establishments and merging; while across multiple markets firm consolidation occurs so that the number of firms decrease, but a few of them are growing disproportionately large. This coincides well with the logic of economies of scale and profit maximization pursued by a few, large, national firms; and in all cases, the existence of national chains, organizations that pursue concentration, and the passage of regulation serve to increase levels of concentration. This consolidation across markets over time further brings into question issues of successorship as a possible source of consolidation, as there is no direct competition across counties.

Establishments themselves operate at the county level such that increasing competition, more establishments and fewer deaths, increases concentration – here, the binding together of establishments. A larger proportion of establishments tend to be bound together as their number increases, but this concentration is mitigated by deaths. This corresponds well with the county level findings for firms. As more establishments are competing, they seek to be bound together to minimize competition – the firms that own them merge, binding establishments together – and as the size of the resource space grows new single-establishment firms are able to enter and successfully compete in the environment.

Disentangling the actual processes behind changes in density and concentration proves valuable in telling the detailed story of this case. Investigating the vital rates of organizational founding and failure more closely, an interesting distinction develops: the forces of competition operate differently for establishments and firms. Deaths have a typical negative effect on competition among establishments – increasing foundings and decreasing failures and changes in ownership of establishments. However, they have a reversed effect on firms at the state level and no effect on firms in local markets: increases in the resource space actually increase failures among firms and decrease foundings. This implies that the establishment-level response to resources is birth and the firm-level response to increasing resources is growth and merger. Further, by considering organizational densities as a component of competition, establishments are shown to operate in an actively competitive market where the number of organizations is directly associated with failure rate; firm densities, on the other hand, have no bearing on firm vitality. Establishments appear to be operating competitively, while firms appear to have freedom to grow: a compatible, and fascinating finding.

Within these vital processes, I find that the acceptance of chain form organizations plays a strong role in firm dynamics, increasing failures and decreasing foundings, while federal regulation operates at the level of the establishment to increase failures and decrease foundings.

Together, these findings imply that firms and establishments respond to their environments in very different ways, but that both forms are pursuing economies of scale regardless of institutional constraints against such operation, implying that the institutions

that bind human deaths with the industry are stronger than the institutions limiting organizational growth. In particular here local markets are competitive for establishments, but firms can operate across markets and take minimize risk by doing so. Additionally, the changing acceptance of chain form organizations may not to be an independent institution, but, instead, one that arise out of the necessity of establishment and firm growth.

THEORETICAL CONTRIBUTIONS

Firms operate relative to the organizational environment differently than establishments – they have different ecologies, in part because they operate at different levels of the market and experience institutional demands differently. In particular, the link between establishments and the resources space appears to produce competition in its most traditional form, while firms link to it via growth.

Density dependence (Hannan and Freeman 1989; Carroll and Hannan 2000) is supported only in part by the results here. It holds for terminal events for establishments and firms at the county level, but not for firms at the state level, nor for founding events in any case. The other component of competition, the size of the resource space, is shown to have expected effects on establishment foundings and failures, but to actually increase the failure of firms.

As per the theories of resource partitioning (Carroll 1985; Peli and Nooteboom 1999; Carroll and Hannan 2000; Carroll and Swaminathan 2001), inequality in the size distribution of firms produces an increase in firm foundings. Alternately, concentration

among establishments decreases foundings and increases failures – implying that concentration produces barriers to entry for competitors – an operation compatible with resource dependence theories (Pfeffer and Salancik 1978).

Social institutions are shown to be dramatic determinants of organizational mass. Once true legitimation is achieved, carrying capacity determines a narrow range of organizational mass. If there are barriers to the attainment of necessary mass, those barriers will fall or legitimacy will change. If those barriers are part of legitimacy, then the legitimacy of the industry will be called into question allowing for a wider range of possible organizational masses to exist. Further, changing institutions are shown to have an affect on how competition is felt by firms and establishments; and to directly affect organizational structure, in the case of chain-form acceptance, and failures, in the case of regulation.

FUTURE RESEARCH

Of foremost attention in future research will be multi-level modeling of establishments nested within firms over time in order to capture the dynamic differences between organizational forms. This will serve to detail the relationships between the two, and allow for an advanced organizational-level analysis of failures and growth of firms. Additionally, pursuit of data regarding issues of family ownership and problems with succession appears to be imperative to this research as it may well be at the center of changing patterns of ownership towards chains and multi-unit firms. Also, pursuit of detailed establishment level size data – number of cases embalmed, number of cases

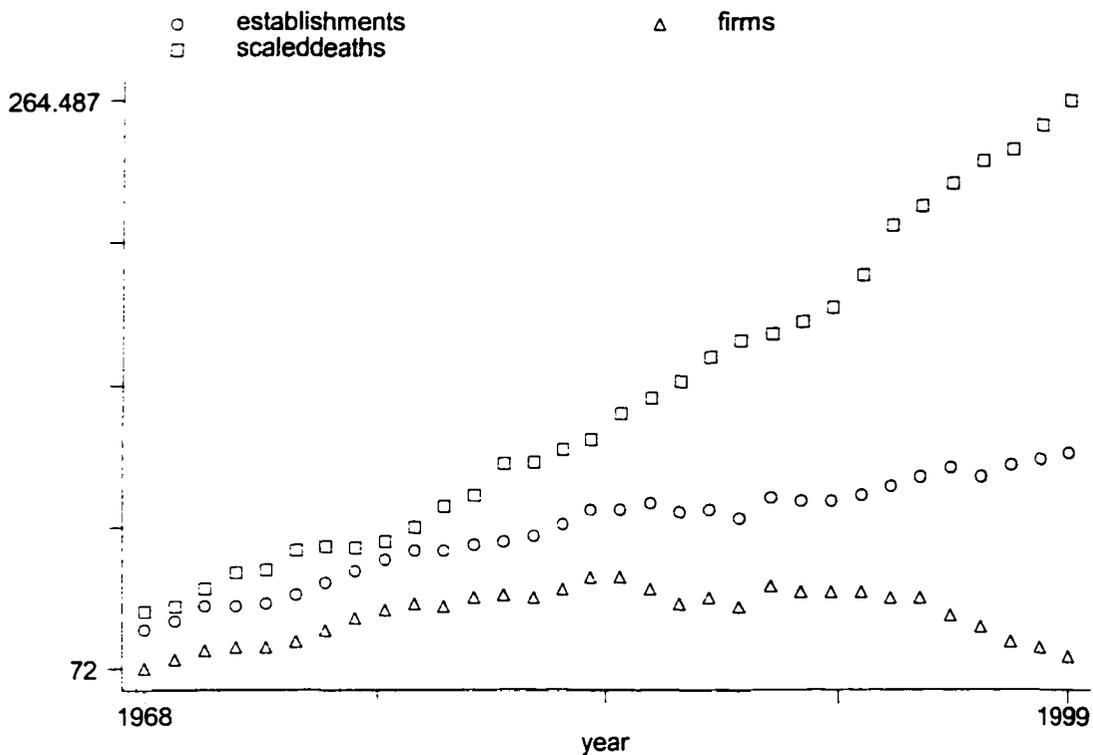
cremated, number of cases shipped to other funeral homes, etc. – would be a value augmentation to this existing data. Further, expanding this research to include cemeteries and information about ownership and business linkages between the two would add to both an understanding of the industry, and a more dynamic analysis of organizational communities.

From the perspective of theory, the results here indicate that further delving into the relationship between size-localized competition and organizational concentration is worthy of further pursuit. But in this regard, a key arena should be the examining competition among establishments and its effect on merger, in combination with growth at the level of the firm – creating formal theoretical linkages between firm and establishment dynamics. Further pursuit of the idea of “geographic generalism” is also warranted. That operating in multiple markets is comparable to the varied resources and “course grained niche” associated with theories of resource partitioning.

Finally, I hope to pursue additional research examining the embeddedness of funeral organizations in the resource space. That it is not just variation in the size of the resource space, but variation in its content that can affect organizational processes. In particular, by including measures of migration I can begin to examine how the breakdown in traditional family bonds with local funeral homes affects changes in the industry.

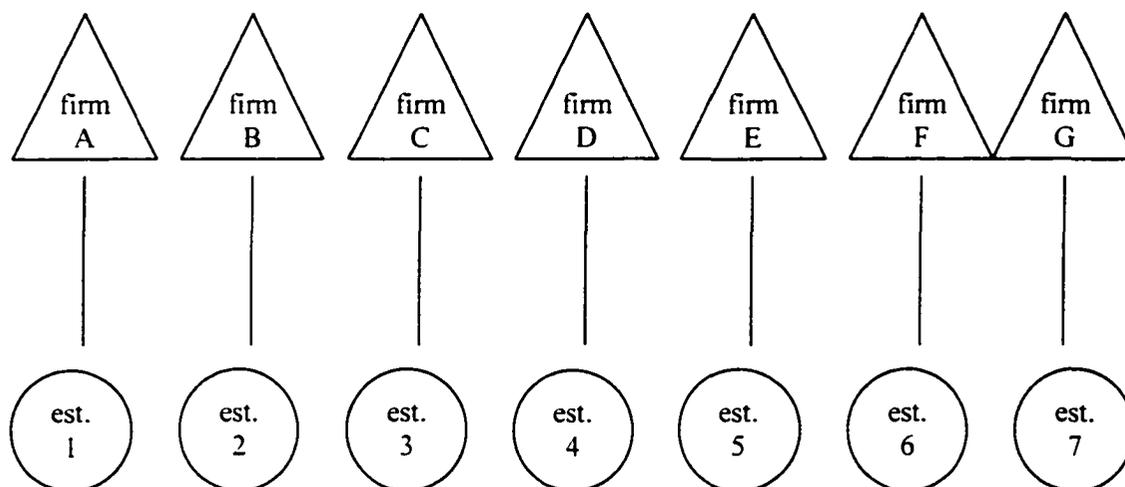
APPENDIX A

Figure 1 - Numbers (Density) of Funeral Home Establishments, Funeral Home Firms, and Human Deaths by Year in the state of Arizona, 1968-1999



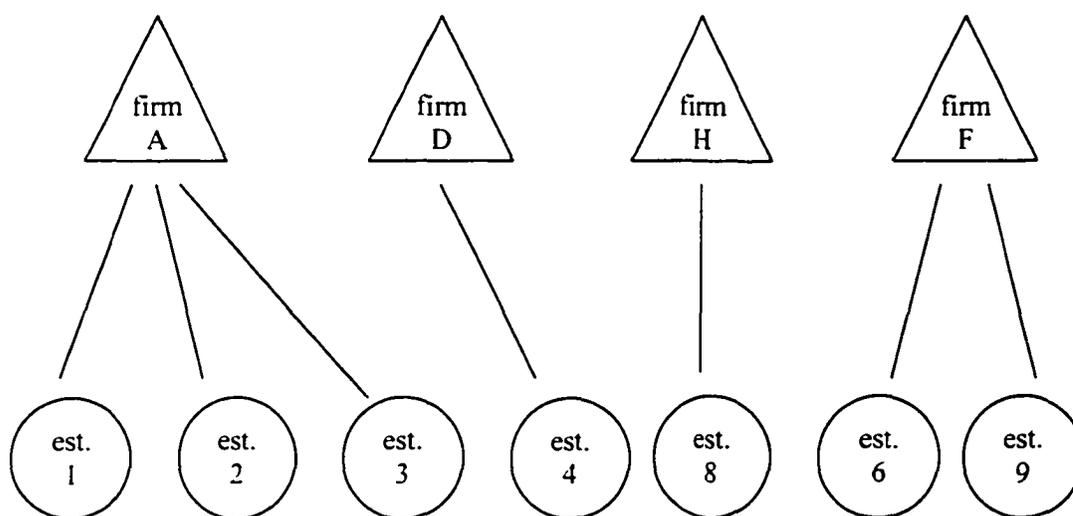
square - Number of human deaths in Arizona, scaled (deaths/150)
 circle - Number of funeral home establishments operating in Arizona
 triangle - Number of funeral home firms operating in Arizona

Figure 2 – Example of Firm-Establishment Linkages Presenting Low Organizational Concentration³⁹



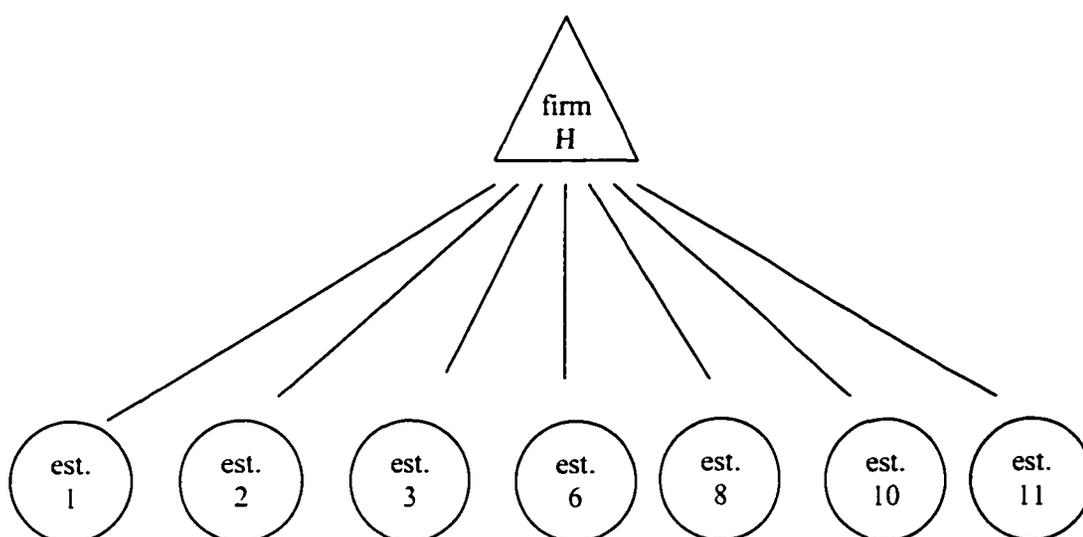
³⁹ Note that Figures 2, 3, and 4 represent the level of concentration of both *ownership ties between establishments* and *firm size* (as measured in establishments owned, such that the total size of the population of firms is equally distributed among all firms).

Figure 3 – Example of Firm-Establishment Linkages Presenting Medium Organizational Concentration⁴⁰



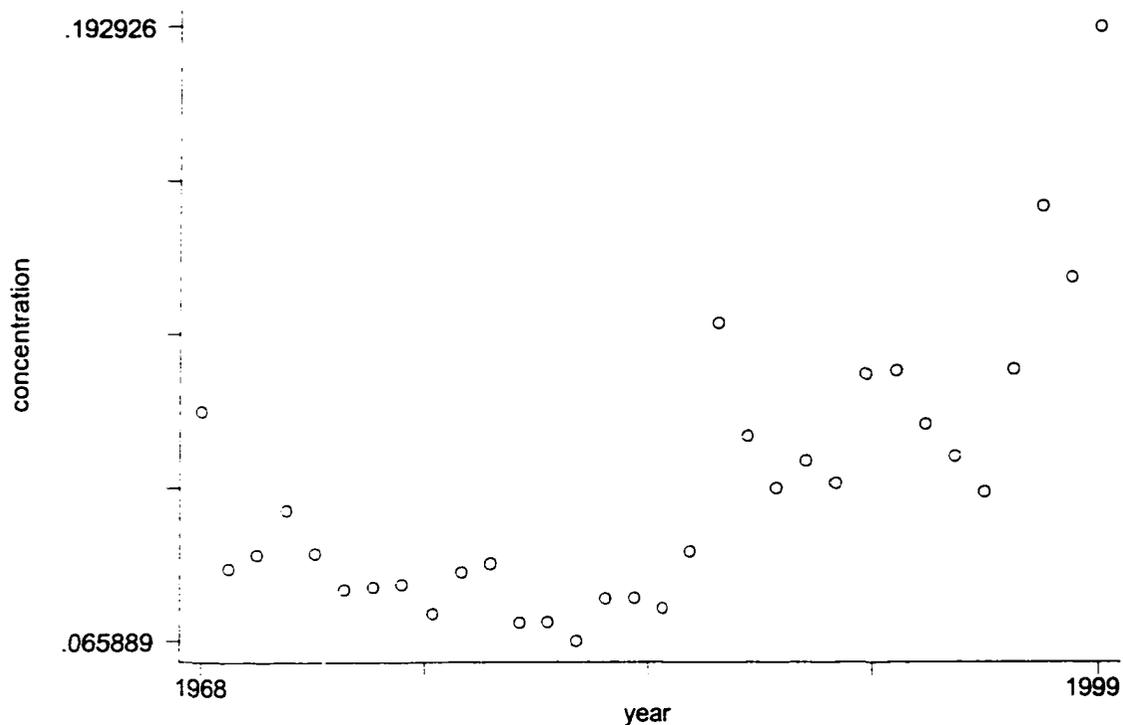
⁴⁰ Note the change from Figure 2 implies the failure of firms B, C, E, and G, and establishments 5 and 7; the founding of firm H and establishments 8 and 9; and the change in ownership of establishments 2 and 3. Also, recall from Figure 2 that this can be interpreted as an increase in the concentration of both *ownership ties between establishments* and *firm size* (as measured in establishments owned, such that the total size of the population of firms is not equally distributed).

Figure 4 – Example of Firm-Establishment Linkages Presenting High Level of Organizational Concentration⁴¹



⁴¹ Note the change from figure 3 implies the failure of firms A, D, and E, and establishments 4 and 9; the founding of establishments 10 and 11; and the change in ownership of establishments 1, 2, 3, and 6. Again, recall from Figure 2 that this can be interpreted as a further increase in the concentration of both *ownership ties between establishments* and *firm size* (as measured in establishments owned).

Figure 5 – Proportion of Maximal Concentration⁴² of Ownership by Year in the State of Arizona, 1968-1999.



circle - proportion of maximal level of ownership concentration among firms and establishments operating in Arizona, 1968 - 1999

⁴² The proportion of concentration is measured on a scale from 0 – 1 (zero to one), such that given an existing population of firms and establishments in a particular year, the value zero implies minimal concentration and one implies maximal concentration.

Figure 6 – Diagram of Simple Ecological Variables, Forces, and Relationships

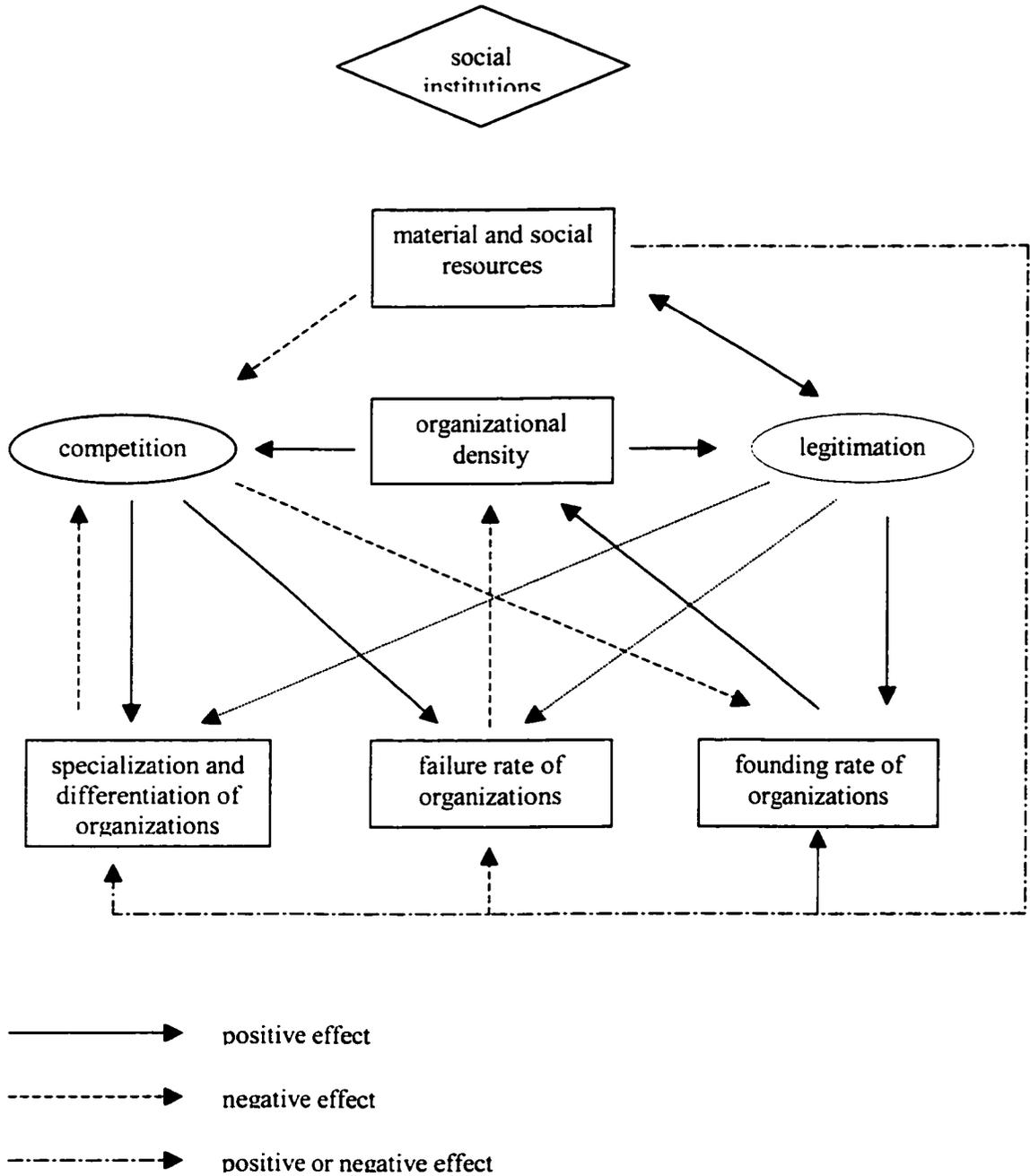
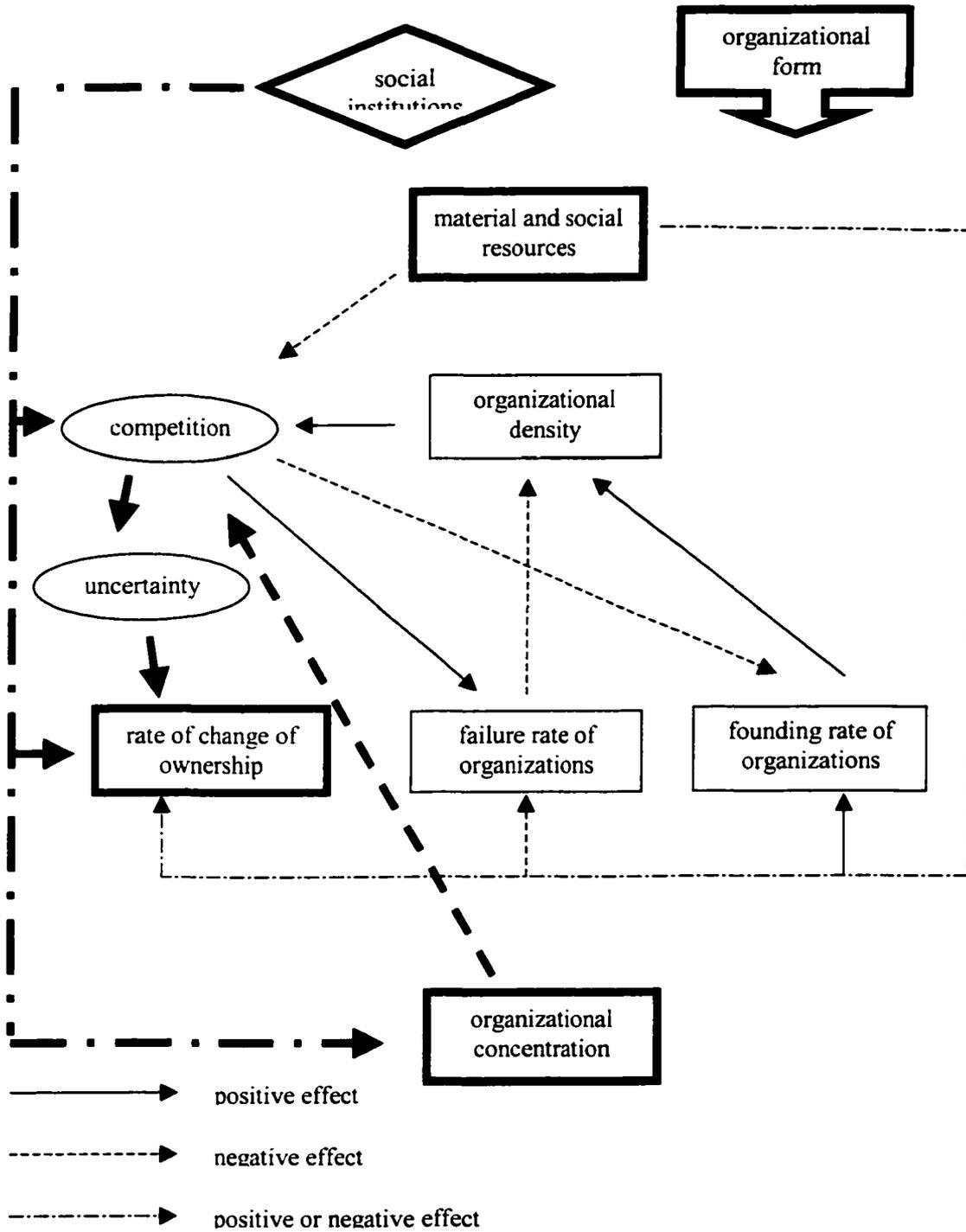


Figure 7– Diagram of Variables and Forces Analyzed in Chapters 5 - 7⁴³



⁴³ Features in bold provide novel additions to this tradition of research.

Figure 8 - Funeral Firm Foundings by Year in Arizona, 1968-1999.

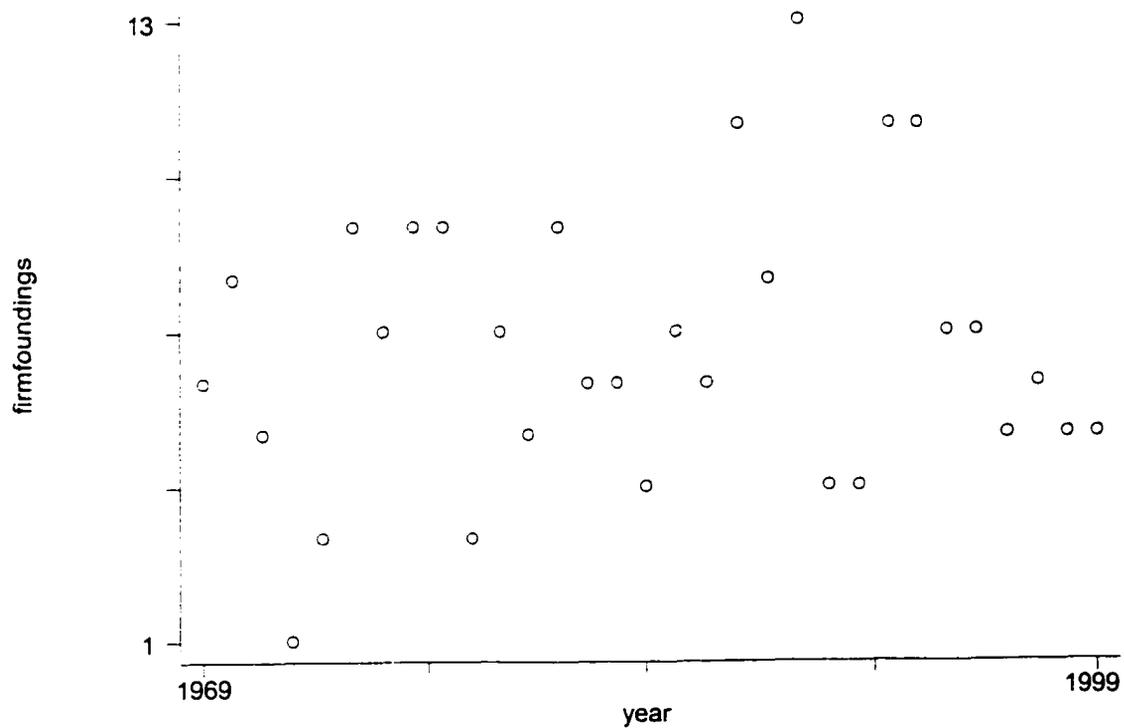


Figure 9 - Funeral Firm Failures by Year in Arizona, 1968-1999.

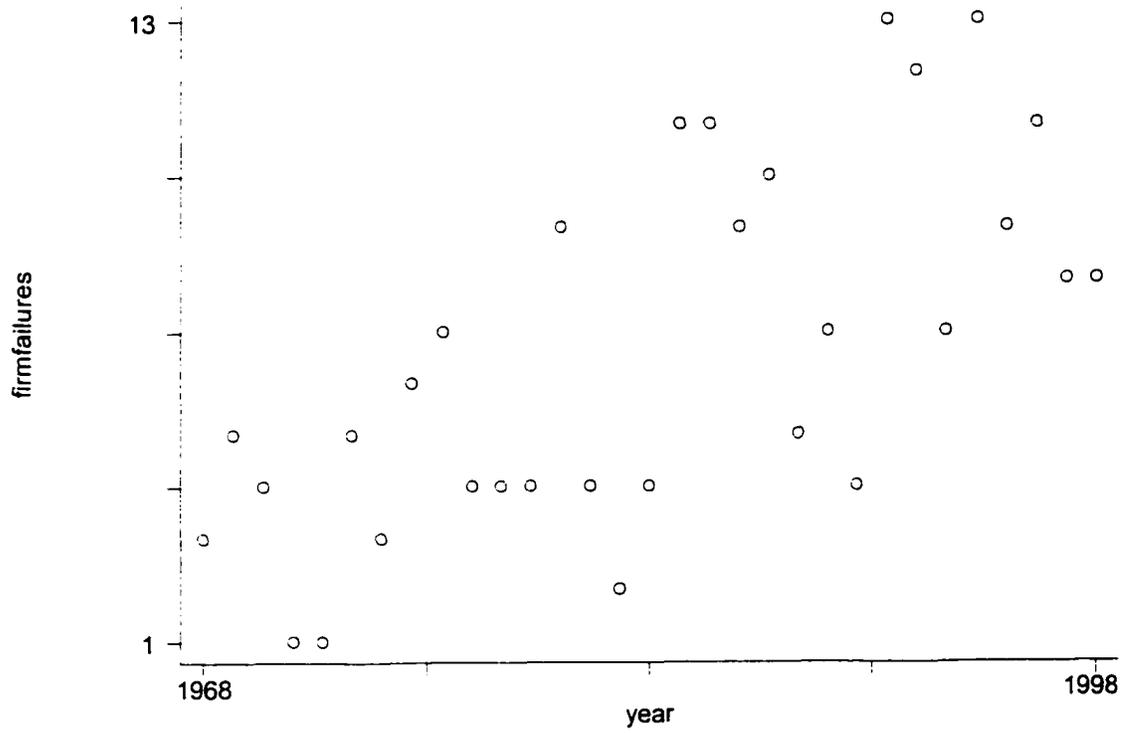


Figure 10 - Funeral Establishment Foundings by Year in Arizona, 1968-1999.

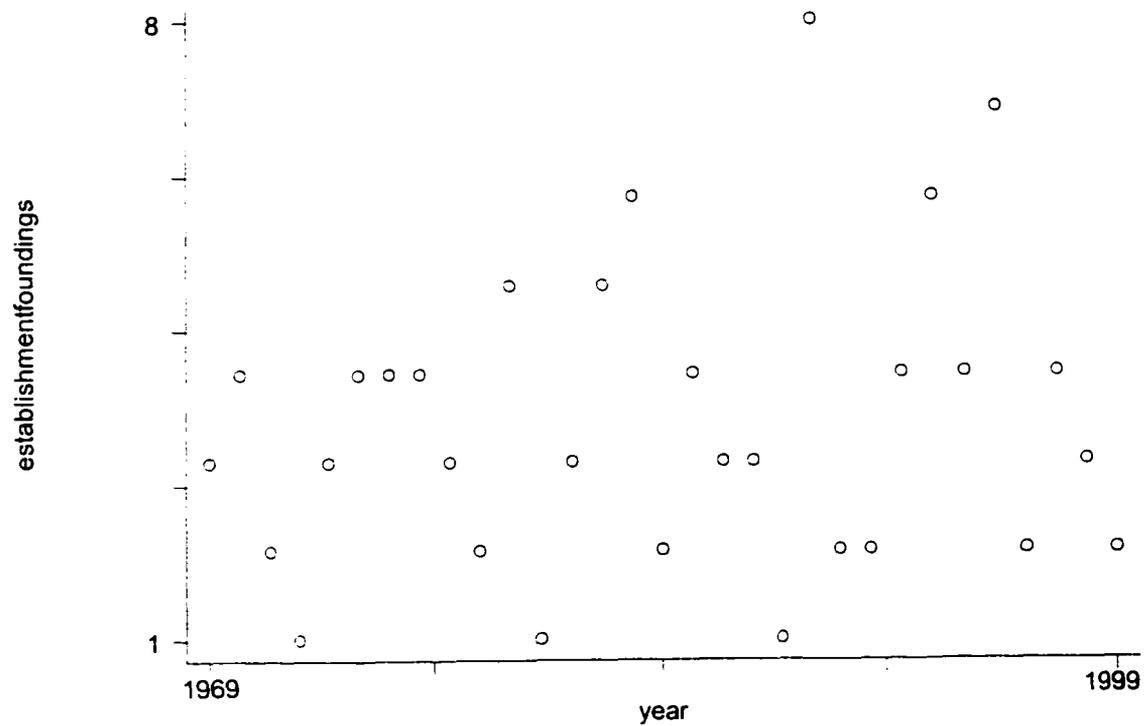


Figure 11 - Funeral Establishment Failures by Year in Arizona, 1968-1999.

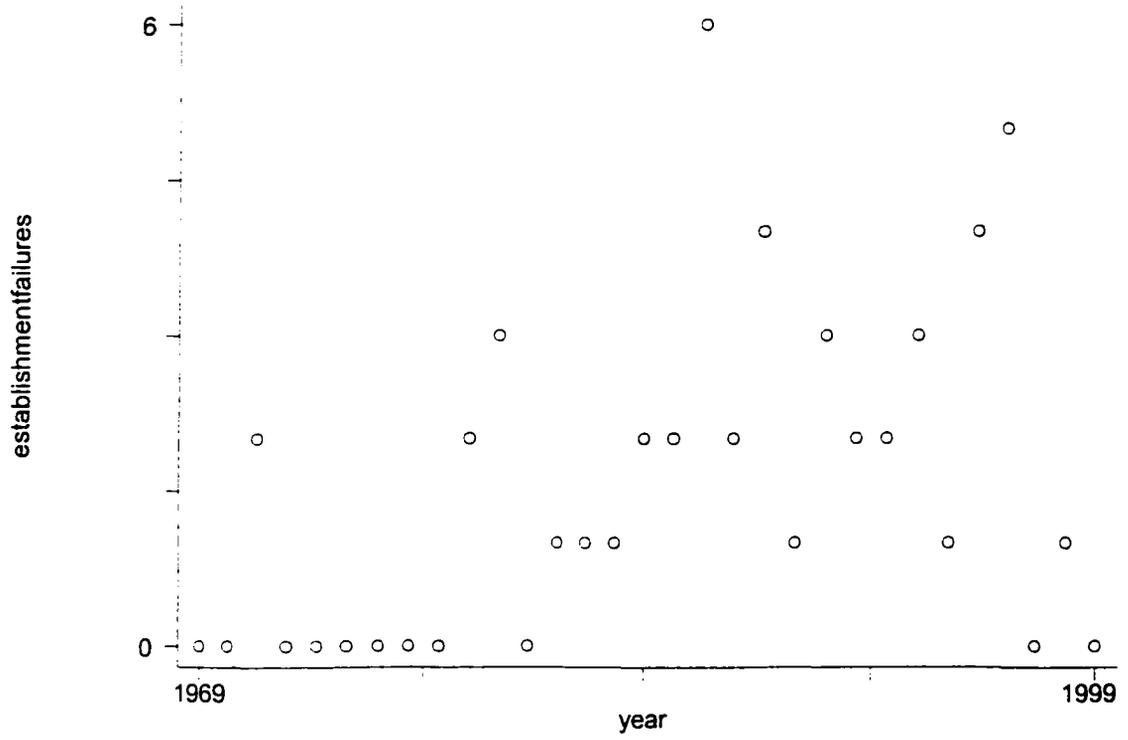


Figure 12 - Funeral Establishment Ownership Changes by Year in Arizona, 1968-1999.

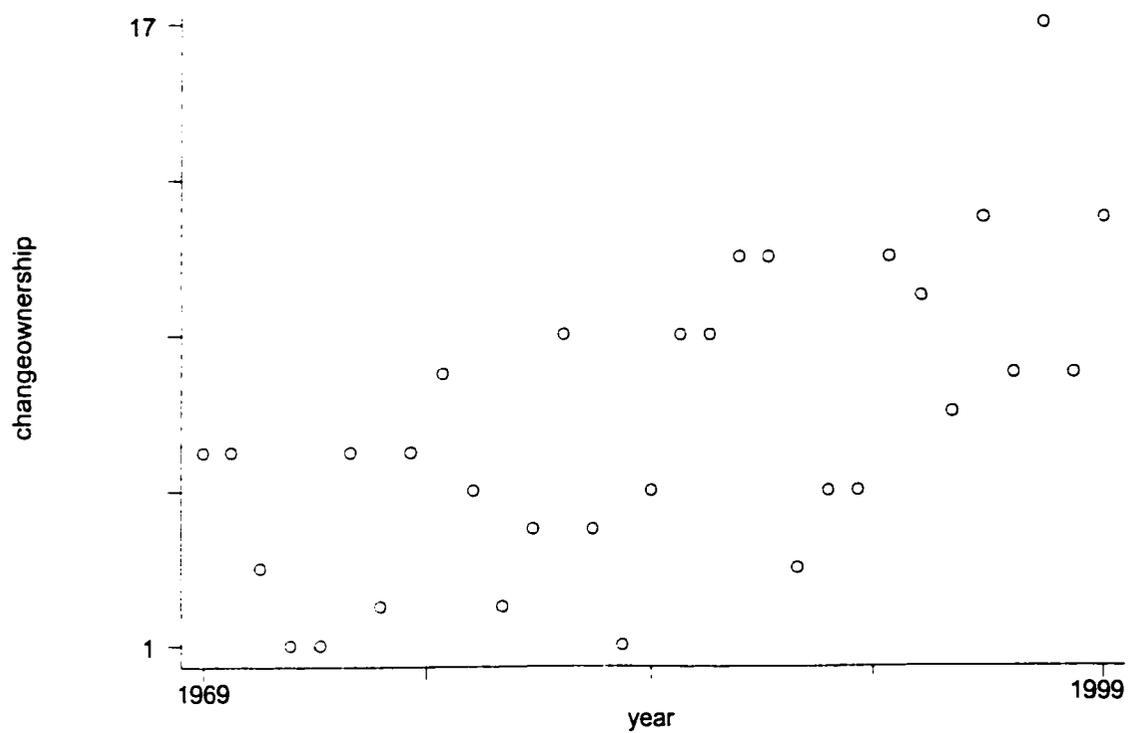


Table 1 - Variable Descriptions, Sources, and Summary Statistics

Variable Name Variable Type Abbreviation	Description	Construction and Source
Establishments ratio “ests” or “est’ments”	The number of funeral home establishments operating in a given year, measured at the end of the year.	Obtained from official records at the Arizona State Board of Funeral Directors and Embalmers.
Firms ratio “firms”	The number of firms owning at least one funeral home establishment in a given year, measured at the end of the year.	Obtained from official records at the Arizona State Board of Funeral Directors and Embalmers.
Deaths ratio “deaths”	The number of human deaths having occurred by the end of a given year.	Obtained from official records of Arizona State Office of Vital Statistics.
Period 1 dichotomous “p1”	The period after the arrival of national chain firms into the state, prior to the passage of the Funeral Rule (1977-1983).	Obtained by identifying the first year of operation of national chain firms - based on official records from the Arizona State Board of Funeral Directors and Embalmers.
Period 2 dichotomous “p2”	The period after the arrival of national chain firms into the state, prior to the passage of the Funeral Rule (1977-1983).	Obtained via records of the passage of FTC Funeral Rule.

Table 1 - continued

Variable Name Variable Type Abbreviation	Description	Construction and Source
Concentration, standardized by establishments ratio "C1"	The concentration of ownership ties linking any given set of establishments: this is the proportion of maximal concentration of linkages between establishments, where having a common owner links establishments.	Obtained from official records at the Arizona State Board of Funeral Directors and Embalmers identifying firm-establishment ownership ties; and the use of mathematical formula from chapter 4.
Concentration, standardized by firms and establishments ratio "C2"	The concentration of the size distribution of firms for any given set of firms and establishments: this is the proportion of maximal inequality in the size distribution, where firm size is measure in establishments owned.	Obtained from official records at the Arizona State Board of Funeral Directors and Embalmers identifying firm-establishment ownership ties; and the use of mathematical formula from chapter 4.
Firm Foundings ratio "f-founds"	The number of firms starting operation in a given year.	The count of firms for which no prior licensing record existed.
Firm Failures ratio "f-fails"	The number of firms for which a given year is their last year of operation.	The count of firms that both failed to renew all of their licenses from the previous year and did not obtain any new licenses.
Lag Firm Foundings ratio "Lf-founds"	The number of firms starting operation in the prior year.	Obtained via manipulation of the variable "Firm Foundings."
Lag Firm Failures ratio "Lf-fails"	The number of firms ceasing operation in the prior year.	Obtained via manipulation of the variable "Firm Failures."

Table 1 - continued

Variable Name Variable Type Abbreviation	Description	Construction and Source
Establishment Foundings ratio "e-founds"	The number of establishments starting operation in a given year.	The count of establishments, based on address, for which no prior licensing records existed.
Establishment Failures ratio "e-fails"	The number of establishments for which a given year is their last year of operation.	The count of establishments that did not renew or re-apply for licensing in a given year.
Lag Establishment Foundings ratio "Le-founds"	The number of establishments starting operation in the prior year.	Obtained via manipulation of the variable "Establishment Foundings."
Lag Establishment Failures ratio "Le-fails"	The number of establishments ceasing operation in the prior year.	Obtained via manipulation of the variable "Establishment Failures."

Table 1 - continued

Variable Name Variable Type Abbreviation	Description	<u>Construction and Source</u>
Changes in Ownership of Establishments ratio "e-change"	The number of establishments that change ownership in a given year.	Obtained from official records at the Arizona State Board of Funeral Directors and Embalmers.
Lag Changes in Ownership of Establishments ratio "Le-change"	The number of establishments that change ownership in the prior year.	Obtained via manipulation of the variable "Establishment Foundings."

Table 2 – Interaction Variables and Coefficient Descriptions

Variable Name	Description and Interpretation
Deaths * Period 1	The change in effect of Deaths on the dependent variable during Period 1 (1977-1983).
Establishments * Period 1	The change in effect of Establishments on the dependent variable during Period 1 (1977-1983).
Firms * Period 1	The change in effect of Firms on the dependent variable during Period 1 (1977-1983).
Concentration1 * Period 1	The change in effect of Concentration 1 on the dependent variable during Period 1 (1977-1983).
Concentration2 * Period 1	The change in effect of Concentration 2 on the dependent variable during Period 1 (1977-1983).
Deaths * Period 2	The change in effect of deaths on the dependent variable during Period 2 (1984-1999).
Establishments * Period 2	The change in effect of Establishments on the dependent variable during Period 2 (1984-1999).
Firms * Period 2	The change in effect of Firms on the dependent variable during Period 2 (1984-1999).
Concentration1 * Period 2	The change in effect of Concentration 1 on the dependent variable during Period 2 (1984-1999).
Concentration2 * Period 2	The change in effect of Concentration 2 on the dependent variable during Period 2 (1984-1999).

Table 2 - continued

Variable Name Abbreviation	Description and Interpretation
Deaths * Concentration1	The change in effect of Deaths on the dependent variable for a unit increase in Concentration 1 OR the change in effect of Concentration for a unit increase in Deaths.
Deaths * Concentration2	The change in effect of Deaths on the dependent variable for a unit increase in Concentration 2 OR the change in effect of Concentration for a unit increase in Deaths.
Deaths * Firms	The change in effect of Deaths on the dependent variable for a unit increase in Firms OR the change in effect of Firms for a unit increase in Deaths.
Deaths * Establishments	The change in effect of Deaths on the dependent variable for a unit increase in Establishments OR the change in effect of Establishments for a unit increase in Deaths.

Table 2 – continued

Variable Name Abbreviation	Description and Interpretation
Establishment * Concentration1	The change in effect of Concentration 1 on the dependent variable for a unit increase in Establishments OR the change in effect of Establishments for a unit increase in Concentration 1.
Firms * Concentration1	The change in effect of Concentration 1 on the dependent variable for a unit increase in Firms OR the change in effect of Firms for a unit increase in Concentration 1.
Establishment * Concentration2	The change in effect of Concentration 2 on the dependent variable for a unit increase in Establishments OR the change in effect of Establishments for a unit increase in Concentration 2.
Firms * Concentration2	The change in effect of Concentration 2 on the dependent variable for a unit increase in Firms OR the change in effect of Firms for a unit increase in Concentration 2.

Table 3 - State Level Summary Statistics and Pearson Correlations

Variable	Mean	Std. Dev.	Min	Max
ests	119.2	15.8732	85	143
e-founds	3.5	1.717054	1	8
e-fails	1.6	1.631585	0	6
e-change	6.5	3.794279	1	17
firms	91.43333	8.198752	72	103
f-founds	6.733333	2.72831	1	13
f-fails	6.7	3.495317	1	13
deaths	24384.33	7432.2	13959	38395
C1	.0089812	.0081853	.0034479	.0346269
C2	.0943838	.0233553	.0658889	.1558813
period1	.7333333	.4497764	0	1
period2	.5	.5085476	0	1

	ests	e-found	e-fails	e-chang	firms	f-found	f-fails
ests	1.0000						
efounds	0.2872	1.0000					
efails	0.4799	-0.0246	1.0000				
echange	0.5565	0.0609	0.3064	1.0000			
firms	0.4985	0.2413	0.2892	-0.0183	1.0000		
ffounds	0.2091	0.5889	-0.0015	0.3831	0.3013	1.0000	
f-fails	0.6518	0.0316	0.3047	0.4355	0.3548	0.1613	1.0000
deaths	0.9375	0.2075	0.4741	0.6214	0.2122	0.1484	0.6395
C1	0.6822	0.0790	0.2173	0.6187	-0.2698	-0.0354	0.4004
C2	0.6245	0.0143	0.3746	0.6146	-0.1694	0.0667	0.4859
period1	0.8385	0.1339	0.5075	0.4243	0.6870	0.1649	0.4738
period2	0.8159	0.0987	0.5818	0.5987	0.2936	0.1988	0.7275

	deaths	C1	C2	period1	period2
deaths	1.0000				
C1	0.8287	1.0000			
C2	0.7755	0.8545	1.0000		
period1	0.6874	0.3695	0.3625	1.0000	
period2	0.8541	0.6138	0.7384	0.6030	1.0000

Table 4 – County Level Summary Statistics and Pearson Correlations

Variable	Mean	Std. Dev.	Min	Max
ests	13.96535	16.42483	0	68
e-founds	.3910891	.7265538	0	4
e-fails	.1534653	.4127482	0	3
e-change	.8069307	1.478655	0	10
firms	10.47525	11.98099	0	45
f-founds	.8168317	1.180738	0	5
f-fails	.7821782	1.289868	0	8
deaths	3197.733	4815.561	278	21041
C1	.1358463	.2167145	.0068028	1
C2	.3169271	.132104	0	.5714288
period1	.8118812	.391778	0	1
period2	.6188119	.4868853	0	1

	ests	e-found	e-fail	exchange	firms	f-found	f-fails
ests	1.0000						
efounds	0.6628	1.0000					
e-fails	0.3296	0.2136	1.0000				
exchange	0.6966	0.5337	0.2852	1.0000			
firms	0.9806	0.6524	0.3031	0.6261	1.0000		
ffounds	0.7411	0.7393	0.2315	0.7633	0.7489	1.0000	
f-fails	0.6905	0.5267	0.4369	0.9273	0.6342	0.7707	1.0000
deaths	0.9808	0.6337	0.3525	0.6997	0.9408	0.7106	0.6967
C1	-0.3058	-0.1878	-0.0157	-0.1799	-0.337	-0.2544	-0.1761
C2	-0.3659	-0.2662	-0.1838	-0.2060	-0.358	-0.2518	-0.2308
period1	-0.0087	-0.0024	0.1794	0.0916	-0.032	0.0327	0.1351
period2	-0.0334	-0.0547	0.1440	0.1184	-0.081	-0.0009	0.1444

	deaths	C1	C2	period1	period2
deaths	1.0000				
C1	-0.2696	1.0000			
C2	-0.3899	-0.4829	1.0000		
period1	0.0418	0.1084	0.0117	1.0000	
period2	0.0424	0.1691	-0.0379	0.6133	1.0000

Table 5 - Prais-Winsten Time-Series Estimates of Funeral Home Establishment Density⁴⁴ in Arizona, 1968-1999.

	(1)	(2)	(3)
deaths/1000	5.617** (1.284)	5.633** (1.338)	3.545** (0.995)
(deaths/1000) ²	-0.067** (0.023)	-0.067** (0.023)	0.054* (0.019)
period1:1977-1999 chain forms		3.295+ (1.713)	52.333* (19.574)
period2:1984-1999 Funeral Law		-0.232 (3.929)	118.931** (19.155)
deaths * period1			-2.823* (1.163)
deaths * period2			-5.690** (1.066)
Constant	25.716 (16.317)	24.459 (16.163)	26.696* (12.706)
Observations	32	32	32
R-squared	0.82	0.87	0.97

Standard errors in parentheses

+ significant at 10%; * significant at 5%; ** significant at 1%

⁴⁴ "Density" refers to the number of operating organizations.

Table 6 - Time-Series Generalized Least Squares Estimates of Funeral Home Establishment Density in Arizona, by County, 1968-1999.

	(1)	(2)	(3)
deaths/1000	4.304** (0.230)	4.444** (0.219)	4.724** (0.153)
(deaths/1000) ²	-0.061** (0.013)	-0.061** (0.012)	-0.063** (0.010)
period1:1977-1999 chain forms		0.081 (0.095)	0.072 (0.093)
period2:1984-1999 Funeral Law		-0.131 (0.094)	0.066 (0.092)
deaths * period1			0.022 (0.085)
deaths * period2			-0.263** (0.066)
time		0.133** (0.032)	0.129** (0.026)
time ²		-0.005** (0.001)	-0.005** (0.001)
Constant	2.383** (0.229)	0.921** (0.299)	1.306** (0.226)
Observations	434	434	434
Counties	14	14	14

Standard errors in parentheses

+ significant at 10%; * significant at 5%; ** significant at 1%

Table 7 - Prais-Winsten Time-Series Estimates of Funeral Home Firm Density⁴⁵ in Arizona, 1968-1999.

	(1)	(2)	(3)
deaths/1000	7.825** (0.914)	7.960** (0.977)	7.620** (1.557)
(deaths/1000) ²	-0.146** (0.017)	-0.147** (0.016)	-0.111* (0.042)
period1:1977-1999 chain forms		2.028 (2.045)	24.628 (23.182)
period2:1984-1999 Funeral Law		-1.108 (4.673)	37.243 (35.917)
deaths * period1			-1.306 (1.373)
deaths * period2			-1.925 (1.711)
Constant	-4.981 (11.008)	-7.421 (11.346)	-10.877 (16.169)
Observations	32	32	32
R-squared	0.79	0.80	0.81

Standard errors in parentheses

+ significant at 10%; * significant at 5%; ** significant at 1%

⁴⁵ "Density" refers to the number of operating organizations.

Table 8 - Time-Series Generalized Least Squares Estimates of Funeral Home Firm Density in Arizona, by County, 1968-1999.

	(1)	(2)	(3)
deaths/1000	2.400** (0.255)	3.076** (0.285)	3.772** (0.278)
(deaths/1000) ²	-0.087** (0.014)	-0.088** (0.014)	-0.102** (0.013)
period1:1977-1999 chain forms		0.051 (0.111)	0.016 (0.121)
period2:1984-1999 Funeral Law		-0.083 (0.109)	-0.013 (0.119)
deaths * period1			0.060 (0.117)
deaths * period2			-0.115 (0.089)
time		0.141** (0.036)	0.106** (0.033)
time ²		-0.005** (0.001)	-0.005** (0.001)
Constant	2.304** (0.147)	1.339** (0.328)	1.628** (0.282)
Observations	434	434	434
Counties	14	14	14

Standard errors in parentheses

+ significant at 10%; * significant at 5%; ** significant at 1%

Table 9 - Prais-Winsten⁴⁶ Time-Series Estimates of the Firm-based Concentration of Ownership⁴⁷ in Arizona, 1968-1999.

	(1)	(2)	(3)
firms/100	-0.161** (0.041)	-0.212** (0.048)	-0.035 (0.329)
deaths/1000	0.003** (0.001)	0.001 (0.001)	-0.001 (0.014)
period1:1977-1999 chain forms		0.017+ (0.009)	-0.177 (0.173)
period2:1984-1999 Funeral Law		0.021+ (0.010)	0.312 (0.301)
deaths * period1			-0.000 (0.007)
deaths * period2			0.004 (0.002)
firms * period1			0.206 (0.148)
firms * period2			-0.371 (0.285)
firms * deaths			-0.003 (0.018)
Constant	0.171** (0.034)	0.237** (0.045)	0.165 (0.241)
Observations	32	32	32
R-squared	0.70	0.79	0.82

Standard errors in parentheses

+ significant at 10%; * significant at 5%; ** significant at 1%

⁴⁶ Note that other time-series techniques were considered: attempts at Chocrane-Orcutt (1949) estimation and step-wise processes (Hildreth and Lu 1960) do not converge and may be inappropriate with small samples (StataCorp 2001).

⁴⁷ This measure is analogous to the concentration of the size distribution of firms (measured in establishments owned) and is standardized by number of firms and establishments in operation – higher scores mean that firm sizes are more unequally distributed.

Table 10 - Time-Series Generalized Least Squares⁴⁸ Estimates of Firm-Based Concentration of Ownership⁴⁹ in Arizona, by County, 1968-1999.

	(1)	(2)	(3)	(4)
firms/100	0.241 (0.152)	0.161 (0.106)	0.195 (0.527)	0.333+ (0.183)
deaths/1000	-0.013** (0.004)	-0.015** (0.004)	-0.031+ (0.018)	-0.029** (0.005)
period1:1977-1999 chain forms		0.003 (0.009)	-0.010 (0.016)	-0.009 (0.011)
period2:1984-1999 Funeral Law		-0.006 (0.008)	-0.011 (0.012)	-0.012 (0.009)
deaths * period1			-0.004 (0.019)	
deaths * period2			0.013 (0.013)	0.008** (0.002)
firms * period1			0.302 (0.565)	0.194+ (0.110)
firms * period2			-0.114 (0.392)	
firms * deaths			0.013 (0.016)	
time/100		-0.087 (0.248)	-0.178 (0.244)	-0.141 (0.240)
(time/100) ²		0.766 (0.575)	1.102+ (0.587)	0.949+ (0.565)
Constant	0.367** (0.012)	0.373** (0.024)	0.351** (0.029)	0.360** (0.025)
Observations	195	195	195	195
Counties	10	10	10	10

Standard errors in parentheses

+ significant at 10%; * significant at 5%; ** significant at 1%

⁴⁸ This method via STATA (StataCorp 2001) allows for the consideration of correlated and heteroskedastic error terms across panels, an important issue with geographically contiguous panel-units that vary in size (Rabe-Hesketh and Everitt 2000), as is the case in this examination of counties.

⁴⁹ Again, higher scores mean that firm sizes are more unequally distributed.

Table 11 - Prais-Winsten⁵⁰ Time-Series Estimates of Concentration of Establishment Co-Ownership⁵¹ in Arizona, 1968-1999.

	(1)	(2)	(3)
establishments/100	0.000 (0.019)	-0.002 (0.019)	-0.410** (0.079)
deaths/1000	0.002* (0.001)	0.002* (0.001)	-0.019** (0.004)
period1:1977-1999 chain forms		-0.001 (0.001)	0.226** (0.048)
period2:1984-1999 Funeral Law		-0.003+ (0.001)	0.323** (0.090)
deaths* period1			-0.006** (0.001)
deaths* period2			-0.003** (0.001)
est'ments* period1			-0.107** (0.030)
est'ments* period2			-0.191** (0.063)
establishments* deaths			0.023** (0.004)
Constant	-0.022 (0.020)	-0.023 (0.022)	0.353** (0.067)
Observations	32	32	32
R-squared	0.17	0.21	0.95

Standard errors in parentheses

+ significant at 10%; * significant at 5%; ** significant at 1%

⁵⁰ Note that other time-series techniques were considered: attempts at Chocrane-Orcutt (1949) estimation and step-wise processes (Hildreth and Lu 1960) do not converge and may be inappropriate with small samples (StataCorp 2001).

⁵¹ This measure identifies the bonding-together of establishments under common owners and is standardized by number of establishments in operation – higher scores mean that higher proportions of establishments are parts of co-owned groups.

Table 12 - Time-Series Generalized Least Squares⁵² Estimates of Concentration of Establishment Co-Ownership⁵³ in Arizona, by County, 1968-1999.

	(1)	(2)	(3)	(4)
establishments/100	-0.002 (0.002)	0.034 (0.022)	0.077 (0.052)	0.095+ (0.049)
deaths/1000	-0.001** (0.000)	-0.005** (0.002)	-0.010** (0.003)	-0.010** (0.002)
period1:1977-1999 chain forms		0.000 (0.001)	0.001 (0.001)	0.001 (0.001)
period2:1984-1999 Funeral Law		-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)
deaths* period1			0.002 (0.003)	0.003 (0.002)
deaths* period2			0.000 (0.002)	
est'ments* period1			-0.063 (0.060)	-0.081 (0.051)
est'ments* period2			-0.006 (0.040)	
establishments * deaths			0.008** (0.003)	0.008* (0.003)
time/100		0.045 (0.041)	0.075+ (0.039)	0.073* (0.034)
(time/100) ²		0.413** (0.119)	0.408** (0.115)	0.378** (0.101)
Constant	0.010** (0.002)	0.038** (0.005)	0.042** (0.006)	0.038** (0.005)
Observations	310	310	310	310
Counties	10	10	10	10

Standard errors in parentheses

+ significant at 10%; * significant at 5%; ** significant at 1%

⁵² This method via STATA (StataCorp 2001) allows for the consideration of correlated and heteroskedastic error terms across panels, an important issue with geographically contiguous panel-units that vary in size (Rabe-Hesketh and Everitt 2000), as is the case in this examination of counties.

⁵³ Again, higher scores mean that higher proportions of establishments are parts of co-owned groups.

Table 13 - Prais-Winsten Times-Series Regression Estimates of Number of Firm Foundings in the State of Arizona, 1968-1999.

	(1)	(2)	(4)	(5)	(7)
firms _{t-1} /100	2.726 (1.948)	2.844 (1.834)	-0.036 (1.419)	2.415 (1.966)	1.100 (3.691)
(firms _{t-1} /100) ²	-0.015 (0.011)	-0.016 (0.010)	-0.001 (0.008)	-0.013 (0.012)	-0.014 (0.022)
deaths _{t-1} /1000		-0.210 (0.175)	-4.512* (1.862)	-0.214 (0.153)	-2.689** (0.696)
period1		-0.606 (1.923)	-5.142* (2.154)	-1.450 (2.252)	-105.658+ (59.913)
period2		1.407 (2.781)	135.255* (52.850)	0.036 (3.723)	163.744** (37.424)
deaths * firms			0.043* (0.018)		
firms* period1					1.124 (0.667)
firms* period2			-1.380* (0.531)		-1.631** (0.368)
C2 _{t-1}				39.655 (40.632)	-2,126.538** (321.698)
deaths * C2					21.045** (5.957)
firms * C2					16.707** (3.246)
foundings _{t-1}	-0.149 (0.136)	0.120 (0.140)	0.055 (0.148)	0.160 (0.140)	0.130+ (0.074)
failures _{t-1}	0.390* (0.149)	0.502* (0.209)	0.530** (0.181)	0.497* (0.207)	0.334* (0.158)
Constant	-115.208 (87.345)	-119.496 (77.734)	30.662 (66.307)	-107.255 (79.505)	83.976 (144.164)
Obs	30	30	30	30	30
R-squared	0.31	0.47	0.62	0.53	0.89

Standard errors in parentheses

+ significant at 10%; * significant at 5%; ** significant at 1%

Table 14 - Prais-Winsten Times-Series Regression Estimates of Number of Firm Failures in the State of Arizona, 1968-1999.

	(1)	(2)	(4)	(5)	(7)
firms _{t-1} /100	-0.154 (1.041)	1.396 (1.165)	-0.648 (1.230)	1.397 (1.241)	-0.738 (1.237)
(firms _{t-1} /100) ²	0.002 (0.006)	-0.006 (0.007)	0.006 (0.007)	-0.006 (0.007)	0.007 (0.007)
deaths _{t-1} /1000		0.183 (0.111)	0.326* (0.122)	0.183 (0.112)	0.325* (0.120)
period1		-4.160** (1.456)	77.299** (26.844)	-4.157* (1.651)	78.013* (27.572)
period2		2.324 (1.551)	-68.571* (29.614)	2.331 (1.922)	-69.427* (31.185)
deaths * firms					
firms* period1			-0.883** (0.289)		-0.892** (0.296)
firms* period2			0.727* (0.304)		0.733* (0.317)
C2 _{t-1}				-0.182 (26.986)	7.742 (29.610)
deaths * C2					
firms* C2					
foundings _{t-1}	-0.350+ (0.200)	-0.444* (0.178)	-0.442* (0.165)	-0.444* (0.180)	-0.446* (0.166)
failures _{t-1}	0.610** (0.126)	0.210 (0.141)	0.194 (0.145)	0.210 (0.144)	0.195 (0.151)
Constant	4.388 (45.638)	-69.737 (50.315)	11.265 (52.022)	-69.777 (52.487)	14.013 (52.140)
Obs	29	29	29	29	29
R-squared	0.66	0.84	0.89	0.84	0.89

Standard errors in parentheses

+ significant at 10%; * significant at 5%; ** significant at 1%

Table 15 - Negative Binomial Time-Series Cross-Sectional Generalized Estimating Equation Estimates of the Rate of Firm Founding by County in Arizona, 1968-1999.

	(1)	(2)	(3)	(4)	(6)
firms _{t-1} /100	13.334** (3.112)	15.734** (3.987)	19.975** (6.001)	7.036* (3.053)	3.884 (3.833)
(firms _{t-1} /100) ²	-16.754* (7.326)	-17.345* (6.960)	-35.033* (15.755)	-6.081 (4.642)	-3.984 (6.118)
deaths _{t-1} /1000		-0.056 (0.036)	-0.187+ (0.106)	0.059 (0.053)	0.114 (0.081)
period1		-0.106 (0.432)	-0.476 (0.519)	-0.155 (0.509)	-0.508 (0.686)
period2		0.187 (0.341)	0.272 (0.383)	-0.056 (0.397)	0.356 (0.373)
deaths * firms			0.393 (0.333)		
firms* period1			3.420** (1.172)		2.451+ (1.366)
firms* period2			-0.867 (0.739)		-2.629** (0.793)
C2 _{t-1}				2.564** (0.270)	2.895** (0.328)
deaths * C2					
firms * C2					
time/100		-1.093 (10.655)	0.078 (10.723)	1.412 (8.728)	0.302 (9.470)
(time/100) ²		5.113 (23.369)	3.096 (23.457)	-4.929 (19.301)	-3.674 (20.328)
foundings _{t-1}	0.009 (0.117)	-0.004 (0.120)	-0.029 (0.123)	0.028 (0.128)	-0.024 (0.134)
failures _{t-1}	0.041 (0.040)	0.054 (0.062)	0.049 (0.057)	0.015 (0.049)	0.053 (0.049)
Constant	-1.676** (0.198)	-1.766* (0.692)	-1.797** (0.690)	-2.020** (0.504)	-1.860** (0.502)
Obs	436	436	436	202	202
Counties	15	15	15	10	10

Standard errors in parentheses

+ significant at 10%; * significant at 5%; ** significant at 1%

Table 16 - Negative Binomial Time-Series Cross-Sectional Generalized Estimating Equation Estimates of the Rate of Firm Failure by County in Arizona, 1968-1999.

	(1)	(2)	(3)	(4)	(6)
firms _{t-1} /100	13.199** (4.163)	16.890** (5.508)	28.288** (6.009)	3.953 (4.422)	11.143* (5.435)
(firms _{t-1} /100) ²	-17.199+ (10.330)	-19.300* (8.477)	-58.216** (13.929)	-0.124 (6.648)	-7.126 (7.102)
death _{t-1} /1000		-0.069 (0.070)	-0.432** (0.105)	0.048 (0.067)	-0.022 (0.090)
period1		0.123 (0.528)	-0.204 (0.572)	0.394 (0.418)	0.063 (0.634)
period2		0.423 (0.282)	0.270 (0.262)	0.361* (0.177)	0.095 (0.241)
deaths * firms			1.023** (0.255)		
firms* period1			3.497** (1.284)		2.091 (1.707)
firms* period2			1.103+ (0.611)		3.045* (1.213)
C2 _{t-1}				2.825** (0.578)	4.132** (0.636)
firms* C2					-23.812** (7.464)
deaths * C2					
time/100		-1.921 (11.736)	-1.421 (11.185)	-6.791 (9.749)	-6.037 (9.406)
(time/100) ²		8.896 (23.809)	9.985 (23.166)	10.945 (21.569)	11.827 (20.685)
foundings _{t-1}	0.025 (0.104)	0.029 (0.107)	0.017 (0.109)	0.095 (0.110)	0.100 (0.113)
failures _{t-1}	0.114** (0.024)	0.082 (0.076)	0.014 (0.042)	0.059 (0.081)	0.020 (0.076)
Constant	-1.821** (0.202)	-2.299** (0.841)	-2.375** (0.792)	-1.957* (0.798)	-2.184** (0.741)
Obs	436	436	436	202	202
Counties	15	15	15	10	10

Standard errors in parentheses

+ significant at 10%; * significant at 5%; ** significant at 1%

Table 17 - Negative Binomial Time-Series Cross-Sectional Generalized Estimating Equation Estimates of the Rate of Establishment Founding by County in Arizona, 1968-1999.

	(1)	(2)	(3)	(4)	(6)
ests _{t-1} /100	11.866** (1.934)	9.941** (2.960)	14.833* (6.595)	6.251* (3.171)	-0.466 (5.267)
(ests _{t-1} /100) ²	-10.504** (2.723)	-12.062** (3.210)	-35.459* (16.194)	-8.178* (3.550)	-3.278 (5.472)
deaths _{t-1} /1000		0.099 (0.071)	-0.056 (0.154)	0.138* (0.058)	0.318* (0.126)
period1		-0.497 (0.675)	-1.066 (0.710)	-0.415 (0.672)	-0.769 (0.732)
period2		-0.230 (0.727)	0.443 (0.837)	-0.320 (0.732)	0.144 (0.867)
deaths * est'ments			0.790+ (0.467)		
est'ments* period1			3.641** (1.179)		2.327+ (1.235)
est'ments* period2			-3.656* (1.444)		-2.863* (1.238)
C1 _{t-1}				0.199 (0.496)	1.133** (0.350)
deaths * C1					
est'ments* C1					-47.714* (21.086)
time/100		10.772 (14.987)	11.118 (15.299)	9.576 (14.802)	7.528 (15.318)
(time/100) ²		-22.359 (27.001)	-26.154 (27.821)	-21.560 (26.528)	-16.721 (27.578)
foundings _{t-1}	-0.183 (0.151)	-0.169 (0.147)	-0.264+ (0.148)	-0.172 (0.126)	-0.300* (0.128)
failures _{t-1}	-0.047 (0.191)	-0.075 (0.200)	-0.045 (0.213)	-0.066 (0.200)	-0.015 (0.211)
Constant	-2.557** (0.216)	-3.074** (0.981)	-3.055** (0.979)	-2.623** (0.980)	-2.133* (0.990)
Obs	436	436	436	345	345
Counties	15	15	15	13	13

Standard errors in parentheses

+ significant at 10%; * significant at 5%; ** significant at 1%

Table 18 - Negative Binomial Time-Series Cross-Sectional Generalized Estimating Equation Estimates of the Rate of Establishment Failure by County in Arizona, 1968-1999.

	(1)	(2)	(3)	(4)	(5)
est'ments _{t-1} /100	9.882** (2.900)	20.197** (5.918)	28.592** (8.301)	18.126* (7.332)	34.292** (8.159)
(ests _{t-1} /100) ²	-11.139* (5.628)	-12.982** (4.924)	-60.896** (18.471)	-11.770* (5.945)	-76.865** (14.844)
deaths _{t-1} /1000		-0.315* (0.131)	-0.740** (0.198)	-0.268+ (0.152)	-0.892** (0.201)
period1		1.423* (0.706)	0.482 (0.907)	1.438* (0.713)	0.123 (1.044)
period2		1.525** (0.580)	1.500* (0.732)	1.532** (0.592)	1.328+ (0.716)
deaths * est'ments			1.510** (0.521)		1.894** (0.446)
est'ments* period1			7.887* (3.515)		9.355** (3.624)
est'ments* period2			-0.084 (1.434)		0.594 (1.526)
C1 _{t-1}				0.710* (0.312)	1.396* (0.664)
deaths* C1					0.653 (2.559)
est'ments* C1					-12.988 (72.349)
time/100		-4.681 (16.937)	-2.517 (17.397)	-4.059 (17.550)	3.118 (20.412)
(time/100) ²		4.237 (36.649)	-4.404 (38.523)	-1.631 (39.128)	-21.770 (47.200)
foundings _{t-1}	0.244 (0.190)	0.206 (0.212)	0.204 (0.178)	0.206 (0.216)	0.248 (0.177)
failures _{t-1}	0.002 (0.332)	-0.319 (0.457)	-0.304 (0.386)	-0.332 (0.464)	-0.282 (0.399)
Constant	-3.183** (0.234)	-5.029** (1.533)	-4.649** (1.364)	-4.851** (1.562)	-5.012** (1.408)
Obs	436	436	436	345	345
Counties	15	15	15	13	13

Standard errors in parentheses

+ significant at 10%; * significant at 5%; ** significant at 1%

Table 19 - Negative Binomial Time-Series Cross-Sectional Generalized Estimating Equation Estimates of the Rate of Change in Ownership of Establishments by County in Arizona, 1968-1999.

	(1)	(2)	(3)
est'ments _{t-1} /100	8.538** (3.054)	12.021+ (7.013)	18.912** (5.401)
(ests _{t-1} /100) ²	-5.962 (5.386)	-5.028 (4.419)	-12.298** (4.500)
deaths _{t-1} /1000		-0.158 (0.121)	-0.338** (0.117)
period1		0.222 (0.511)	-0.249 (0.561)
period2		0.365 (0.427)	-0.007 (0.532)
est'ments* period1			3.558** (1.360)
est'ments* period2			2.254** (0.720)
time/100		-7.726 (11.448)	-5.361 (10.941)
(time/100) ²		23.223 (24.281)	21.270 (22.834)
firms _{t-1} /100		0.773 (2.998)	-2.277 (2.843)
own changes _{t-1}	0.134 (0.100)	0.118 (0.084)	0.092 (0.084)
foundings _{t-1}	-0.075 (0.126)	-0.108 (0.167)	-0.099 (0.193)
failures _{t-1}	-0.255 (0.191)	-0.268 (0.197)	-0.343 (0.222)
Constant	-1.797** (0.206)	-1.822* (0.827)	-1.844* (0.764)
Observations	436	436	436
Counties	15	15	15

Standard errors in parentheses

+ significant at 10%; * significant at 5%; ** significant at 1%

Table 19 - continued

	(3)	(4)
est'ments $t-1/100$	10.463 (7.838)	20.575** (6.931)
(ests. $t-1/100$) ²	-1.413 (4.328)	-37.448* (15.231)
deaths $t-1/1000$	-0.178 (0.113)	-0.360* (0.176)
period1	0.346 (0.507)	-0.020 (0.610)
period2	0.450 (0.440)	0.405 (0.630)
deaths* est'ments		0.963+ (0.526)
est'ments* period1		3.542** (1.156)
est'ments* period2		0.189 (1.177)
C1 $t-1$	-1.419 (1.050)	-1.685 (1.325)
deaths* C1		-4.455** (1.714)
est'ments * C1		101.006* (50.639)
deaths * C2		
est'ments * C2		

Columns continued on following page.

Table 19 - continued

time/100	-9.942 (11.415)	-12.110 (11.594)
(time/100) ²	28.090 (23.452)	34.669 (23.518)
firms _{t-1} /100	0.230 (3.704)	-1.384 (6.871)
own changes _{t-1}	0.099 (0.077)	0.107 (0.094)
foundings _{t-1}	-0.113 (0.163)	-0.201 (0.176)
failures _{t-1}	-0.244 (0.189)	-0.316 (0.197)
Constant	-1.441+ (0.875)	-1.557* (0.789)
Observations	345	345
Counties	13	13

Standard errors in parentheses

+ significant at 10%; * significant at 5%; ** significant at 1%

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