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Heterogeneous Population and Evolutionary Dynamics of Subpopulations: The Entry of Nonprofit Organizations in Florida Counties 1994-2007

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HETEROGENEOUS POPULATION AND EVOLUTIONARY DYNAMICS OF SUBPOPULATIONS: THE ENTRY OF NONPROFIT ORGANIZATIONS IN FLORIDA COUNTIES 1994-2007

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Dedicated to My Parents,

Eu-hwan Ahn and Gong-nam Bak,

My Lovely Wife, and Three Kids

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Jusun, Jubean, and Judy Ahn

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ABSTRACT

Despite a long-running debate about the existence and nature of the nonprofit sector, scholars rarely make clear how organizations constitute the sector, nor do they describe how this sector evolves. Scholars have typically focused on one of two conceptions about the sector -- either as a unitary sector or as individual sub-areas of a nonprofit sector. The following questions emerge: is there a nonprofit sector as has been asserted by some scholars? If there is a nonprofit sector, how does the nonprofit sector evolve? What is problematic about this inquiry is that there exist various distinctive types of nonprofit organizations that cannot easily be integrated into a notion of a unitary nonprofit sector. On the other hand, they cannot be treated as being completely different from others. So, how can this diversity of nonprofit organizations be understood? And how can the organizational dynamics of nonprofit organizations be explained? Does a "broad," unitary nonprofit sector have its own dynamics of organizational change regardless of sub-components within the sector? Or do sub-population nonprofit organizations have their unique dynamics regardless of the existence of a "broad" nonprofit sector? If so, are there distinguishable effects of a "broad" nonprofit sector on the evolution of sub-populations of nonprofits? These questions are not only related to nonprofit studies, but also to the main questions of the population ecology perspective.

Cooperative and competitive interrelationships are central to organization theory. Organizational ecology, and density-dependence theory in particular, investigates how large-scale mutualistic and competitive processes affect the entry, or birth, -of new organizations, and thus large-scale organizational evolution. To date, existing ecological research has focused on populations of organizations that are relatively homogeneous with respect to their organizational form – often defined through salient product markets. However, some organizational forms are complex, thus resulting in heterogeneous populations, as illustrated by the nonprofit sector. The nonprofit sector holds a common cognitive base that has been accepted by the public but operates in diverse arenas with different strategies and organizational forms.

From a theoretical perspective that uses population ecology and density dependence theory, the present study investigates what implications such heterogeneity has on the mutualistic and competitive relationships within a population, and how this affects the predictions of nonprofit organization entry. The identity approach to organizational forms is

used as a basis for conceptualizing complex forms as systems of hierarchically nested sub-forms. Furthermore, the issue of hierarchical form complexity is extended by combining the differences of geographical location that have been studied by ecologists.

Hypotheses are derived regarding density-dependent entry in heterogeneous populations characterized by complex organizational forms. The hypotheses are tested with comprehensive data on nonprofit organizations in Florida counties from 1994 to 2007, including ten sub-forms and eight geographical boundaries of sub-forms. This study anticipates that the systemic hierarchical structures in terms of both form and location of populations have impacts on the entry of sub-forms.

The key findings of the study can be summarized as follows. First, the systemic structure of the underlying complex form has clear implications for the operation of the processes of density-dependent legitimation and competition. The different units and levels have clear communal interdependencies and exert mutualistic and competitive forces on one another. Second, legitimation tends to operate on a broader scale than competition. Within the simple systemic structure with the sub-populations nested directly under the main population, virtually all ecological competition is contained at the sub-population level. However, the main population has a much stronger legitimizing effect on sub-population entry than the individual sub-populations themselves.

Third, the regional density variables show no effects in most models, unlike a number of earlier studies based on the empirical tests of industrial organizations in the geographical context. This may be interpreted as meaning that nonprofit organizations are strongly rooted in the local community.

The present study contributes to organization theory by shedding additional light on the mechanisms creating organizational diversity, how such diversity is structured, and what implications such diversity has on the large-scale mutualistic and competitive interdependencies between organizations. Density dependence theory is extended by proposing how legitimation and competition operate in settings with complex organizational forms and underlying multilevel systems of forms.

For a nonprofit sector study, most importantly, this study provides a significant clue about understanding the existence and nature of the nonprofit sector. Unlike the dominating two conceptions about the sector -- either as a unitary sector or as individual sub-areas of the nonprofit sector without considering other nonprofit dimensions, this study shows that a nonprofit sector is in fact a heterogeneous population with significant constituent nonprofit sub-populations.

This study also has implications for nonprofit managerial practice. For potential entrepreneurs' decisions to create organizations, it is possible to infer which kinds of external settings are most favorable for entrepreneurial activity, and where the entry of new nonprofit organizations is at its toughest. For nonprofit managers, it may be advantageous for individual organizations to follow and even replicate existing organizational forms that have attained considerable amounts of legitimation. The study also has important implications for nonprofit managers who seek to expand service boundaries of a nonprofit organization.

CHAPTER 1

INTRODUCTION

Problem Statement

Identifying and defining *the* nonprofit sector. Scholars in the study of nonprofit organizations and voluntary action have for several decades debated the existence, definition, and scope of the nonprofit sector. Many of these characterizations originate from a five-part definition offered by Salamon and Anheier (1996) for distinguishing nonprofit organizations from other types of formal and informal organized entities. Following their model (Salamon & Anheier, 1996), an organization is presumed to be a nonprofit if it: a) is formally constituted, b) self-governing, c) separate from government, d) non-profit distributing, and, e) substantially voluntary in its sources of labor and monetary resources. Unfortunately, most who subscribe to this model simply take a leap of faith in asserting that a society's nonprofit sector is thus the total of all organizations within the society that fit the five-part definition. They rarely make clear how these organizations constitute a sector, nor do they describe how this sector is bounded from the other two presumed sectors, market and government.

This failure of explanation has led Roger Lohmann, for example, to point out the folly of labeling organizations by what they are not – for example, describing them as non-profit or as non-governmental (Lohmann, 1989). Lohmann has argued instead for attending to an area he calls "the commons" in which humans come together and engage in other-regarding voluntary action (Lohmann, 1992). Thus for Lohman, it is more important to focus on a common arena or normative behavior than on some abstract notion of nonprofits and sectors. But Lohmann and other critics (see, for example, (Van Til, 2008), in their distinctive focus on voluntary action also sidestep the question of the rather large population of formal and informal organizations that grows continuously in size in the United States and most other countries.

Considering the situation, the following questions emerge: is there a nonprofit sector as has been asserted by these scholars? If there is a nonprofit sector, how does the nonprofit sector evolve? What is problematic about this inquiry is that there exist various distinctive types of nonprofit organizations that cannot easily be integrated into a notion of a unitary nonprofit sector. On the other hand, they cannot be treated as being completely different from others. So, how can this diversity of nonprofit organizations be understood? And how can the

organizational dynamics of nonprofit organizations be explained? Does a "broad," unitary nonprofit sector have its own dynamics of organizational change regardless of sub-components within the sector? Or do sub-population nonprofit organizations have their unique dynamics regardless of the existence of a "broad" nonprofit sector? If so, are there distinguishable effects of a "broad" nonprofit sector on the evolution of sub-populations of nonprofits? These questions are not only related to nonprofit studies, but also to the main questions of the population ecology perspective.

The current research addresses the nature of the nonprofit sector. But rather than doing so by distinguishing the sector conceptually or definitionally, this study does so by exploring the empirical character of the population of nonprofit organizations in all 67 counties of the state of Florida. This study employs the tools of population ecology to explore this organizational population. Population ecology is a theoretical framework widely used in organization studies for more than 30 years but rarely in the study of nonprofits (cf. (Galaskiewicz & Bielefeld, 1998; Tucker & Sommerfeld, 2006) nor in public administration.

An introduction to population ecology. The founding of new organizations changes the existing organizational landscape, thus shaping new relations between organizations and organizational evolution. In this context, both cooperative and competitive mechanisms between organizations are central subjects in organization theory. In much of the field of organizational studies the basic focus is on dyadic relationships between individual organizations. However, the open systems approach has changed our attention toward the relationship between organizations and their broader environment (Scott & Davis, 2007). A number of fields give their attention to the mutualistic and competitive forces by organizations as members in the overall organizational environment. Thus organizations that are not in direct relationships with each other may still be crucial for other organizations. Institutional theory focuses on how organizations and organizational forms gain taken-for-granted status by following institutional patterns compatible with other organizations and external social units (DiMaggio & Powell, 1983; Meyer & Rowan, 1977; Meyer & Scott, 1983). Resource dependency theory emphasizes organizational interdependence to control access to resources and to constrain organizational action (Pfeffer & Salancik, 2003). Organizational ecology examines how mutualistic and competitive interdependencies affect the organizational landscape through survival and death of organizations, leading to dynamic distributions of organizational forms adapted to the environmental conditions surrounding them (Hannan & Freeman, 1977, 1989).

According to general evolutionary theories, the entry of new organizations is a key process that affects diversity, growth, and change in the overall organizational landscape (Aldrich, 2001; Baum & Amburgey, 2002). Within the ecological approach, extensive effort has been extended to develop and test the density dependence theory which holds that the entry of new organizations is significantly affected by mutualistic and competitive forces at the level of organizational populations. According to this theory, cognitive legitimation of the underlying organizational form in the minds of participants and stakeholders generates mutualistic effects, while seeking common resources from the environment generates competitive pressures (Hannan & Freeman, 1977, 1989).

Density dependence theory assumes that the members of an organizational population are homogenous with respect to their core properties – stated goals, forms of authority, the product market served, and core technology (Hannan & Freeman, 1977, 1984, 1989). The assumption of homogeneity is based on the idea that all members of a population share a common organizational form (Baum & Amburgey, 2002; Hannan & Freeman, 1977, 1984, 1989). While ambiguity and disagreement exist about the theoretical underpinnings of the concept of organizational form, it is generally agreed that forms are socially constructed and are used in identifying organizations that are ecologically similar (Hannan, 1997; McKendrick, Jaffee, Carroll, & Khessina, 2003; Polos, Hannan, & Carroll, 2002; Romanelli, 1991). The concept of niche is related with such ecological similarity. Niches are sets of environmental resources that can sustain the functioning of organizations that embody a particular form (Hannan & Freeman, 1989). The resources include social, economic, and political conditions. The organizations that share a common form are dependent on a common material and social environment and thus are influenced homogeneously by pressures from the environment (Carroll & Hannan, 2000; Hannan & Freeman, 1989). That is, the organizations as members of a population share the same destiny. A population is defined as a set of organizations with a common form at a particular place and time. Therefore, as Hannan (2005) points out, specifying forms and population boundaries in a way that yields productive analysis presents major challenges.

The theoretical ambiguity of organizational form in defining empirical populations has been pointed out as one of the main problems in the organizational ecology area (McKendrick & Carroll, 2001). A large body of empirical work has been undertaken using the idea of intra-population homogeneity. This has led to a general focus on relatively homogenous populations with simple forms, often defined crudely through salient product markets and pre-existing industrial categories (Hsu & Hannan, 2005).

However, populations are often far from homogenous (Cattani, Pennings, & Wezel, 2003; Galaskiewicz & Bielefeld, 1998). Indeed, studies have reported mixed results from the original density dependence model based on homogeneity of organizations in a population (Boone, Brocheler, & Carroll, 2000; Cattani et al., 2003; Nickel & Fuentes, 2004). Thus, researchers have increasingly turned attention to the effects of structural and internal boundaries within individual populations (Boone, van Witteloostuijn, & Carroll, 2002; Cattani et al., 2003; Dobrev, 2001; Greve, 2002a; Hannan, Carroll, Dobrev, & Han, 1998; Hannan, Carroll, Dobrev, Han, & Torres, 1998; Singh & Lumsden, 1990). For instance, many industries or populations face diverse environments with geographically unevenly distributed resources (Baum & Amburgey, 2002; Hannan & Freeman, 1989; Lomi, 2000; Poole & Van de Ven, 2004). This raises questions about spatial heterogeneity within organizational populations and has led to studies of the effects of spatial heterogeneity on density dependent entry by new organizations (Greve, 2002a, 2002b; Lomi, 1995a, 1995b, 2000; Wezel, 2005).

An additional type of heterogeneity is related to organizational forms. Recently, the identity approach to organizational forms suggests that an organizational form is an externally enforced, collective identity (Hannan, 2005; Polos et al., 2002). These identities are defined by sets of social codes or rules, conformity to which is enforced by external audiences that have the power to affect organizational success and failure (Hsu & Hannan, 2005). Examples of such external audiences include customer base, the general public, supplier organizations, government authorities, and so forth. Audiences develop a common identity understanding of a specific organizational type in terms of a shared set of social codes. Thus, the externally enforced identity defines a form. The failure of an organization to conform to an externally enforced code results in devaluations by various audiences. Therefore, these procedures eventually lead to decreases in the viability and survival chances of such organizations.

Certain organizational forms may have several distinct audiences that jointly associate a set of different organizations to the form's collective identity and label. Such organizational forms can be defined in terms of their levels of complexity (Hsu & Hannan, 2005; Zuckerman, Kim, Ukanwa, & von Rittmann, 2003). At one end of the continuum are simple organizational forms which have relatively unified collective identities and fewer associated audiences. Logically, more complex organizational forms have broad collective identities and many associated audiences. Therefore, the complexity of a form is considered a type of heterogeneity in empirical organizational populations, which is not captured in notions of heterogeneity characterized by differences of geographical location (McKendrick

et al., 2003).

These ideas provide a useful way to see the nonprofit organization sector as a comprehensive set of nonprofit organizations that possesses a diversity of sub-populations. It is very difficult to define nonprofits in a unitary sense because they exist across a broad range of service and mission areas. However, the nonprofit arena is a prime example of a heterogeneous population characterized by great diversity in forms (Anheier, 1995; Ben-Ner & Van Hoomissen, 1991; Boris & Steuerle, 2006; Salamon & Anheier, 1997; Wolpert, 1993a). Nonprofit organizations hold a common cognitive base which has been shared by the public for a long time, but are populated by a diverse set of organizations operating in various product and service markets with different strategies(Galaskiewicz & Bielefeld, 1998). Thus, a diverse set of organizations is associated with the overarching complex organizational form of nonprofit that has been taken for granted by the public for a long time. However, relatively clear sub-identities and sub-forms can be identified within the main form.

Very little attention has been devoted to theoretical and empirical work to examine the density dependence process of legitimation and competition in heterogeneous populations characterized by complex organizational forms (Dobrev, Ozdemir, & Teo, 2006; Ruef, 2000, 2004). However, extant ecological research has studied intra-population heterogeneity in several other ways. In addition to the spatial heterogeneity, organizational size distributions (Barnett, 1990, 1997; Barnett & McKendrick, 2004), niche width and resource partitioning (Boone et al., 2000; Carroll, 1985; Dobrev, 2001), niche overlap (Baum & Singh, 1994a, 1994b), and temporal heterogeneity (Hannan, 1997; Wezel, 2005) have been found to be important in explaining evolutions of organizational populations by mutualistic and competitive processes.

An interesting theoretical question that is related with heterogeneity emerges: How do mutualistic and competitive interrelationships affect organizational evolution in such heterogeneous populations characterized by complex organizational forms? In particular, are the effects of legitimation and competition applied across the whole population, or do they show up differently within specific parts of the population? In both cases of organizational populations, how are the two forces affecting the overall evolution of the population? Geographical heterogeneity has been supported by several studies that show how legitimating effects operate on a broader scale than competitive effects (Hannan 1995). Does a similar logic apply for the case of heterogeneity caused by form diversity and complexity? Specifically in the case of the nonprofit sector, for example, do heath nonprofits exert an equal competitive pressure toward human service nonprofits or others as they do to other

health nonprofits? Do health nonprofits exert an equal legitimation to other nonprofit forms as they do within a population of exclusively health nonprofits?

Theoretical framework. To examine the above questions, this study rests on the density dependence approach as its predominant framework for examining organizational founding or entry. To proceed with the analysis, one needs to choose an analytical approach to capture the heterogeneity caused by form diversity. If a complex form includes a wide array of different kinds of organizations, such populations need to be approached in ways that are meaningful for systemic analysis. In other words, complex and diverse organizational forms should be identified and classified under a structure that captures the whole population and its relevant sub-populations. Classic work in both human ecology (Hawley, 1950) and organizational ecology (Hannan & Freeman, 1977) have stressed the systemic nature of social structures and isomorphism (Hawley, 1950) between the diversity of organizational forms and the diversity of environments. Organizational phenomena and evolutionary processes can be studied at various levels of analysis, ranging from individuals to organizational communities (Amburgey & Rao, 1996; Astley, 1985; Baum & Amburgey, 2002; Hannan & Freeman, 1977). These levels form social systems that have hierarchical structures with nested levels and interdependent subunits.

Previous studies have applied a systemic approach of classifying distinct sub-entities to capture the spatial heterogeneity of populations (Barron, 1999; Baum & Mezias, 1992; Cattani et al., 2003; Hannan, Carroll, Dobrev, & Han, 1998; Hannan, Carroll, Dobrev, Han et al., 1998; Stuart & Sorenson, 2003; Wezel, 2005). A geographically bounded population has spatially clustered subpopulations or sub-entities. For example, a national population comprises regional populations at the level of cities or regions. The relationships between the individual subpopulations and effects across the different levels of such multilevel systems have implications for how the processes of density dependence legitimation and competition operate. In a similar vein, community ecology focuses on settings where a number of populations exist in the specific boundary but hold symbiotic interdependence on each other (Astley, 1985; Baum & Korn, 1994; Freeman & Audia, 2006; Hannan, 2005; Hawley, 1950). The interdependent structures are also systemic (Astley, 1985).

The identity approach to organizational forms has pointed out the systemic properties of forms as systems of hierarchically nested, simple sub-forms (Hannan, 2005; Hsu & Hannan, 2005; Polos et al., 2002). Organizational identities are often hierarchically nested, comprised of sub-identities related to each other (Hannan, 2005; Hsu & Hannan, 2005). Thus, scholars suggest that organizational forms have nested sub-forms with related identities

(Carroll & Hannan, 2000; Ruef, 2000). According to this logic, complex organizational forms have systemic internal structures comprised of hierarchically nested, simpler sub-forms with related identities. Such systemic structures are reflected to related empirical populations. Sub-populations are hierarchically nested under a heterogeneous main population. They hold systemic relationships to one another and the main population. This is related with organizational taxonomy. According to the taxonomical logic, organizational forms could be classified into universal family trees based on an organizational genetics approach that traces organizational routines and competencies in a way that resembles the role of genes in determining biological classifications of species (Boris & Steuerle, 2006; McKelvey, 1982; McKelvey & Aldrich, 1983; Salamon, 2001; Salamon & Anheier, 1997).

This study combines the hierarchically nested structure and the identity approach to investigate density dependence in heterogeneous populations characterized by complex organizational forms as well as different geographical boundaries. Hypotheses are suggested regarding how the density dependent processes of legitimation and competition affect entry in such settings. To test the hypotheses, the charitable "operating" nonprofit organizations in Florida counties between 1994 and 2007 are chosen as the empirical context. The overarching nonprofit form – especially charitable nonprofits or 501(c)3s – have held a salient identity among several external audiences for a long time – the general public, press, government authorities, academia, and so on. However, the main form is complex and draws together a diverse set of organizations with a socially constructed cognitive identity as a common base. In particular, several product or service areas can be identified, some of which are relatively non-related (arts missions and health missions for example). In this study, defining nonprofit organization as a hierarchically nested system based on the identity approach allows us to bind the population setting differently than previous studies. In other words, this contrasts strongly with the empirical populations tested in a majority of the existing ecological studies by both focusing on only a specific service area (sub-sector or sub-form) and using an aggregated population of nonprofit organizations (Singh, Tucker, and House 1986; Baum and Oliver 1991; Selle and Oymyr 1992; Bielefeld 1992, 1994; Bowen et al 1994; Hager, Galaskiewicz, Bielefeld, and Pins 1996).

Findings and Implications The key findings of the study can be summarized as follows. First, the systemic structure of the underlying complex form has clear implications to the operation of the processes of density-dependent legitimation and competition. When the individual sub-populations are observed in isolation from the rest of the system, the density-dependent effects are weak and work in ambiguous directions. When the whole main

population is observed as a single, uniform entity, the baseline density dependence model seems to work adequately. However, the combined tests of systemic structure show the powerful effects from the underlying diversity, compared to an approach based on a single uniform organizational form. Therefore, the different units and levels have clear communal interdependencies, and exert mutualistic and competitive forces on one another.

Second, legitimation tends to operate on a broader scale than competition. Within the simple systemic structure with the sub-populations nested directly under the main population, virtually all ecological competition is contained to the sub-population level. However, the main population has a much stronger legitimizing effect on sub-population entry than the individual sub-populations themselves.

Third, the r regional density variables show no effects in most models, unlike a number of earlier studies based on the empirical tests of industrial organizations in the geographical context. This may be interpreted that nonprofit organizations are strongly rooted in the local community. In other words, the operating charitable nonprofits are by nature based on strong support from local constituents and firm networks with localities. Therefore, the insignificant results of regional variables show the nature of charitable nonprofit organizations that mostly are small in size and deeply rooted in localities.

This study contributes to the development of general organization theory as well as new understanding about the nature and dynamics of nonprofit organizations. The present study contributes to organization theory by shedding additional light on (i) the mechanisms creating organizational diversity, (ii) how such diversity is structured, and (iii) what implications such diversity has on the large-scale mutualistic and competitive interdependencies between organizations. In particular, the study brings additional understanding on the levels at which mutualistic and competitive forces operate. For the domain of organizational ecology, the present study contributes by carrying forward the original mission to understand “why are there so many kinds of organizations”. The study shows that the distinction between simple and complex organizational forms is meaningful, and demonstrates the analytical power of the systems approach to comprehend the internal structures of complex forms. Density dependence theory is extended by proposing how legitimation and competition operate in settings with complex organizational forms and underlying multilevel systems of forms.

For a nonprofit sector study, most importantly, this study provides a significant clue about understanding the existence and nature of the nonprofit sector. Nonprofit scholars have not had a clear answer about how nonprofit organizations constitute the sector and its

dynamics over time. As a consequence of unclear answer about boundaries and composition of the sector, non-profit scholars have typically focused on one of two conceptions about the sector -- either as a unitary sector or as individual sub-areas of the nonprofit sector without considering other nonprofit dimensions. However, this study shows that both conceptions are partially wrong and at the same time partially correct. In other words, a nonprofit sector is a heterogeneous population with its constituent sub-nonprofit populations, as this study suggests. A sector is neither unitary nor separate. In sum, the whole effects on entries of sub-populations are not only contained in the main form, but also in the sub-nonprofit populations.

This study will have implications to managerial practice in nonprofit issues. For potential entrepreneurs' decisions to create organizations, it is possible to infer which kind of external settings are most favorable for entrepreneurial activity, and where the entry of new nonprofit organizations is at its toughest. This will have impact on the potential founders' decision on which niches and sub-populations enter and how to match the externally enforced identities for organizational viability. For nonprofit managers, it may be advantageous for individual organizations to follow and even replicate existing organizational forms that have attained considerable amounts of legitimation. The study has the important implication for nonprofit managers to seek to expand service boundaries of a nonprofit organization, also. The insignificant results of regional variables show the nature of charitable nonprofit organizations that mostly are small in size and deeply rooted in localities. Therefore, the question is how an organization is deeply rooted in a local community, and is recognized as the unique organization.

Overview of the dissertation

Chapter II of this dissertation presents the relevant parts of the organizational ecology literature to develop a general understanding of the core ideas of the ecological approach. The chapter then proceeds to discuss the concepts of organizational population and organizational form. Thereafter, the identity approach to organizational forms is reviewed, the complexity dimension of forms is defined, and the systems approach to organizational forms is elaborated. Finally, the basic formulation of the density-dependence theory is reviewed. Chapter III proceeds to derive hypotheses regarding density-dependent processes of organizational entry in heterogeneous populations characterized by complex organizational forms, then adding the geographical heterogeneity. Chapter IV describes the data, methods, and modeling framework used in testing the hypotheses. In this chapter an overview of

nonprofits in Florida will be provided. A detailed description and analysis of nonprofit populations between 1994 and 2007, including historical change, environmental conditions as well as the underlying sub-forms, will be described. Chapter V will present the results of the statistical analysis. In this chapter an overview of nonprofits in Florida will be provided. Finally, chapter VI discusses how the study contributes to existing theory and research, as well as providing implications for policy-making and managerial practice. Also the implications and limitations of the study will be discussed, and recommendations for future research are proposed. The chapter will conclude with a summary of the results and implications of the study.

CHAPTER 2

LITERATURE REVIEW

Organizational ecology and density dependence theory focus on the evolution of organizational populations over long time spans. Thus, the population is a unit of analysis. Populations are spatially and temporally bounded groups of organizations whose core properties are similar and who respond similarly to forces stemming from their common environment (Hannan & Freeman, 1989). This definition is based on the idea that all members of a population share a common organizational form or template for organizing (Hannan, 2005). Forms are related to the concept of niche, which is defined as the set of social, economic, and political resources and conditions from the environment that are required for organizations representing a particular form to persist (Carroll & Hannan, 2000; Hannan & Freeman, 1977, 1989).

Organizational ecologists have studied a wide array of different organizational types and industrial settings. However, much of the earlier research has focused on relatively simple, product driven populations with uniform organizational forms or populations, such as Chinese restaurants –sometimes referred to as the "fruitflies of organization studies" – and fastfood businesses (Hsu & Hannan, 2005). Some forms and populations studied by organizational ecologists correspond to industries, whereas others do not seem to fit any conventional notion of industry, like social movement organizations (Hannan, 2005). In other words, the choice of empirical populations has been based on weak linkages to the concept of organizational form. The identity approach (Polos et al., 2002) has brought method to the conceptualization of organizational forms. In particular, the concept of form complexity is helpful to understand organizational heterogeneity within populations in terms of organizational forms (Hsu & Hannan, 2005; Zuckerman et al., 2003).

Population ecology study combines a systems approach to capture such form complexity and related heterogeneity. Organizational ecologists have suggested that collective organizational identities can be hierarchically nested systems of organizational forms, thus emphasizing 'upward' or 'downward' effects (Carroll & Hannan, 2000; McKendrick & Carroll, 2001; McKendrick et al., 2003). Such systemic structures are mirrored to empirical populations, capturing related heterogeneity. The systems approach is used in the current study to formulate hypotheses regarding how processes of legitimation

and competition affect entry in heterogeneous populations characterized by complex organizational forms.

The purposes of this chapter are to review the core ideas, assumptions, and concepts of organizational ecology and density dependent theory and examine the systems approach about hierarchically nested structure to be used in formulating hypotheses. In particular, the two fundamental concepts – the population and the organizational form – will be elaborated. This is followed by a review of the identity approach to organizational forms. The systemic structures of complex organizational forms will also be examined.

Main Assumptions of Organizational Ecology

Organizational ecology studies organizational diversity and organizations' relationships to their exogenous and endogenous environments and tries to explain the macro-sociological processes by which large-scale organizational transformation and evolution unfolds (Carroll & Hannan, 2000; Hannan & Freeman, 1989; McKendrick & Carroll, 2001; McKendrick et al., 2003). Organizational ecology is related with various intellectual roots in the fields of sociology and human ecology (Baum & Amburgey, 2002; Hawley, 1950), as well as the open systems perspective in organization theory (Scott & Davis, 2007). In terms of sharing the idea of environmental influence over organizations, organizational ecology is in a similar vein as sociological neo-institutional theory (DiMaggio & Powell, 1983; Meyer & Rowan, 1977; Meyer & Scott, 1983) and resource dependence theory (Pfeffer & Salancik, 2003). Organizational ecology is also linked to general evolutionary theory which regards variation, selection, and retention as the three key processes of evolution within populations (Aldrich, 2001; Hannan & Freeman, 1989).

According to population ecology, broader social structure is explained by the system of organizations decomposed into individual organizational populations (Carroll & Hannan, 2000). The glacial dynamic changes typically observed within populations in this approach are explained by vital rates of organizations, which are explained by exogenous environmental conditions and endogenous population dynamics. The exogenous conditions include especially carrying capacity and external shocks. The endogenous dynamics come from changes in population density. In the long run, outcomes to the general social structure have feedback effects on the exogenous environmental conditions.

Population ecology assumes that organizations are relatively inert to change, and thus large-scale change in the organizational landscape is driven by evolutionary selection rather

than adaptive efforts of individual organizations (Hannan, 1997; Hannan & Freeman, 1977, 1984). Clearly this perspective casts doubt on strategic managerial interventions; it asserts that, due to internal and external pressures and early imprinting, organizations' efforts to change their core properties are both difficult and slow (Hannan & Freeman, 1977, 1989; Stinchcombe, 1965). The structural inertia implied in this perspective is common to virtually all organizations. Therefore, even though organizations are to some extent capable of transforming themselves and adapting to environmental change, they are not capable of doing so with the same speed as the environmental change. The fit between organizational properties and the demands of the organizational environment is essentially attained by a selection and retention process at the level of whole organizations. Less fit organizations are forced to exit the population and new, fitter organizations are able to enter as new members. The dynamic evolution of organizational populations – that is, the process by which new organizational forms emerge, change, and die out – is explained by external selection processes that introduce new organizations and populations to replace existing ones, not adaptive transformation of core properties to adapt to environmental change (Carroll & Hannan, 2000; Hannan & Freeman, 1977, 1989).

Based on the fundamental assumption of organizational inertia, organizational ecology seeks to explain dynamics within and across organizational populations. Organizations are generally seen as the fundamental building blocks of modern societies to implement collective will and actions (Aldrich, 2001). Thus, the existence of diverse organizations reflects the diversity in the overall social system (Hannan & Freeman, 1977, 1989). However, not all effects and events at the population level can be reduced to the level of individual organizations. Thus, taking a population-level approach provides a unique lens to study organizations.

A population is generally defined as a set of organizations with a common form (or template for organizing) at a particular place and time (Hannan, 2005; Hannan & Freeman, 1977). All organizations within a population share the same organizational form, and are thus considered as fundamentally similar. An organizational form generally refers to the characteristics of an organization that identify it as a distinct entity and classify it as a member of a group of similar organizations (Romanelli, 1991). Organizations sharing the same form have similar core structures and occupy the same niche of resources within their environments (Carroll & Hannan, 2000; Freeman & Hannan, 1983; Hannan & Freeman, 1989). The core structures are the product market served, stated goals, forms of authority, and core technology. Forms are socially constructed and are used in identifying organizations that

are ecologically similar (Aldrich, 2001; Carroll & Hannan, 2000; Freeman & Hannan, 1983; Hannan & Freeman, 1989).

Organizations have many dependence relationships toward other organizations and other social units in order to get resources vital to organizational functions. Thus, organizations are viewed as highly dependent on their environments (Pfeffer & Salancik, 2003). The social environment of a population consists mainly of other organizations, organizational populations, and organizational communities (Carroll & Hannan, 2000; Hannan & Freeman, 1989). The effects imposed by the other members within a population are endogenous while other effects are exogenous to the focal population. Besides other populations, exogenous environments also include resources, institutions, technology, and political forces.

First, resources refer to both physical and social resources that are somehow used as inputs to an organization's activities in generating its outputs. Creating an organization requires the mobilization of various kinds of resources such as capital, members, labor, technological knowledge, and legitimation (Hannan & Freeman, 1984; Stinchcombe, 1965) Second, the exogenous social environment also includes regulative institutions (rules and governance structures imposed by, for example, the legal system), normative institutions (socially shared values and beliefs, and social obligations and sanctions thereof), and cultural-cognitive institutions (common symbolic systems and shared meanings, taken-for-grantedness) that assert external demands on organizations (Meyer & Rowan, 1977; Meyer & Scott, 1983; Scott & Davis, 2007). Third, technological knowledge and innovation are resources that fuel organizational activity (Carroll & Hannan, 2000). Finally, effects of the political environment consist of disruptive social revolutions and political crises whereby class and political structures are destroyed and rebuilt, and continuous, institutional effects such as routine legislative and regime change assert themselves (Carroll & Hannan, 2000).

Organizational environments are generally regarded as diverse, discontinuous and unstable (Hannan & Freeman, 1989). The diversity and discontinuity results in special combinations of environmental resources and conditions called niches (Freeman & Hannan, 1983; Hannan & Freeman, 1977). A niche consists of the "social, economic, and political conditions that can sustain the functioning of organizations that embody a particular form" (Carroll & Hannan, 2000). Thus, niches and organizational forms are fundamentally related. The organizations that share a common form are dependent on a common material and social environment or niche and thus are affected homogeneously by forces stemming from the environment (Hannan & Freeman, 1989). Theories of niche width (Baum & Singh, 1994a,

1994b; Freeman & Hannan, 1983) examine how the resource levels of a niche affect population growth rates and how the organizations within a population are dependent on their shared niche or resource space. The concept of niche is central to ecological analyses of competitive effects within an organizational population, and a large body of works has directed attention to the differential effects of niche conditions on generalist as over against specialist organizational forms (Carroll, 1985). Organizations within a population compete for various types of resources from their shared niche. Thus niches are understood to have a carrying capacity -- the maximum number of organizations that the current resource base can sustain (Baum & Amburgey, 2002; McPherson, 1983).

Environmental instability and structural inertia of organizations is a combination that favors environmental selection and replacement processes in governing organizational diversity and change. According to the original formulation of population ecology by Hannan and Freeman (1977), it is the environment that selects out and thus optimizes the combinations or distributions of organizations to best fit the contemporaneously available configuration of resources.

Organizational Populations and Forms

Early organizational ecology held the view that the members of an organizational population are homogeneous in terms of their core properties and environmental vulnerability, and thus share a similar destiny (Hannan & Freeman, 1977, 1989). This view comes from the definition of organizational population. According to organizational ecologists, populations are spatially and temporally bounded groups of organizations that are characterized by a particular organizational form, and are dependent on a common set of material and social resources from their environment (Carroll & Hannan, 2000). While an organizational form is an abstract concept that defines a class of similar organizations, populations are empirical "instances" of organizational forms (Carroll & Hannan, 2000; Hannan & Freeman, 1989; Hsu & Hannan, 2005). Thus the specification of meaningful population boundaries requires proper understanding and definition of the underlying organizational form (Hannan, 2005).

While it seems that a generally accepted definition of organizational form has not yet emerged, researchers tend to agree on the functional purpose of the concept of form in ecological research (Carroll & Hannan, 2000; Hsu & Hannan, 2005; Romanelli, 1991). In other words, the purpose is to identify an organization as a distinct entity, and to classify an organization as a member of a group of similar organizations. It is also agreed that forms are

socially constructed and are used in identifying organizations that are ecologically similar (Aldrich, 2001). An organizational form is linked with a group of organizations that are similar in relation to some core elements – the organization's mission, form of authority, core technology, and general marketing strategy, but may be different in terms of peripheral features – organizational size, internal members, and facilities.

Even though populations are equated with distinct organizational forms, there is substantial divergence of opinion on how to define organizational populations and organizational forms (Baum & Amburgey, 2002; Rao, 2002). Existing studies have used various ranges of organizational forms or populations for empirical testing purposes. Examples include hotels (Baum, 1995; Baum & Mezias, 1992), breweries (Carroll & Wade, 1991), pizza parlors (Romanelli, 1991), and telecommunication companies (Baum, Korn, & Kotha, 1995). All of these define a specific class of organizations that share core features, but can be different and unique in terms of less central or peripheral properties (size, location, members, etc).

In their early conception of the principles of organizational ecology, Hannan and Freeman (1977) defined an organizational form as a "blueprint for organizational action, for transforming inputs into outputs." Such "blueprints" are essentially defined by characteristics such as "formal structure, patterns of activity and normative order" (Hannan & Freeman, 1977). A little later, the definition was made somewhat more specific, yet still focusing on more or less structural and observable aspects of organizations. According to Freeman & Hannan (1983), organizations sharing the same form have similar core structures and occupy the same niche of resources within their environments. Such core structures can be, e.g. (i) the organization's stated goals, (ii) forms of authority, (iii) core technology, (iv) customer base (Hannan & Freeman, 1984). In this definition, the relationship to the organizational environment and the distinction between core and peripheral features gets emphasized. The latter further underscores that, while belonging to a recognizable set of similar organizations, the definition of the form allows for individual organizations to also possess unique characteristics.

The above early definitions of the concept of organizational form belong to a class of definitions that Carroll and Hannan (Carroll & Hannan, 2000) label as "trait-based." Such definitions see organizational forms as clusters of features, some of which are core and others peripheral. This relates also strongly to the idea that changes in organizations' core features have a negative effect on their chances of survival (Hannan & Freeman, 1984). Thus, just as the principles of isomorphism and structural inertia predict, organizations tend to adhere to

the existing form within the populations and thus keep core features similar to other population members. However, since changes in the peripheral features don't have such effects on survival, the organizations under the same form may vary from each other along this dimension.

Another approach defines the concept of organizational form through social boundaries (Carroll & Hannan, 2000). In this approach organizations are also seen as clusters of features, but the existence and location of socially identifiable boundaries between different forms matters more than the clustered features (Hannan & Freeman, 1989). Processes that create and maintain such boundaries include social network ties, flows of personnel between the organizations in a population, technological discontinuities, social movements and geographical boundaries. A third class of definitions of organizational form relate to network ties. In other words, if two organizations have similar relationships to key actors and resources in their environments, they can be considered as structurally equivalent (Carroll & Hannan, 2000).

As noted in earlier sections, organizational forms and populations are also related to the concept of niche. Niches are sets of environmental resources that "consist of the social, economic, and political conditions that can sustain the functioning of organizations that embody a particular form" (Dobrev et al., 2006; Freeman & Hannan, 1983; Hannan & Freeman, 1989). For example, financial cooperatives in Singapore benefited from overlapping the identity of commercial banks as an established social identity in early proliferation, but later the "code violation" from trying to overcome the identity of commercial banks led to an increasing death rate of these financial cooperatives (Dobrev et al., 2006). The organizations that share a common form are dependent on a common material and social environment and thus are affected homogeneously by forces stemming from the environment (Hannan & Freeman, 1989).

In sum, organizational populations are spatially and temporally bounded groups of similar organizations. The members of populations share a common organizational form, which means that they have similar core properties and are dependent on the same set of resources from their environmental niche. Thus the organizations are homogenously affected by environmental variation. Forms are central in defining empirical populations, but disagreement exists regarding the definition and conceptual underpinnings of the concept of form.

Surprisingly, a majority of the extensive body of empirical work in organizational ecology has not explicitly applied the concept of organizational form in defining empirical

populations (McKendrick & Carroll, 2001). Empirical populations often follow conventional industry or product-market categories. This has led to a focus on relatively homogeneous populations with uniform organizational forms. The origins of the prevailing focus can be traced to both the high level of abstraction and fragmentation of the early conceptual work in organizational forms (Hsu & Hannan, 2005; McKendrick & Carroll, 2001; McKendrick et al., 2003; Polos et al., 2002; Romanelli, 1991), as well as the overarching original idea that the members of a population should be more or less homogeneous.

A new strand of theorizing has recently emerged to explain organizational forms through socially recognizable organizational identities (McKendrick & Carroll, 2001; McKendrick et al., 2003; Polos et al., 2002; Rao, 2002; Ruef, 2000). Following the logic similar to the social boundaries view, the identity based approach sees an organizational form as a cultural object. A form is a recognizable pattern that takes on a rule-like standing or an externally enforced identity (Hannan, 2005; Hsu & Hannan, 2005).

The Identity Approach to Organizational Forms

The purpose of this section is to review the fundamental principles of the identity approach to organizational forms. The approach has been formalized by Polos et al. (2002) to understand discontinuities in social identity. Organizational ecologists have defined populations as commonsense categorizations used by actors such as craft and industrial trade unions, daily and weekly newspapers. However, Polos et al. (2002) emphasize the viewpoint from insiders or outsiders that give meaningful identity. Hsu & Hannan (2005) present a comprehensive review of their core ideas as well as the application of these ideas in the domain of organizational ecology.

According to the identity approach, different social agents -- both internal and external to organizations -- hold assumptions, beliefs, and expectations about an organizational domain as well as the individual organizations within the domain. Relatively homogeneous sets of such agents are called audiences. The agents have control over material and symbolic resources that affect the success and failure of the members in the related organizational domains.

Organizational identity refers to a set of social codes or rules about the organizational actions or attributes that audiences expect an organization to possess or follow. An audience's social approval of an organization depends on how the audience perceives the organization to adhere to or violate the default codes. Violation of the expected action would result in

punishment such as withdrawal of support (Ruef, 2000). In fact, research has shown that an observed violation of a code generally leads to a decreased valuation of the organization by the audience (Polos et al., 2002; Ruef, 2004). Because such expectations are tied to evaluations of organizational worth and, as a result, the chances of success and failure, audiences thus have the power to shape organizations through imposing constraints on the features organizations adopt. Hence, organizational identities generally have a rule-like status. Identities set limits on organizational features and action through their inherent social codes.

The above leads to the important notion that the definition of an organization's identity is not based in the organization itself but within the different audiences external to the organization. Thus, this definition of organizational identity differs somewhat from the definition from the domain of organizational behavior whereby organizational identity is essentially seen as something that gets collectively formed by the internal members of an organization. In addition, identity in this sense is not based on a list of observable properties of an organization. Thus empirical research cannot measure identity by observing such static properties. Instead, to explore such identities researchers must look into the perceptions, expectations, and actions of relevant organizational audiences to learn about the codes that contemporaneously define the external identity of organizations (Hsu & Hannan, 2005; Polos et al., 2002; Ruef, 2000, 2004).

It should also be stressed that an organization can have several different audiences that may have different and perhaps conflicting identity expectations for the organization. Therefore, how much the expectations of various audiences differ from each other essentially defines the ease of acquiring an identity, as well as the sharpness of devaluations that result from code violations. Generally, if all audiences hold very similar default expectations, obtaining a clear identity is easy but violations are sharply sanctioned, and vice versa.

An important question, therefore, is how the concept of organizational identity relates to defining an organizational form. An organizational form represents an externally enforced, collective organizational identity. In essence, an organizational form is a codified category to which an audience attaches a label and a collective identity in terms of codes regarding what is and is not acceptable for the members of the category. Membership in sociologically real categories constitutes a part of an individual organization's identity. Once validated as a member, audiences continue to assume that an organization satisfies the membership standards to the category as long as they get no information showing the contrary (i.e., violating the expected codes or rules). Thus, acquiring the status of a validated member represents an advantage.

In this conception of the organizational form, the existence of distinct labels to categories or forms is an important issue. Labels bring in several advantages to the understanding and formation of organizational forms (Hsu & Hannan, 2005; Polos et al., 2002; Ruef, 2000, 2004). First, access to a label helps audiences isolate a particular form from others in the social world. This reflects the effect of linguistic categories on cognition in general. Second, a label emphasizes the homogeneity of the members of a form by focusing attention on similarities and associations between the members. Third, a label also makes forms more available or salient to audiences. Fourth, labels facilitate communication regarding the form and its relation to other actors, forms, and social phenomena. Finally, an organizational form is a cultural object (Carroll & Hannan, 2000). Thus it has the capability of preserving in time beyond local populations, and the capacity of spreading over boundaries of social systems such as nation-states. Thus, for example, it has been argued that the sociological-institutional process of legitimation operates on a broader geographical scope than the process of competition for scarce resources (Hannan, 1997, 2005).

Heterogeneous populations and Complex Organizational Forms

Unlike the assumption of organizational homogeneity within a population as proposed in the early formulation of population ecology (Hannan & Freeman, 1977), subsequent studies have shown that real organizational populations are relatively heterogeneous (Baum & Amburgey, 2002; Cattani et al., 2003). Several types of heterogeneity have been suggested. Even though it was in the context of community ecology theory, Freeman and Audia (2006) provided guidance to define heterogeneity of populations or communities. That is, the concept of population located in both spatial and functional relations can be defined. They suggest conceptualization of populations and communities in two different yet relevant ways: first, spatially, as "places where organizations are located in resource space or in geography" and second, functionally, as "sets of relations between organizational forms."

Spatial ecology. In organizational ecology geographic location in the macro level environment plays a role as a resource space. Spatial differentiation and interdependency affect the dynamics of populations by providing opportunities and constraints on the availability of scarce and valued resources (Baum & Amburgey, 2002; Freeman & Audia, 2006). Based on this proposition, the literature on spatial ecology suggests that geographical propinquity structures are an essential element of organizational dynamics (Freeman & Audia,

2006). A common geographic location means similarities in demographic, cultural, and policy-related aspects of the environment. Therefore, being in the same geographic community increases the likelihood of sharing an environmental resource space.

Some studies have assessed the effects of geographical proximity and local density on organizational founding and failure. In this context, Carroll and Wade (1991) argued that density dependence processes apply differently according to spatial locations. Lomi (1995) suggested that the level of spatial concentration affected organizational founding rates. Another example of spatial approaches to modeling the ecology of organizations is provided in the context of automobile manufacturers (Carroll & Hannan, 2000; Hannan, Carroll, Dobrev, & Han, 1998; Hannan, Carroll, Dobrev, Han et al., 1998). These authors studied the two nested levels, national and world regional, and found that the processes of legitimation and competition operate differently in the two levels: whereas competition operates at the national level, legitimation operates at a broader level across nations. This nested structure of geographical location will be discussed in the next section.

In summary, spatial location influences organizational dynamics and the ways networks evolve. Resource relationships among organizations are determined by whether organizations are located in resource-rich or resource-poor locations, and in a relative sense, in resource-complementary or resource-competitive locations[1]. In fact, many industries face diverse environments with geographically unevenly distributed resource abundances (Baum & Amburgey, 2002; Carroll & Hannan, 2000). This causes spatial heterogeneity within organizational populations and such heterogeneity has been found to affect the predictions of density dependent entry (Greve, 2002a; Hannan, 2005; Lomi, 1995b; Wezel, 2005).

Functional ecology. Another type of heterogeneity is related to organizational forms, which is the variance related to the core properties and collective identity of the members of a population. In such cases, a diverse set of organizations may be associated to a specific, broadly defined organizational form (Freeman & Audia, 2006; Hannan, 2005). The related organizational populations are often perceived as heterogeneous, as several different types of organizations may be included. These organizations can represent several product markets and operate with different business models. At the same time, they hold common glue such as a technology base or an organizational mission base. More specifically, populations have

[1] In terms of socioeconomic environments, the level of resource abundance among the geographical places that organizations are located causes more competitive forces. Ecologists have included the socioeconomic variables as the exogenous environments. The locational difference is captured by the term “spatial heterogeneity”.

been found to be heterogeneous in relation to organizational size distributions (Barnett, 1990, 1997; Barnett & McKendrick, 2004), time (Hannan, 1997; Wezel, 2005), and generalist vs. specialist strategy (Boone et al., 2000; Boone et al., 2002; Carroll, 1985; Dobrev, 2001), but have the shared core properties to bind members of a population.

The identity approach provides useful conceptual tools to approach such organizational forms. In particular, the identity approach enables the conceptualization of the complexity dimension to organizational forms (Hsu & Hannan, 2005; Zuckerman et al., 2003). In essence, complexity captures the heterogeneity of organizational properties generally associated with an organizational form and thus the heterogeneity of organizations that are qualified as members. Based on the identity approach to organizational forms, the complexity of an organizational form is defined as the number and diversity of codes associated with the externally enforced, rule-like collective identity of the form (Hsu & Hannan, 2005; Zuckerman et al., 2003). A complex organizational form may have several, disparate audiences that collectively associate a heterogeneous set of organizations to the form's collective identity and label. In contrast, simple organizational forms have generic, narrowly defined identities and thus are associated with a rather uniform and homogeneous set of organizations. Consequently, the number of relevant audiences as well as the coherence of the different audiences' expectations regarding the identity generally define the complexity of an organizational form.

Organizational forms defined by product-markets (e.g., automobiles, hotels, or newspapers) clearly represent a simple identity. By the association to an end product or service, audiences generally have uniform, well defined, and concrete understandings of how such organizations are alike, what they do, and how they behave. The same is true for organizational forms that are defined by governmental or other types of authorization (e.g., health maintenance organizations, financial institutions, television and radio stations, telecommunication network operators, labor unions, and accounting firms). Usually such formally authorized organizations also hold quite uniform identities in terms of their product-markets.

On the other hand, organizational forms and identities defined primarily in terms of technology generally are complex. For example, the producers of disk arrays (a computer storage technology) have diverse industrial backgrounds, retain simultaneous activities in other industries, and are also otherwise a heterogeneous set of organizations (McKendrick & Carroll, 2001; McKendrick et al., 2003). Moreover, the disk-array technology itself holds several variants and standards and comprises several different but interconnected

technological components. There is no single and specific technology to identify the disk-array technology (McKendrick, 2001; McKendrick & Carroll, 2001). Thus, despite the quite clear product category, different audiences have had difficulty in associating disk-array organizations to a coherent, universal set of codes for validation as members of a distinct form.

Although the terms nonprofit organization and nonprofit sector have been used, defined, and debated for decades, it can be seen that the nonprofit sector is a good example of a more complex organizational form which is not related to a specific product or service market. Nonprofit organization as an organizational form has been identified by the public and, especially in the United States, by statute and by the Internal Revenue Service. The behavioral expectation and core properties have been shaped and imposed in rule-like fashion. In other words, nonprofit organization may be considered to have a very conspicuous and institutionalized overall identity. When people use the term nonprofit organization, there is a collective identity that represents all organizations for fall under that mantle. As a label, nonprofit organization is well known to the general public and has become extremely important in the individual and collective efforts of organizations to get resources needed for their ongoing operations.

However, nonprofit organization represents neither a clear product market nor a formally bounded organizational type, even though government defines the requirements of nonprofit status for tax-exemption purposes. Instead – as the name implies – nonprofit organization represents an area whose boundaries are defined by common core properties of mission, authority forms, and non-profit seeking market strategy (Galaskiewicz & Bielefeld, 1998). Especially as a research setting for this study, nonprofit charities are conspicuous in these aspects. In other words, the arena of nonprofit charities consists of those organizations whose core activities are related to a set of charitable missions. Clearly nonprofit organizations are not homogenous, and they operate in a wide range of areas (Ben-Ner, 2002; Galaskiewicz & Bielefeld, 1998; Hodgkinson & Toppe, 1991).

Indeed, to capture the underlying organizational heterogeneity, extant research has identified several salient fields of nonprofit charities through the development of classification systems that denote health, arts, education, environment, human service, religion, and other mission areas (Bielefeld, 2000; Boris & Steuerle, 2006; Hodgkinson & Toppe, 1991; Lampkin, Romeo, & Finnin, 2001; Salamon, 2001; Salamon & Anheier, 1997; Wolpert, 1993a). These sub-forms tend to more readily center around specific service markets. With respect to these service markets, their organizational forms are clearly simpler

than that of the main nonprofit organization form. Yet most audiences readily identify these sub-forms while simultaneously identifying them as integral parts of the main form.

The complexity of the nonprofit organization form is further increased by its connections with the private sector. Nonprofit service areas often share market space with private companies in a diverse set of service areas. These private companies readily enter and exit various traditional nonprofit areas. Therefore, nonprofit service boundaries and forms are more changeable than static (Ben-Ner, 2002; Ben-Ner & Van Hoomissen, 1991; Salamon, 2003). Thus the field has a multitude of different audiences with obviously diverse understandings of the underlying default codes that define the identity of the field.

Recall that the extant body of empirical research in organizational ecology reveals that a majority of the studies have concentrated on relatively simple organizational forms or areas. While a few of the studies relate to the nonprofit sector (Ben-Ner & Van Hoomissen, 1991; Salamon, 2003; Twombly, 2003), virtually all of them have narrowed their focus to the field of a specific service area or the aggregated broad sector. Broadly in ecological studies, a few studies have paid attention to the variation of the organizational form within populations, as exemplified by the studies such as the wine (Swaminathan & Delacroix, 1991; Swaminathan & Wiedenmayer, 1991), and brewing industries (Swaminathan, 1998).

An intriguing question then becomes: How do population-level mutualism and competition operate in such settings with heterogeneous populations characterized by complex organizational forms? In addition, how can such settings be approached in an analytical manner for more detailed understanding? The next section sketches a systems approach to capture such form complexity and thus the related population heterogeneity.

A Systems Approach to Complex Forms: Hierarchical Structure

How is the complexity of an organizational form reflected in the domain of real organizational populations? What kind of an analytical approach should be chosen to study the processes of density dependent entry in heterogeneous populations characterized by complex organizational forms? In general, the analytical direction advanced here takes an explicit systems approach to meaningfully capture the effects of the population heterogeneity caused by complexity in organizational forms. The systems approach builds on the straightforward conceptual idea that there is a main unit and a number of hierarchically nested sub-units that are integral parts of the main unit. In the spatial context, the main unit would be a national population, in which case the hierarchically nested sub-units would then

be the sub-populations at the county or city level. In the context of organizational forms, the main unit would be a main form such as nonprofit organizations, and the sub-units would be the nested sub-forms such as health-related organizations or human service nonprofits.

Classic work in both human ecology (Hawley, 1950) and organizational ecology (Baum & Amburgey, 2002; Hannan & Freeman, 1977) have stressed the systemic nature of social structures, and the isomorphism (Hawley, 1968) between the diversity of organizational forms and the diversity of environments. Connection across levels has been emphasized, and order is typically found to be the result of a multilevel interplay between downward and upward causation (Baum & Amburgey, 2002; Hannan & Freeman, 1977). In this perspective, organizational phenomena and evolutionary processes can be studied at various levels of analysis, ranging from individuals through intraorganizational units, organizations, and organizational populations to organizational communities (Amburgey & Rao, 1996; Hannan & Freeman, 1977). These levels form social systems that have hierarchical structures with nested levels and related, interdependent sub-units.

A number of earlier ecological studies have applied a systems approach to understand the microstructures of organizational populations and thus account for population heterogeneity (Barnett, 1990; Barnett & Carroll, 1987; Baum & Amburgey, 2002; Cattani et al., 2003; Greve, 2002a; Lomi, 2000; Wezel, 2005). However, most of these studies have set their focus on the geographical context, studying the effects related to the geographical clustering of subpopulations under a single main population. For example, Greve (2002a) has studied density-dependent entry in the Tokyo banking industry by decomposing the population into 20 sub-populations according to the wards and counties within Tokyo. It is argued here that a similar systems approach can also be applied in the domain of organizational forms (McKendrick, 2001; McKendrick & Carroll, 2001). This approach builds strongly on the identity-based definition of the organizational form, as well as the concept of form complexity. The simple main idea is to analyze complex organizational forms as bounded systems of simpler sub-forms with closely related sub-identities. Such sub-forms are not only associated as integral parts of the main form, but also hold conspicuous identities of their own, thus making them different from each other. By definition, this heterogeneity and underlying hierarchical structure are reflected in empirical populations of organizations.

The conceptual starting point lies in identities and audiences. Organizational identities are often hierarchically nested, comprised of sub-identities related to each other (Baum & Amburgey, 2002; Carroll & Hannan, 2000; Carroll & Swaminathan, 2000). The

relationships between the sub-forms and the main form are systemic, and thus they form together a system of identities. Thus, complex organizational forms – as collective identities – may also have nested sub-forms with related identities (Ruef, 2000). This resembles in many ways the geographical clustering of populations and sub-populations.

As mentioned above, the complexity of an organizational form stems from the heterogeneity of the codes associated to the form's collective external identity. Complexity is thus a function of the number of relevant audiences and the heterogeneity of the codes that the different audiences associate with the common collective identity (Hannan, 2005; Hsu & Hannan, 2005). For example, the member organizations of a complex organizational form might serve a multitude of different product and output markets, thus being relevant to several different groups of target customers and stakeholders with significantly different material and social demands. Similarly, the activities, structures and operational modes of the individual organizations within a form may require multiple types of resource inputs such as employees with specialized skills, budgets from safe sources, and so on. This further increases the diversity of relevant audiences.

In such settings, the different audiences may associate differentiated sets of codes to the common collective identity of the organizations. This leads to the clustering and differentiation of sub-identities in accordance with the different audiences (Hannan, 2005; Hsu & Hannan, 2005; Polos et al., 2002). However, since the different audiences collectively associate the organizations to the same general identity, the codes imposed by different audiences are at least partly overlapping. Some of the codes are common to all of the associated organizational types or sub-identities, while others may differ. Those codes that are universal across different audiences link the complex main identity and its constituent sub-identities together. Different audiences may also weight the associated identity codes differently, thus adding to the differentiation of the sub-identities.

How is this clustering of identities reflected in organizational forms? By definition, organizational forms are sociologically real categories with collective identities that are externally enforced by audiences through related identity codes. Thus, a complex organizational form has a complex collective identity. Consequently, the existence of distinct sub-identities leads to the formation of conspicuous sub-forms that are hierarchically nested under the main form. The sub-forms hold systemic relationships to the main form and the other sub-forms through the underlying system of identities (Hannan, 2005; Hsu & Hannan, 2005; Polos et al., 2002).

According to the identity approach, audiences have control over material and

symbolic resources for the organizations associated to a collective identity -- organizational form (Hsu & Hannan, 2005; Polos et al., 2002). Thus audiences are able to affect the success and failure of organizations by first screening and validating them as members and subsequently applying varying levels of valuations to the organizations. The valuations are based on the organizations' perceived conformity to the codes that the audiences except based on the collective identity they associate with the form. Thus audiences have the power to force organizations to conform to specific sets of codes (Hsu & Hannan, 2005).

This is the process by which organizations and organizational properties tend to get clustered under salient organizational sub-forms that follow the identity enforced by powerful audiences (Hsu & Hannan, 2005; Polos et al., 2002; Poole & Van de Ven, 2004). Usually end-customers or other output/service-driven stakeholders represent the most powerful audiences. This is implicitly indicated by the fact that extant ecological studies have largely focused on product-market driven organizational forms.

In the case of nonprofit charities, several hierarchically nested sub-identities or sub-forms has been detected under the complex main form (broadly defined "nonprofit organization"). These sub-forms tend to more readily center around specific product or service areas, exemplified by the health, human service, or education sectors. Thus the organizational forms of these sub-categories are clearly simpler than that of the main form. Yet, most audiences associate these sub-forms also as integral parts of the main form (Hsu & Hannan, 2005; Polos et al., 2002; Poole & Van de Ven, 2004; Zuckerman et al., 2003). These audiences may be associated with a specific nonprofit area, or sometimes participate in the broad nonprofit sector according to types of issues.

The systemic structure of an organizational form can be considered to be very strong, if explicit labels get naturally created for the individual sub-forms. These labels help to distinguish the forms from others, underline the homogeneity of members, foster related communication and, most importantly, help audiences to simplify and better understand the underlying complexity of the main form (Hsu & Hannan, 2005; Ruef, 2004). The hierarchical structure described above represents a relatively elementary system of forms. Interestingly, in a related vein, students of organizational taxonomy have even proposed that organizational forms could be classified into universal family trees based on an organizational genetics approach that traces organizational routines and competencies in a way that resembles the role of genes in determining biological classifications of species (Hodgkinson & Toppe, 1991; Lampkin et al., 2001; Salamon, 2001; Wolpert, 1993a).

By definition, populations are spatial-temporal, empirical instantiations of

organizational forms (Carroll & Hannan, 2000). Thus, the complexity of an organizational form gets reflected in populations and becomes visible through heterogeneity of the member organizations. With a similar logic, the systemic structure of organizational sub-forms will also be reflected in real organizational populations. The population related to the main form comprises of a relatively heterogeneous set of organizations that are clustered into sub-populations that correspond to the sub-forms. Again, these sub-populations are hierarchically nested under the main population, and the organizations belonging to a sub-population also form a part of the main population. There is also the possibility that spaces are left under the main form that do not belong to any clear sub-form. Empirically this would mean that there may be organizations that belong to the main population but not belong to any of the sub-populations. However, it should be noted that such sub-populations are not linked to any specific geographical clustering of the related organizations.

By decomposing a heterogeneous main population into its constituent simpler subpopulations in terms of the underlying structure of organizational forms, testable hypotheses may be drawn regarding density-dependent entry in such a heterogeneous population, as a bounded system of sub-populations. As McKendrick et al. (2001) pointed out, several ecological mechanisms can be identified that operate between the sub-forms of such a system and thus affect the structure and change of the whole system. Additionally, in a nested system of forms, organizational sub-forms may gain advantage from their systemic position because of taken-for-grantedness of the main form, protective action by the entities under larger system, ease of resource mobilization within the system, or ease of interaction with organizations outside the system because of existing routines (Dobrev et al., 2006; McKendrick & Carroll, 2001; McKendrick et al., 2003).

In a related vein, research in community ecology has concentrated on studying broader communities of organizations, i.e., the dynamics between separate populations or populations of populations (Astley, 1985; Astley & Van de Ven, 1983). In such settings a number of populations occupy non-overlapping niches but hold symbiotic interdependencies on each other (Freeman & Audia, 2006; Hawley, 1950). A typical symbiotic setting is a case where a population of producers holds vital and supporting dependence relationships to both the population(s) of supplier organizations as well as to the population(s) of customer organizations (Freeman & Audia, 2006; Hannan, 1997, 2005). Taking a clearly broader view beyond individual populations, community ecology focuses on organizational evolution “in the context of a concrete system of interrelationships between organizational suppliers, consumers, regulators, and intermediaries operating in an institutional area” (Ruef, 2000).

Theory of Density Dependence

Density dependence is one of the most central theories to explain organizational entry within the field of organizational ecology (Baum & Amburgey, 2002; Baum & Oliver, 1996; Hannan & Freeman, 1989; Wezel, 2005). The simple core idea is that there is a two-step process by which *density* – i.e., the number of organizations within a population – is related to the *entry rate* of new organizations to the population. In the first step, the level of density has an effect on two important processes of population dynamics, legitimation and competition. A rise in density increases legitimation, which means an enhancement to the general social acceptance of the underlying organizational form (DiMaggio & Powell, 1983; Meyer & Rowan, 1977). As the levels of density further increase, competition for scarce resources from the environment starts to get bigger (Baum & Amburgey, 2002; Baum & Rao, 2004; Hannan & Freeman, 1984, 1989). According to the theory, legitimation increases with density at a decreasing rate, whereas competition increases at an increasing rate (Baum & Amburgey, 2002; Carroll & Hannan, 2000). Therefore, the legitimation effect is strongest when a population has only a small number of organizations or initially at the developing stage of populations, whereas competition becomes salient for more dense populations or at the mature and developed stage.

In the second step, legitimation and competition again have counterbalancing effects on the entry of new organizations. In simple terms, legitimation increases the rate of entry and competition has exactly the opposite effect. The combination of the above two effects produces a non-monotonic relationship between density and entry rate of an inverted U-shape. Ignoring the process by which organizations exit from populations, this basic relationship generates an evolutionary trajectory of population density that has the shape of a stretched S and ends up with a steady density in the time domain. The core density-dependence argument was first proposed by Hannan in his seminal work (1986), and has since served as the baseline for the more recent and extended formulations of density dependent entry. Excellent reviews of the basic density-dependence argument and its recent developments and critiques can be found in existing literature (Baum & Amburgey, 2002; Baum & Rao, 2004; Carroll & Hannan, 2000).

The basic density-dependence theory has received a substantial amount of empirical validation under a lot of empirical contexts. A majority of these studies provide strong support for the predictions of the basic model (Baum & Rao, 2004; Carroll & Hannan, 2000; Singh & Lumsden, 1990). Excellent reviews of empirical studies of density-dependence can be found elsewhere (Baum & Amburgey, 2002; Baum & Rao, 2004; Baum & Singh, 1996;

Carroll & Hannan, 2000; Cattani et al., 2003; Greve, 2002a; Wezel, 2005). However, many studies have found the basic model too inaccurate and have built several extensions and amendments on the basic density dependence theory – to increase the precision of the predictions, and to investigate density-dependent processes in special cases (Baum & Amburgey, 2002; Carroll & Hannan, 2000). In particular, several studies have identified the basic assumption of homogeneous populations as too simplistic and have proposed new models to account for the spatial or geographical heterogeneity of populations (Carroll & Wade, 1991; Cattani et al., 2003; Greve, 2002a; Hannan, Carroll, Dobrev, & Han, 1998; Hannan, Carroll, Dobrev, Han et al., 1998; Hannan & Freeman, 1989; Lomi, 1995b, 2000; Sorenson, 2000; Sorenson & Audia, 2000). Other sophistications of the basic density-theory include density delay (Carroll & Hannan, 1989a), mass dependence (Barnett, 1990), institutional embeddedness and relational density (Baum & Oliver, 1992), temporal heterogeneity and interactions of density and population age (Baum, 1995; Cattani et al., 2003; Hannan, 1997; Wezel, 2005), relationships between organizational size and density on growth rate (Barron, 1999; Barron, West, & Hannan, 1994), as well as weighted density models including localized competition (Baum & Mezias, 1992), red queen[2] (Barnett & Hansen, 1996; Barnett & Sorenson, 2002; Barnett & Woywode, 2004), and niche overlap (Baum & Singh, 1994a, 1994b).

However, the extended models have received mixed empirical results. This section will review the basic density dependence argument in detail to derive arguments and hypotheses to test density dependent processes of organizational entry for heterogeneous populations characterized by complex organizational forms.

Legitimation generally refers to institutional processes by which an organizational form gains social acceptance and recognition (DiMaggio & Anheier, 1990; DiMaggio & Powell, 1983; Meyer & Rowan, 1977). The legitimation process conveys several advantages to both entrants and the existing organizations within a population and thus generally improves their viability (Hannan & Freeman, 1989). The legitimation process can be classified as one of two types of legitimation: constitutive or cognitive legitimation (Baum & Amburgey, 2002; Carroll & Hannan, 2000; Dobrev, 2001) and socio-political or coercive legitimation(DiMaggio & Powell, 1983). Constitutive legitimation refers to the institutional

[2] Red queen effect refers to an evolutionary principle in which much of the evolution of a lineage consists simply of keeping up with environmental changes, rather than occupying or adapting to new environments. Simply stated, a "big" success prohibits an organization or population from developing new changes and variation.

process by which an organizational form becomes known to the general public and other relevant audiences. Thus the form attains a taken-for-granted position whereby it is generally seen as the natural way of organizing a specific type of collective action (Carroll & Hannan, 2000; Hannan & Freeman, 1989; Meyer & Rowan, 1977). Hannan et al (1998) exemplified this process through the case of the automobile industry. Accordingly, there is currently a well known and commonly accepted, natural way in which automobile producers operate their businesses – and are expected to do so. Thus the underlying organizational form has gained a fair amount of constitutive legitimation. Coercive isomorphism refers to a process of institutionalization where organizations gain legitimation by conforming to generally accepted rules (DiMaggio & Powell, 1983). In sociopolitical legitimation, socially powerful stakeholders, such as the general public, opinion leaders, government officials and the like, accept an organizational form as appropriate and legitimate. Legislative statute, legal precedent, and administrative rule-making also exert coercive isomorphic pressures. However, because density dependence theory seeks to explain the legitimizing effect of increasing density, the coercive forms of legitimation are only of marginal interest (Carroll & Hannan, 2000).

According to the basic density dependence argument, there is a relationship between population density and constitutive legitimation. Given the taken-for-grantedness explanation of constitutive legitimation, the legitimation rises at a decreasing rate as the density of the population increases. More specifically, this legitimizing process can be explained as follows. Initially, when the first organizations enter a population, many relevant audiences are not familiar with the new organizational form and will be skeptical to make any commitments towards the early entrants as suppliers, customers, or other stakeholders. Thus it is difficult for the early entrants to mobilize resources, secure funds, initiate operations. However, as more organizations appear that represent the same organizational form, the different stakeholders will gradually become familiar with and learn more about the new type of organizational activity. The addition of still more organizations boosts the spreading of information regarding the new form. Thus, the constitutive legitimation of the form increases rapidly. However, when the population already has many members and the form is well legitimized, the entry of additional organizations will have little effect on the general constitutive legitimation of the form. Above a certain level of density, the addition of new entrants has no effect of legitimation any more. Thus legitimation increases with density at a decreasing rate and approaches a ceiling.

The density-dependent explanation relates constitutive legitimation to organizational

entry rates. Legitimation generally conveys several advantages to the organizations that represent a specific form. Therefore, as constitutive legitimation rises, organizations find it easier to mobilize resources such as skilled labor. Additionally, securing funding and increasing sales become easier as financiers and customers get educated on the operation and offerings of the organizational form in question. As the organizational form becomes taken-for-granted to the general public and key stakeholders, it will generally be easier and more advantageous for organizations to enter the population (Baum & Amburgey, 2002; Carroll & Hannan, 2000; Hannan, 1997; Hannan & Freeman, 1989). Thus there is a positive relationship between legitimation and organizational entry rate.

Competition refers to some kind of negative effect of the presence of one or more actors (populations) on the life chances or growth rates of some focal actor (population) (Carroll & Hannan, 2000). Some important kinds of competition are structured or directed, as when two actors engage in rivalry or head-to-head competition. In other cases, the effects are indirect or diffuse, as when a set of actors are dependent on a pool of limited resources. In such cases, the entry of additional actors into the arena lowers the life chances of a focal population by increasing the demand on the resource base. Both structured and diffuse competition are important to understanding organizational evolution. However, in density-dependence theory, competition has a special meaning that reflects organizational ecology's special view of organization-environment relationships in general, as well as the aim of density-dependence to relate the level of competition with population density. In other words, the ecological approach to competition aims to capture indirect competitive interaction that takes place at the level of the whole population and cannot be traced to direct competition between any specific pair of organizations (Barnett & Carroll, 1987; Carroll & Hannan, 2000; Hannan, 1997; Hannan, Carroll, Dobrev, & Han, 1998; Hannan, Carroll, Dobrev, Han et al., 1998). In diffuse competition the focus is largely on how a population of organizations indirectly competes for resources from the environment.

Following the general ecological conception of the environment, all of the organizations belonging to a population are more or less dependent on the same set of key resources from the environment, called a niche (Carroll, 1985; Freeman & Hannan, 1983; Hannan & Freeman, 1977). Such key resources can be, for example, demand for products and services, skills and labor, funding, or purely raw materials. Moreover, such niches have natural limits on the availability of the resources, called the carrying capacity. For example, there usually is a natural limit for the demand of a specific type of product, like automobiles (Hannan, Carroll, Dobrev, & Han, 1998; Hannan, Carroll, Dobrev, Han et al., 1998).

For an emerging population, a new niche or combination of available resources has usually opened up from the environment. It generally takes time for a niche to be populated with organizations representing a new, related type of organizational form. Thus, when density is small, the indirect competition for the resources is also relatively small, because the abundance of the resources from the environment is enough to satisfy the needs of the members of the population. However, for more densely populated environments, the diffuse competition for resources strengthens as the available resource spaces gradually get tapped by the organizations within the population (Hannan, 1997; Hannan, Carroll, Dobrev, & Han, 1998; Hannan & Freeman, 1977). Fewer resources are available for new entrants and, on the other hand, the entry of new organizations hits harder the existing organizations within the population, because some entrants may be able to force the existing organizations to give up some of their resource space. Ultimately, as the carrying capacity of the environment is almost fully exploited, competition starts to get very strong. This has a strong effect on the viability of existing organizations and new potential entrants to the population.

Returning to the first phase of the density-dependent process and following the above logic, the argument is that the strength of competition increases with population density at an increasing rate. Indeed, as Hannan and Carroll (1992) point out, as the number of organizations increases linearly, the number of potential competitive relationships increases geometrically. In the second step of the density-dependent process, the level of competition affects the entry of new organizations. As the abundance of resources from the environment decreases and the number of potential competitors increases, the potential gains for entering the population decreases. In other words, increasing competition has a negative effect on the entry rate of new organizations to the population.

Putting the pieces together and combining the effects of legitimation and competition yields the general density-dependence model to explain organizational entry through population density. According to the model, as density increases linearly, the rate of entry of organizations to the population first rises, then reaches a peak and finally starts to decline back towards zero. Thus the implication is that density and entry rate should have a non-monotonic relationship in the shape of an inverted U (Baum & Amburgey, 2002; Baum & Rao, 2004; Carroll & Hannan, 2000; Hannan & Freeman, 1977, 1989).

Controversies and Key Challenges

The domain of organizational ecology and the density dependence theory have

received several critical reviews. One of the earliest critiques relates to the neglect of powerful organizations (Perrow, 1986). Indeed, the standard density variable treats the competitive and institutional effects of all organizations as equal. This might become an issue for industries with a few large organizations and several small ones (Barnett, 1990). Second, the approach of combining two important lines of organizational inquiry – the institutional perspective (legitimation) and the ecological perspective (competition) – has received theoretical concerns that have been both positive and critical (Poole & Van de Ven, 2004; Zucker, 1989). The main argument of this critique is that the two perspectives generally come from different intellectual traditions, which might make their integration problematic.

The third line of critique questions whether the mechanisms of constitutive legitimation and diffuse competition are able to sufficiently explain density-dependent organizational entry. It has been argued that other types of legitimation – mainly sociopolitical legitimation – may also have effects on entry, and that such legitimation may not have been appropriately accounted for in the density dependence models (Baum et al., 1995; Zucker, 1989). In a similar context, it has also been argued that effects of organization-level legitimation should be separated from population-level legitimation (Amburgey & Rao, 1996). It has also been questioned whether the approach of concentrating only on diffuse competition is able to capture well enough the relevant competitive processes affecting entry and exit (Baum & Korn, 1994; Baum & Mezias, 1992; Baum & Singh, 1994a).

A fourth issue is related with the validity of the approach of measuring legitimation and competition indirectly through density. Researchers have questioned whether the simple number of organizations within a population is able to indirectly capture well enough the effects of constitutive or taken-for-granted legitimation (Amburgey & Rao, 1996; Nickel & Fuentes, 2004; Zucker, 1989). A similar argument has also been presented regarding the measurement of diffuse competition, combined with calls for more accurate and more direct approaches to measuring competitive processes (Nickel & Fuentes, 2004).

Fifth, a general level critique has been presented towards the density variable itself (Amburgey & Rao, 1996; Nickel & Fuentes, 2004). More specifically, researchers have debated whether density is a relevant construct in explaining organizational entry (and mortality, for that matter) as well as the evolution of organizational populations in the first place. Researchers have proposed that other factors such as time and mass (the sum of the sizes of all organizations in a population) should be integrated into the analysis. On the other hand, it has also been suggested that density might be a proxy also for processes other than legitimation and competition. Finally, some critics have also noted that founding studies

account only for successful founding attempts (Amburgey, Kelly, & Barnett, 1993; Delacroix & Carroll, 1983), and the process of legitimation may be applied only for young populations (Zucker, 1989).

The above critiques have provoked detailed responses and healthy discussion with the field (Carroll & Hannan, 2000; Nickel & Fuentes, 2004; Hannan, 1997). First, the issue related to powerful organizations has become obsolete as researchers have investigated size-dependence and size-based segmentation of organizational populations. Some studies have also substituted density with population mass as the key dependent variable (Barnett, 1990; Baum & Mezias, 1992). Second, the integration of the institutional and ecological perspectives is advocated for the sake of better understanding the processes governing population dynamics (Baum & Oliver, 1992; Baum & Powell, 1995; Carroll & Huo, 1986; Hannan & Freeman, 1989). In fact, in defining the concept of constitutive legitimation, ecologists have noted post hoc that the word institutionalization would have been "strategically" a more appropriate choice than legitimation because it does not have the connotation of approval or endorsement and thus more purely reflects the taken-for-granted nature of the process (Hannan, 1997). Some of the critique has generally seen the integration of different perspectives as legitimate, as long as methodological contradictions do not pose a problem (Zucker, 1989).

Third, it has been stressed that population density has the most salient effect on the taken-for-granted type of constitutive legitimation. However, the important role of other types of legitimation has also been acknowledged. Moreover, in line with the arguments of some of the critics (Baum & Amburgey, 2002), ecologists have pointed out that sociopolitical legitimation is more tied to legislative and other specific events than the continuous measure of population density. However, a majority of the empirical works on density dependence have explicitly accounted for such institutional events through extensive analysis of the exogenous period effects that mark the major changes in the institutional environment (Hannan, 1997; Hannan & Freeman, 1989). More generally, ecologists have stressed at several points that the generalizability of the density variable across long time periods and across various industries is an advantage of the analytical approach that more than justifies the possible sacrifices in measurement accuracy and context specificity (Carroll & Hannan, 1989a, 1989b, 2000; Hannan, 1997; Hannan & Freeman, 1989). Moreover, empirical research has several times demonstrated that there is a significant effect between density and the entry and other vital rates of organizational populations and that such effects are more significant than changes in the exogenous environmental aspects (Carroll & Hannan, 2000;

Hannan, 1997).

Fourth, ecologists generally agree on the need to have more direct and accurate measures of legitimation and competition but, at the same time, building on the above position, argue for methods that are generalizable, cost-effective, and realistic in terms of research efforts needed (Carroll & Hannan, 2000). As Hannan (1997) notes, "both legitimation and competition are hard to [directly] measure systematically over the full histories of organizational populations." Thus, "the theory abstracts from the many conditions affecting vital rates and concentrates on *density*." Arguably, focusing on the simple observable of population density provides consistency to the analysis over long periods of time and across various industrial settings.

CHAPTER 3

HYPOTHESES

This section formulates testable hypotheses regarding the density-dependent processes of organizational entry in heterogeneous populations characterized by complex organizational forms. The following picture shows the systemic structure of heterogeneous population. In terms of organizational form, sub-populations are nested under the main form. Geographical hierarchy shows the structure of local boundaries nested under regional boundary.

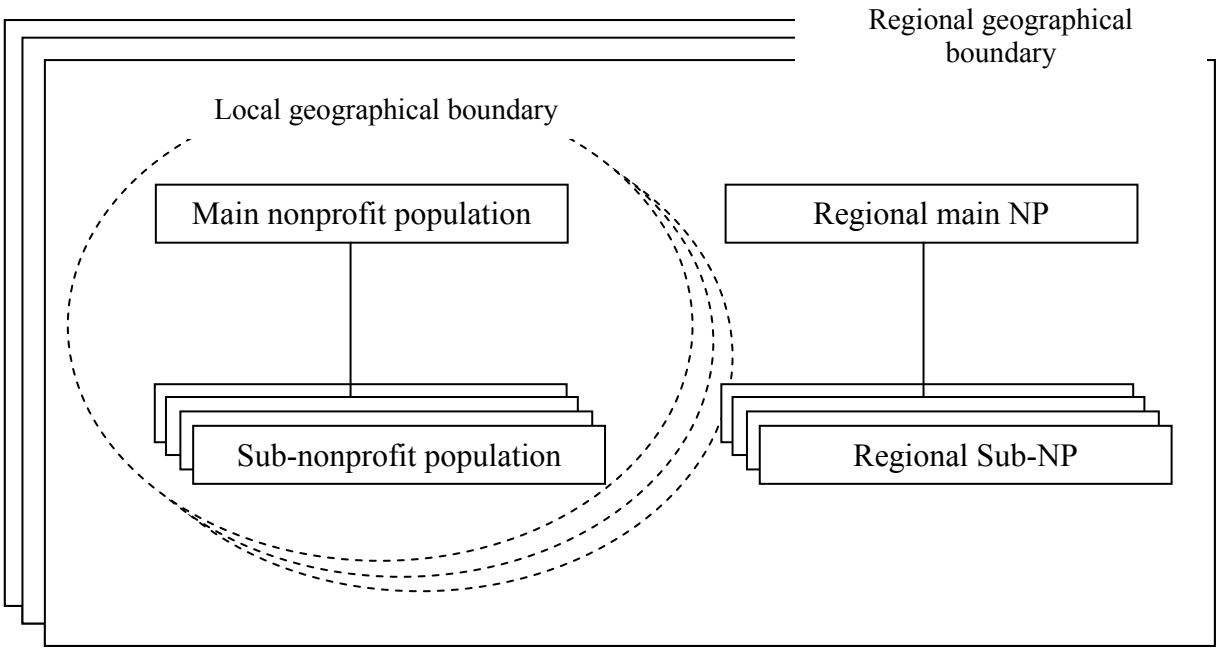

Figure 3.1: Hierarchical structure in terms of form and geographical location

The formulations begin by first ignoring the underlying systemic structure of the heterogeneous population and proposing hypotheses based on the classic single-population density dependence theory within local geographical boundaries. Next, the systems approach sketched in the previous sections is incorporated, and the analysis is focused on the simple case[3] where a number of individual sub-populations are directly nested under the main

[3] Intermediate levels between main population and sub-populations may exist. Under individual sub-population, it is possible to have more specific sub-sub-populations. However, in this study only the simple structure will be tested, due to limitations in gathering data.

population within local geographical boundaries. The third formulation considers effects of a different level of geographical aggregation on the argument about the nested structure between the main population and the individual sub-populations. In other words, regional effects over local boundary will be considered. All three formulations aim to capture how strongly the processes of legitimation and competition affect entry and, more importantly, from which parts of the system these effects originate.

Formulation 1: Classic Single-Population Density Dependence

The classic density-dependence argument (Carroll & Hannan, 2000; Hannan & Freeman, 1977, 1989) suggests that the density-dependent effects of legitimation and competition should apply to any ecological population of organizations. It proposes that population density has both a legitimizing and competitive effect on the entry rate within the same population.

As discussed earlier, for heterogeneous populations characterized by complex organizational forms, it is possible to define and observe individual populations at different levels of aggregation. Recall that under the systems approach to organizational forms, it was assumed that a complex main form exists comprised of hierarchically nested, simpler sub-forms. Based on the identity-based approach to organizational forms (Dobrev et al., 2006; Hannan, 2005; Hsu & Hannan, 2005; Polos et al., 2002), both the main form and the underlying nested sub-forms can be considered as appropriate bases for defining real ecological populations. For example, the main form "'charitable nonprofit organization" and one of its sub-forms, "heath nonprofit organizations," could both be used as bases for ecological analysis of population dynamics individually, ignoring the possible effects of the underlying system of populations. The picture below shows the situation without considering the systemic structure. In this and subsequent figures the X marks mean that the particular relationship will not be considered in this formulation.

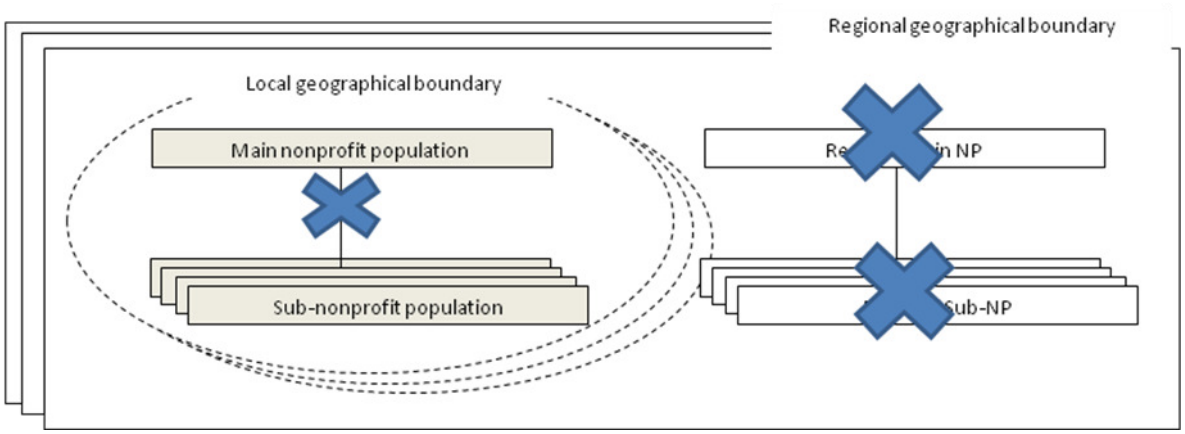

Figure 3.2: classic single population model without considering the hierarchical structure

Based on the above logic, the classic density-dependence theory should then apply on both levels – within the main population and within each of the individual sub-populations. This proposition can easily be backed up by the standard arguments behind density dependence.

Consider the case of charitable nonprofit organizations, for example. As any organizations rooted in nonprofit form having charitable mission start to enter the field, key stakeholders such as donors and nonprofit entrepreneurs become familiar with the form. Potential entrepreneurs get interested in the upside potential underlying the future products and services. Audiences generally start to view such organizations as legitimate forms of organizing mission-related activity different from private counterparts. Thus, legitimation boosts entry to the field in general. However, as the number of organizations grows, resources such as finances, talent and demand for products and services start to become fully exploited by the existing group of organizations. Thus competitive forces set in to hinder the entry of new organizations.

A similar argumentation can be applied for any of the underlying sub-forms of nonprofit organization sector. Of course, here the arguments are somewhat more precise, because one can talk about specific sets of products and demand, as well as more specific audiences that hold stakes and power regarding the focal sub-form.

Based regarding the above, the following hypotheses are presented:

H1a: Main population density has a legitimation (positive linear) and a competitive (negative squared) effect on the rate of entry of organizations to the main population, when the systemic structure of the population is not considered.

H1b: Without being considered the systemic structure of the population, sub-population density has a legitimation (positive linear) and a competitive (negative squared) effect on the rate of entry of organizations to the sub-populations.

The above hypotheses will be used as the baseline for the analysis, and will be refined with additional hypotheses formulated in the following sections.

Formulation 2: Density Dependence in a Hierarchical Identity Space

To incorporate the hierarchically nested structure to the analysis, a starting point is to consider the systemic structure: a single main form with a limited number of sub-forms or populations that are hierarchically nested directly under the main unit. Thus, besides the isolated effects within the main population and the individual subpopulations, are there density-dependent effects that operate across the different levels, hence taking into account the whole underlying structure of the complex organizational form?

The different sub-forms have a systemic relationship to a single main form and thus also to one other. Thus one would expect that the entry of organizations to the subpopulations do not operate in isolation from the main population and the other sub-populations. More precisely, because the individual sub-forms have a hierarchically nested relationship to the main form, we can ask: does the main population have density-dependent effects of legitimation or competition on the entry of organizations into individual sub-populations?

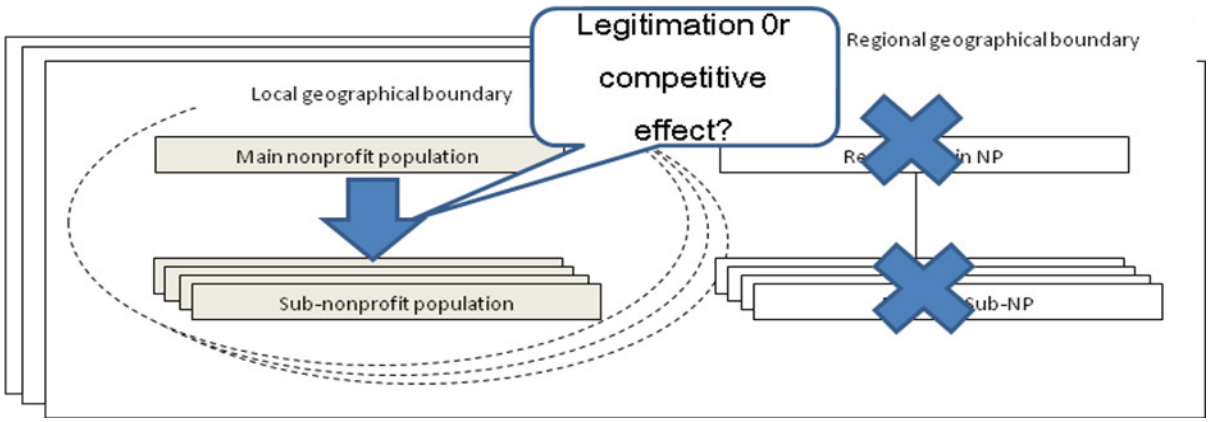

Figure 3.3: density dependence model considering a hierarchical identity effect

The above question relates to the underlying networks of dependence relationships

between the sub-populations and the main population (Lomi, 2000) as well as to the permeability of the internal boundaries of the system in terms of resources and institutions. The main proposition advanced here is that legitimation is more readily transmitted across system boundaries, whereas competition tends to be more tied to resource niches that are specific to individual sub-populations. Thus it is argued that the density of the main population has a legitimizing but not a competitive effect on the entry rates within individual sub-populations. In a similar vein, a study recently showed that established form has positive impacts on foundings of an emergent form through transferring legitimacy because the existing form as the main form has a role in sharing the identity of form already accepted by various audiences (Dobrev et al., 2006). However, extant research has mostly proposed and confirmed similar effects in the context of spatial heterogeneity within the same population (Baum & Mezias, 1992; Hannan, 1997).

To back up the analytical approach, it is briefly noted that complex interdependence relationships exist between organizations (Lomi, 2000; McPherson & Smith-Lovin, 1987). Such interdependencies include access to external resources (Carroll, 1985; Hannan & Freeman, 1977) as well as processes of institutionalization (Carroll & Huo, 1986). The interdependence relationships also define the permeability of boundaries within a system, and thus how the processes of resource access and institutionalization operate across the system boundaries.

In case of legitimation, an organizational form gaining constitutive legitimation means that the form becomes generally known, as well as accepted as the standard structure for organizing a specific type of collective action (Baum & Amburgey, 2002; Hannan & Freeman, 1989). The increasing density has become a standard observable indicator of the legitimation of an organizational form (Baum & Amburgey, 2002; Carroll & Hannan, 1989b; Hannan, 1997). The legitimizing effect of the main form on a hierarchically nested sub-form depends on the legitimation of the main form itself, as well as how the sub-form is associated to the main form. According to the identity approach to organizational form, audiences associate organizations into forms (or collective identities) based on the organizations' conformity to the associated rule-like identity codes (Hsu & Hannan, 2005). The members of a sub-form are implicitly accepted also as members of the main form. In other words, conformity to the codes associated with the sub-form also guarantees conformity to the (less uniform) codes associated with the main form. Thus, from the perspective of taken-for-granted legitimation, the sub-forms are directly associated with the main form.

According to the above logic, the legitimation of the main form will have a positive

effect on the legitimation of the sub-form. Indeed, when knowledge concerning the general organizational type represented by the main form spreads and it becomes generally accepted, the viability of all organizations representing the main form is increased – including the nested sub-populations. It generally becomes easier for all organizations representing the general form to mobilize resources of different kinds. Additionally, potential entrants find it more advantageous to replicate the existing form in entering the organizational field. These effects naturally benefit the underlying sub-forms. Thus, following the basic density-dependence argument, besides the density of the sub-form itself, the density of the main population should also positively affect the legitimation of the sub-form. Thus the density of the main form will also have a positive effect on the entry rate of organizations to a sub-population.

Consider competition next. Density-dependent diffuse competition within an organizational population is driven by the process by which organizations indirectly compete for resources from their common environmental niche (Barnett, 1990; Barnett & Carroll, 1987; Hannan, 1997; Hannan & Freeman, 1977, 1989). Key external resources to organizations include demand for their products and services, skilled labor, raw materials, facilities, financing, and so forth. By definition, the organizations within a single population are dependent on the same set of resources, i.e., they occupy the same niche in their environment. However, the different sub-populations under a main population generally do not occupy entirely the same ecological niches. For example, a complex main form may be defined by a common scientific or technological base or some other non-product market resource environment. The underlying simpler sub-forms may again be driven by different product or service markets even though they share the collective common identity of the main population. In other words, in the case of demand for products and services that represent resources critical to organizations, the different subpopulations clearly occupy non-overlapped space in the sets of resources. This is comparable to a situation where the sub-populations under a spatially distributed main population depend on different, localized sets of resources (Lomi, 1995b). The European automobile industry has been used as an example of this, as illustrated by its nationally bounded sub-populations and demand for automobiles (Hannan, Carroll, Dobrev, & Han, 1998; Hannan, Carroll, Dobrev, Han et al., 1998). In a similar vein, community ecology theory suggests that organizations have the mutual and symbiotic relationships of functional complementation, which means sub-populations support each other or the outputs of one population are used as critical resources of other populations (Baum & Amburgey, 2002; Baum & Korn, 1994; Blau & Rabrenovic, 1991; Freeman &

Audia, 2006; Hawley, 1950)

It should be noted that the resource niches of individual sub-populations may be partially overlapping, which is referred to as symbiosis (Hawley, 1950). For example, different sub-populations may serve different markets but share a common dependence on finance or employees with a specific type of expertise. However, this represents only part of the competitive space of the related organizations, and the general difference between the resource niches remains. Because the different sub-populations underlying the main population represent a diverse overall set of resource niches, one really cannot say that all sub-populations under the main population will exert a competitive effect on the organizations within an individual sub-population. Using the charitable nonprofit sector as an example, consider education-related nonprofits on one hand and human service nonprofits on the other hand. The target customers and demand for products and services of these organizations do not overlap in practical terms. On the contrary, these two forms might even have a mutualistic relationship in terms of creating products and services as inputs to each other within the sector (Hannan & Freeman, 1977; Hawley, 1950; Korn & Baum, 1994). In addition, there can be several resource niches under the main form with non-exhausted carrying capacities (Carroll & Hannan, 2000; Hannan & Freeman, 1989). Discoveries of new service areas or resources increase carrying capacities without any harmful effects on the existing organizations. Thus the addition of new organizations to such sub-populations doesn't necessarily consume the resource space of the other sub-populations at all. A good example of this involves HIV/AIDS-related nonprofit organizations, which have emerged significantly later than many other sub-fields (Chambre, 1999; Chambre & Fatt, 2002; Lune & Oberstein, 2001). Those organizations influenced and developed the new emerging policy of HIV/AIDS prevention and health, then helped expand financial resources and customers which were not included in the existing nonprofit areas.

Based on the above, it is proposed that the density of the main form does not have a direct effect on the density-dependent competition within a sub-population. Thus the density of the main form does not have a competitive effect on entry rates within subpopulations. The combination of the above legitimating and competitive processes yields the following hypotheses:

H2a: When the systemic structure of the main population is considered, main population density has a legitimation (positive linear) but not a competitive (negative squared) effect on the rate of entry of organizations to the subpopulations.

H2b: When the systemic structure of the main population is considered, sub-population density has a legitimation (positive linear) and a competitive (negative squared) effect on the rate of entry of organizations to the subpopulations.

While the competitive effects on organizational entry should be mainly contained to the sub-population level, effects of density-dependent legitimation are assumed to originate both from the focal sub-population itself and from the main population. If so, how do the legitimation effects of these two levels differ? Where does the majority of the legitimizing power originate from? In the geographical domain, extant research has found local density to have the greatest effect on density-dependent legitimation (Cattani et al., 2003; Greve, 2002a). The argument is based on spatial proximity. In other words, network ties, social interaction, information sharing, and the number of personal contacts between geographically close actors are strongest. Thus the effects of constitutive legitimation are most prevalent at the local level (Cattani et al., 2003). This may be an argument for a homogeneous population.

However, the logic is not directly applicable to the domain of complex organizational forms where the level of social interaction and the permeability of system boundaries is not defined by physical distance. The members of a sub-population may be geographically scattered while still holding a common identity and form. Similarly, the members of a geographically agglomerated group of firms may represent several different sub-forms even though they belong to the same main form.

In this study, a somewhat different effect is proposed for the context of complex organizational forms. It is argued that the main population density will have a stronger legitimation effect on sub-population entry than the density of the sub-populations themselves. According to Hsu et al. (2005), the origins of this effect lie in several mechanisms and structural properties that are prevalent in heterogeneous populations characterized by complex organizational forms.

The first mechanism lies in the use of linguistic labels. Extant research has shown how linguistic labels appear for sociologically real categories (Hsu & Hannan, 2005). The existence of such labels fosters the taken-for-granted legitimation of forms because audiences find it easier to distinguish the forms from other units in the social world, and this also makes them generally more accessible (DiMaggio, 1997; Hannan, 2005; Hsu & Hannan, 2005). Linguistic labels also facilitate communication related to the forms, thus leading to more acceptability of the forms (Hsu & Hannan, 2005). In the context of complex organizational forms, the sub-forms and sub-populations of the system hold separate, though related,

collective identities and thus labels. In the case of nonprofit charitable organizations, this is illustrated by labels that are classified with service areas that organizations serve, such as ”human service nonprofits, or “environmental nonprofits.” However, very often social actors simplify communications and other social interaction by replacing sub-form labels with the main form label. Thus, general communication by several audiences – general public, media, investors, and the like – may use the word “nonprofit organization” instead of the sub-form labels.

A good example of this can also be found from extant nonprofit organization and management research that has been published. Although a majority of the studies concentrate on specific nonprofit organizations, the word “nonprofit organization” as a collective identity is used (Boris & Steuerle, 2006; DiMaggio & Anheier, 1990; Gronbjerg & Paarlberg, 2001; Saxton & Benson, 2005). In other words, the institutionalization of the general nickname of the nonprofit form is applied for all organizations in the ostensible nonprofit sub-sectors. Such simplification and label-replacing also makes the institutionalization effects of the main form stronger relative to sub-form labels. Whenever communication and other social interaction takes place related to any of the sub-forms, very often the main form label is used, and thus the institutional effects spill over to the whole main form and to the other nested sub-forms as well (Dobrev et al., 2006; Hsu & Hannan, 2005).

The second mechanism relates to absolute levels of density -- the sheer number of organizations. By definition, the density of a sub-population is restricted to a potentially much smaller scale than the density of the main population. This means that the legitimizing effect of density cannot by definition be as high for the individual sub-populations as for the main population. Combined with the increased use of the main form label in communication and interaction, it is obvious that the density of the whole main population should show stronger legitimation effects than the densities of the individual sub-populations.

Third, Dobrev et al. (2006) list several ecological processes at different levels of analysis by which emerging organizations gain constitutive legitimation. In their analysis, the processes that operate at higher levels of aggregation are likely to have a stronger and more profound effect on constitutive legitimation than those that take place at lower levels. At the highest level of populations, the emerging population benefits from a key process in promoting legitimation, which the authors call “identity transfer,” because both populations share identity space with audiences.

Furthermore, other processes for developing cognitive legitimation exist in the real world, such as promotional activities through third parties that include the media, industry

associations, and trade associations. Such promotional efforts are likely to have more profound effects at the level of the main form than at lower levels. In the nonprofit arena, for example, several powerful nonprofit associations exist that serve as collective advocates for the whole industry, even though they are not public charities. Examples within the Florida context include FANO (Florida Association of Nonprofit Organization) and the Nonprofit Center of Northeast Florida**.** None of these major associations are focused to promote a specific subfield of nonprofits, but the field in general. Clearly, the institutionalization efforts at the levels of individual populations or sub-forms – symbolic language/behavior and developing dominant designs, respectively (Aldrich, 2001) – are less likely to have as much impact on general cognitive legitimation as the processes at the level of the main form.

Finally, as described above, the legitimation processes operating at the system of organizational forms does not feature similar proximity-based local proliferation of network ties and communications relationships as in the geographical context. This makes the other processes described above more salient in the context of organizational forms, and thus shows a lower legitimizing power of local or sub-unit density vis-à-vis the geographical context.

Thus the following hypothesis can be formulated:

H2c: The effect of density-dependent legitimation on sub-population entry is stronger for main population density than sub-population density.

Formulation 3: Density Dependence in Geographical and Identity Hierarchy

The systems approach to heterogeneous populations characterized by complex organizational forms (identity) can be taken one step further by considering the differences of geographical aggregation (location). In other words, the effects of identity space might be also different by the geographical location and its hierarchical system – multilevel geographical boundary (Hannan, 2005). Even though they may be different and separately labeled in terms of identity, the collective identities of some sub-forms may be closer to each other than the rest by differences of geographical locations – by geographical clusters (Wezel, 2005). This may be clearly visible in public charities. For example, a number of nonprofit sub-forms including health, human services, education, etc. may form a larger group with the common property of offering local community development or preservation activities in a

specific geographical boundary. Such geographical boundaries would be a county or a regional boundary over several counties.

How does the introduction of the clustering level affect predictions of density-dependent legitimation and competition in terms of geographical hierarchy? Unlike the above hypothesis assuming the local level of geographic boundary, the regional density should be considered at the two levels of identities – legitimating and competitive effects of regional main population density and regional sub-population density on the entry rates of sub-populations.

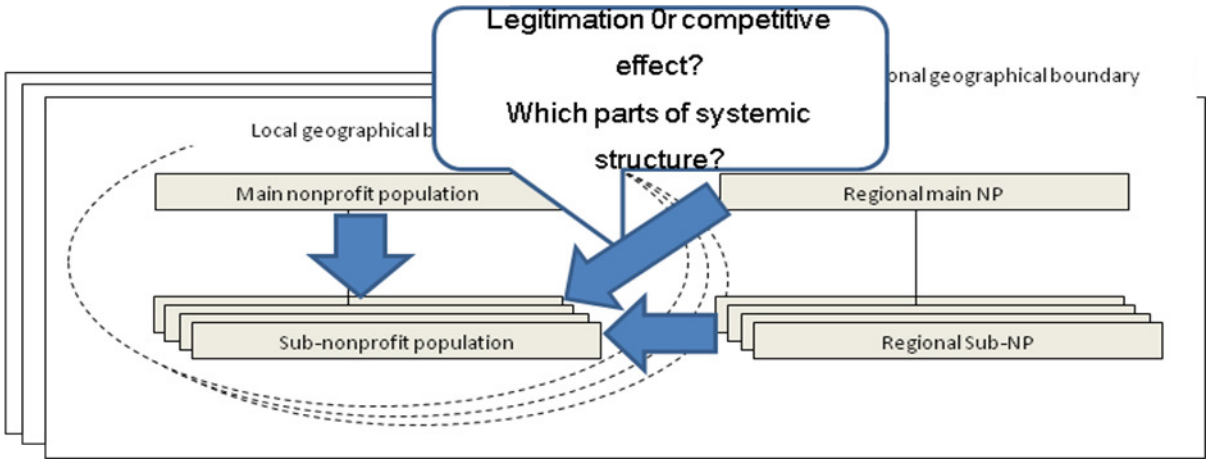

Figure 3.4: density model considering a hierarchical identity and geographical effect

Consider first legitimation. The earlier sections provided a detailed elaboration on how effects of density-dependent legitimation on sub-population entry originate from two levels of aggregation: the main population and the sub-populations themselves. Given the mechanisms by which the legitimation effects at the two levels unfold – legitimation-transferring effects from the upper level to lower level -- it is a logical consequence that even the geographically clustered density should have a density-dependent legitimation effect on sub-population entry in the lower geographical boundary also. Of course the identities of the geographically clustered sub-populations are closer or similar to each other, but this should not make the legitimizing effect of the cluster density nonexistent. Thus it is proposed that cluster density has a density-dependent effect of legitimation on entry rates in those sub-populations that are members of the geographical cluster.

Turn next to competition. In the simple two-level hierarchy, strong competitive effects are proposed to be present at the sub-population level within lower geographical boundary. The reason for this was that ecological competition is essentially diffuse

competition of resources from the environment and thus limited only among those organizations that share the same environmental niche – narrower niche space. It was noted that for a complex main organizational form, individual sub-populations are likely to differ from each other in terms of their resource niches (most notably demand for specific types of products and services). Thus density dependent effects of competition would be insignificant at the main population level, unless a severe resource constraint affected all member organizations equally. Following the similar logic, to determine the competitive effects of geographically clustered-density, the key question becomes how similar the niches of the constituent sub-populations by the different geographical boundaries are. Are the niches similar enough to generate competitive pressures across the sub-populations at high densities? The clusters (regional boundaries) are typically defined by broader areas above a specific local boundary, such as "northeastern region" or "southeastern region," which governments have used for inter-governmental activities or nonprofit foundations use to define their service boundaries. The sub-populations within a cluster are dependent on the same, though rather broadly defined, demand for products and services. As mentioned before, there are certain types of environmental resources on which *all* sub-populations are commonly dependent. Such common resources include technological know-how, educated experts, private investors, and the like (McPherson, 1983; McPherson & Smith-Lovin, 1987). Given the above, it is assumed that the organizations and subpopulations within clusters hold similar resource niches to produce a regional density-dependent effect of competition. This competition will affect the rates of entry of organizations to the constituent sub-populations.

Thus it can be hypothesized:

H3a: The geographically clustered (regional) density of both main population and sub-populations has a legitimation (positive linear) and a competitive (negative squared) effect on the rate of entry of organizations to the sub-populations that are members of the cluster.

A final point of interest is the relative strength of the legitimizing and competitive effects of the cluster level density. Are these effects likely to be stronger or weaker than those of the individual sub-population densities at the lower level? As for legitimation of multilevel population studies in terms of geographical difference, it has been earlier proposed that higher level population density will have a stronger legitimizing effect than population density at the local level (Baum & Mezias, 1992; Wezel, 2005). This effect has been explained through several mechanisms, including the use of linguistic labels, more powerful

legitimizing efforts at higher levels, as well as the geographical concentration of interaction relationships. Even in this study, most of these arguments can quite readily be used in proposing a similar effect strength argument for the cluster level density. Most notably, the absolute densities of clusters are clearly higher than those of the lower level sub-populations, which signal favorable conditions. Thus the legitimation effects are likely to be higher. The linguistic effect is also likely to be present, as well as the collective inter-industry legitimization efforts suggested by Aldrich and Fiol (1994). Indeed, it is presumed that the sub-populations belonging to a single cluster are likely to engage in collective promotional and political efforts to promote the legitimacy of their common field. Also, the use of common language as well as the creation of dominant designs are likely to occur at this level. In addition, the geographical concentration of interaction argument applies here.

For competition, it is proposed that the effect is generally stronger for sub-population density than cluster density. This follows logically from the fact that the organizations within a sub-population are dependent on virtually the same resource niche, whereas the niches of the sub-populations within are likely to differ to a greater extent. Because ecological competition is caused by firms trying to exploit a common set of limited resources, this kind of competition is likely to be stronger within local sub-populations than clusters.

Thus it is hypothesized:

H3b: The effect of density-dependent legitimation on sub-population entry is stronger for regional density than local density of individual sub-populations.

H3c: The effect of density-dependent competition on sub-population entry is stronger for local level of sub-population density than regional density.

CHAPTER 4

REARCH DESIGN AND METHODOLOGY

To test the hypotheses of entry in multilevel heterogeneous populations – in terms of form and location, a wide array of sources have been triangulated to compile a comprehensive dataset that covers the entire nonprofit organization sector by counties in Florida between 1994 and 2007. Using the collected data, the current and historical developments of nonprofit organizations in Florida counties will be described. The present chapter describes the data and methods used; it is organized into three sections. First, the process of data collection is described. This is followed by a description of the variables used, including related descriptive statistics. The final section describes the modeling approach used in testing the hypotheses.

Data and Nonprofit Organizations in Florida

Data In nonprofit organizational research, existing studies of the nonprofit sector have concentrated on a single segment (Bielefeld & Murdoch, 2004; Gronbjerg, 2001; Salamon, 2003; Twombly, 2003), such as art organizations, day care centers, human service organizations, or an aggregated number of nonprofits (Gronbjerg & Paarlberg, 2001; Saxton & Benson, 2005). However, given the objectives of the present study, the aim is to include a wide array of nonprofit subsectors or populations that cover all relevant mission areas within the Florida nonprofit sector. Only nonprofit charitable organizations that provide mission-related services directly to the public are included in the analysis. In other words, non-charitable nonprofit organizations and nonprofit foundations which support charitable organizations or fundraising activities are excluded. In this study, therefore, empirical setting of organizational populations is referred to as "operating" organizations.

The geographic unit of analysis of interest for empirical tests of the study is the county[4] in Florida. Making a complete list of populations is the most important work in

[4] In this study, the county is a unit of analysis, although most studies of the nonprofit sector have relied on metropolitan-level data. County-level data have many advantages. First, there is a broad range of demographic, social, political, and economic data available at the county level. For this study, environmental conditions can be controlled more precisely. Second, counties in states are playing an increasingly important role in the planning and implementation of many public policies. Metropolitan Statistical Areas (MSAs), while they offer many unique forms of

ecological studies. The data collection process is staged into several phases. The first phase involved the identification of all nonprofit charities that have operated in Florida during the period 1994 to 2007. Data regarding nonprofit organizations in Florida have been derived from organizational data files (Core File) maintained by the National Center for Charitable Statistics (NCCS). The data files include a population of all 501(c)(3) operating organizations with $25,000 or more in annual gross receipts that filed Form 990 returns with the IRS for all of the years from 1994 to 2007. In addition, the NCCS has verified portions of the files[5] and added other useful information to them (such as NTEE[6] and FIPS county codes). The ten NTEE major categories will be used to identify the sub-populations under the main nonprofit population[7]. However, the data do not always provide current information about each organizations' status – whether it has deceased or is still in business. This may cause our analysis to drop organizations that have not reported to the IRS but are still being active in their communities. In contrast, the files may occasionally include organizations that are now deceased.

As the second stage, checking active and inactive organizations was accomplished by using data collected by the Division of Corporations under the Florida Department of State. Under state law the Division requires all corporations to register the status of organizations annually. These data represent the broadest and most comprehensive list available to build the historical development of nonprofits in Florida. Thorough checking the two data sources, the

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census data, often lack governmental structures that correspond to the MSA as a whole. Thus counties as the unit of analysis are preferred here because their governments can be construed as having direct legitimation and resource supply effects for the geographic environments they represent. Finally, analysis at the county level allows us to retain many metropolitan-level differences. Although metropolitan areas more accurately represent economic patterns of commerce and employment, they appear to less reliably capture differences in community dynamics, particularly where they include large rural areas. Studies using counties as the unit of analysis might be more responsive to socioeconomic characteristics than at the metropolitan level (Gronbjerg & Paarlberg, 2001).

[5] Further information about these files can be obtained from the NCCS, and extensive discussion and documentation is contained on the Web site (http://www.nccs.urban.org).

[6] The National Taxonomy of Exempt Entities (NTEE) code is a definitive classification system for nonprofit organizations recognized as tax exempt under the Internal Revenue Code. These charitable organizations are exempt from federal taxes because of their religious, educational, scientific, and public purposes.

[7] A category of organizations is decided by different audiences. First, each organization reports their mission areas to IRS according to organization's mission statement and activities. This is the perspective of internal audiences according to the identity approach. Second, the NCCS researchers confirm or reclassify a category of organization with the descriptions of activities and service areas that organizations reported. This functions as the perspective of external audiences. Therefore, the categories are appropriate for this study. Further information from the NCCS, and extensive discussion and documentation is contained on the Web site (http://www.nccs.urban.org).

final data set includes more nonprofit organizations than the NTEE files, because the Division data include organizations that have not reported to the IRS but are still active in their communities. By combing the two data sources, therefore, the current study greatly enhances the reliability and validity of data used in this analysis.

Nonprofits in Florida Whether or not people recognize the importance and existence of these organizations, a nonprofit sector has played important roles to provide public services in our daily lives. Many scholars have discussed the concept of public goods being provided by nonprofit actors and organizations. In fact, nonprofit organizations have had long and deep historical roots tracking back to the Revolution periods in the United States (Hammack, 2002). Beyond the service provision, the nonprofit sector has played crucial roles as value guardian, advocacy and problem identification, and creating and maintaining social capital (Salamon, 2003). Under the tradition of the non-distribution principle, this sector has been devoted to improving private initiatives for the common goods or special needs, which are not met by both the public and private sectors (Young, 1998).

The status of the nonprofit sector in Florida is very distinct in two aspects. First, Florida is one of the fastest growing states in the number and size of nonprofit organizations (Salamon, Geller, & Sokolowski, 2008). In spite of scholars' gloomy prediction for the future of nonprofits in general, the nonprofit sector in Florida has increased rapidly in both the number and the size of organizations during the past decade. According to 2008 NCCS data (National Center for Charitable Statistics)**,** Florida is one of the fastest growing states in the number of non-profits that registered with the IRS (Internal Revenue Service). In 1995, the total number of nonprofits registered was around 38,000. However, in 2008 70,668 nonprofits were registered, including foundations, non charitable, andcharitable nonprofits, which means a growth of 83.0 % by comparison to 1995. During the time period between 1995 and 2007, Florida's average growth rate was 4.51%, ranging from 1.31% to 8.75%, while the national average was 2.62%. It is also noteworthy that yearly growth rates fluctuated considerably.

Second, during the past years, Florida experienced rapid changes in its socioeconomic environment. Between 1990 and 2000, the population of Florida grew more than 23 percent faster than most states, and this growth has continued into the present. Between 2000 and 2004, in fact, the population growth rate in Florida was twice that of the nation, and this growth had been projected to extend for the foreseeable future. As a consequence, according to 2007 projections[8], Florida was expected to become the nation's

[8] See Enterprise Florida's "Florida Demographic Overview," June 14, 2007, from http://edr.state.fl.us/pre

third largest state by 2010, surpassing New York. According to the demand and supply arguments that have been used for explaining the existence of the nonprofit sector (Salamon, 2003) ,such rapid growth should influence the founding patters of survival of nonprofit organizations. That is, rapid growth means rapidly increasing demands not only for infrastructure such as schools, roads, and housing, but also for a wide assortment of human services, ranging from child care to nursing home care, and from education to health. This is particularly so in view of the fact that Florida has a 25 percent larger proportion of elderly residents than the nation as a whole. This rapid change in socio-economic environment characterizes the nonprofit sector in Florida.

Table 4-1: The Operating Nonprofits in Florida in 1994-2007 – Entries, Deceased, Density

Year	Florida Total			County Average		
	Entries	Deceased	Density[9]	Entries	Deceased	Density
1994	2,516	286	30,323	38	4.3	453
1995	1,395	372	31,502	21	5.6	470
1996	1,637	399	32,859	24	6.0	490
1997	1,778	409	34,408	27	6.1	514
1998	2,147	454	36,263	32	6.8	541
1999	3,150	558	37,963	47	8.3	567
2000	2,064	614	39,714	31	9.2	593
2001	2,454	671	41,761	37	10.0	623
2002	2,675	752	44,025	40	11.2	657
2003	2,487	819	45,973	37	12.2	686
2004	3,546	896	47,835	53	13.4	714
2005	2,002	1,046	49,075	30	15.6	732
2006	2,247	1,088	50,497	34	16.2	754
2007	2,256	1,226	51,794	34	18.3	773
Average	2,311	612	40,999	34	10.0	685

During the observation period 1994-2007, the charitable operating nonprofits showed rapid growth. Table 4-1 shows the yearly trends of nonprofit organizations. The yearly entry

-sentations/recentpresentations/Demographic%20Overview.pdf; and Florida's Office of Economic and Dem -ographic Research's "Florida Demographic Summary," retrieved November 26, 2007 from http://edr.state .fl.us/population/popsummary.pdf. Recent effects from the current economic recession suggest that these earlier projections may not be sustained, and some forecasters now back away from claims about repla-cing New York as the third largest state.

[9] Density is the total number of organizations that exist in a certain niche space. In this study, density is the total number of operating nonprofit organizations in a county last year. Entries are the number of newly founded organizations. The formula is as follows: density = the previous density + new entries – deceased organizations.

rates fluctuate, while the overall density pattern reveals an increasing curve. The number of deceased organizations is highly related with the number of entries. In Table 4-1, county average values should be interpreted very cautiously because considerable variation exists.

Under the conception of the "whole nonprofit sector," the sector is characterized by various sub-fields and salient differences between their organizational forms. In particular, several distinct market areas can be identified, some of which are seemingly unrelated. However, all relevant audiences associate the sub-nonprofit populations to the main nonprofit form at the certain aspects. In other words, subpopulations can be dissected under the whole nonprofit sector.

To study density-dependent entry in the heterogeneous population represented by the nonprofit sector in Florida, the sub-sectors were operationalized into 10 sub-forms. As mentioned above, the NTEE classification system is used as a basis for defining the sub-forms. However, a modification in the NTEE classification system has been made. Specifically, Mutual Benfit Nonprofits and Unclassified Nonprofits will not be analyzed statistically. Both of these populations have no distinct missions with the potential to create legitimacy in their own right; they are essentially miscellaneous categories for which I expect no theorized relationship to the sector as a whole or to other mission areas. In other words, compared to other categories, the two categories have unclear identities. Therefore, to maintain consistency with the NTEE classification system and include all organizations that may influence the population dynamics, these two groups of nonprofits are counted in the main population of nonprofits in Florida, but will not be analyzed in the statistical testing models that involve sub-sectors. In addition, the Mutual Benefit Nonprofit population is too small to have practical relevance for the statistical analysis.

The related sub-sector populations have developed through differential evolutionary paths. Table 4-2 and 4-3 below show the annual level densities and entry rates of the ten sub-nonprofit populations, respectively. From Table 4-2, it can be noted that the sizes of the different sub-populations vary substantially, as well as their temporal paths of evolution. While showing the increasing curves in the growth of all sub-populations, overall patterns show considerable slowdown after 2004. The entry rates shown in Table 5-3 show very substantial levels of annual variation.

Table 4-2: Densities of the Sub-Nonprofit Populations in Florida 1994-2007

Year	Art/Culture NP	Education NP	Environment NP	Health NP	HumanService NP	International ForeignAffairs NP	PublicBenfits NP	Religious NP	MutualBenfits NP	Unclassified NP	Sum
1994	2,438	4,659	880	2,562	5,740	271	3,219	8,803	55	471	30,323
1995	2,563	4,797	949	2,694	6,084	296	3,368	9,030	54	488	31,502
1996	2,689	4,935	1,020	2,791	6,405	312	3,486	9,337	56	471	32,859
1997	2,815	5,097	1,070	2,899	6,806	339	3,656	9,663	59	455	34,408
1998	2,936	5,283	1,145	3,009	7,282	359	3,907	9,983	61	443	36,263
1999	3,071	5,550	1,238	3,115	7,746	402	4,188	10,450	66	437	37,963
2000	3,231	5,754	1,329	3,238	8,196	438	4,381	10,890	68	438	39,714
2001	3,375	5,991	1,413	3,373	8,655	480	4,568	11,353	71	435	41,761
2002	3,542	6,253	1,529	3,528	9,312	534	4,754	11,788	74	447	44,025
2003	3,739	6,528	1,643	3,681	10,015	581	4,976	12,342	73	447	45,973
2004	3,883	6,819	1,753	3,822	10,578	621	5,154	12,814	75	454	47,835
2005	4,042	7,058	1,846	3,947	11,165	664	5,332	13,238	79	464	49,075
2006	4,121	7,197	1,898	4,015	11,547	708	5,472	13,565	78	474	50,497
2007	4,223	7,344	1,991	4,143	11,964	747	5,629	13,893	88	475	51,794

Table 4-3: Entries of the Sub-Nonprofit Populations in Florida 1994-2007

Year	Art/Culture NP	Education NP	Environment NP	Health NP	HumanService NP	International ForeignAffairs NP	PublicBenfits NP	Religious NP	MutualBenfits NP	Unclassified NP	Sum
1994	234	275	114	268	729	46	269	544	3	34	2,516
1995	150	159	77	130	374	17	147	329	2	10	1,395
1996	165	181	59	169	470	28	217	343	3	2	1,637
1997	161	212	94	168	515	24	259	341	2	2	1,778
1998	176	289	103	174	538	40	302	515	5	5	2,147
1999	300	378	144	273	867	72	351	749	2	14	3,150
2000	185	281	88	167	552	45	227	505	5	9	2,064
2001	211	296	128	223	771	50	246	512	3	14	2,454
2002	239	317	136	234	800	51	274	616	1	7	2,675
2003	192	321	129	207	749	45	239	589	3	13	2,487
2004	309	411	159	298	1,103	89	347	811	6	13	3,546
2005	157	224	88	175	606	55	219	461	2	15	2,002
2006	185	247	124	195	709	47	238	491	8	3	2,247
2007	189	286	131	195	636	52	309	438	8	12	2,256

Variables

Dependent variable. Following existing ecological research, the dependent variables used in modeling entry into Florida's nonprofit sector were the entry rates of nonprofit charitable organizations, specified at the county-level, for the main population and the individual sub-populations of nonprofit organizations. Considering the standard convention, the entry data are pooled into annual levels and thus the variables measure annual rates. The data cover entry rates between 1994 and 2007. The entry rates of the ten sub-populations were pooled together for fourteen years. The pooling is necessary for capturing the effects among and across the whole system of populations composing nonprofit communities over the time period.

Independent variables. As for the independent variables, it has become customary in ecological research to measure the effects of legitimation and competition in terms of density – the number of organizations within a population. To test whether the relationship between density and entry rates takes the shape of an inverted U, both the linear and the squared versions of the density variable were included. The simultaneous estimation of parameters for both linear and squared density variables allows for the non-monotonic U-shaped relationship between density and entry rates. This is the most straight-forward way to test the effects of legitimation and competition. If the theory holds, the linear and squared density variables would be significant and have positive and negative signs, respectively.

The density variables used in this study are specified at the different levels of analysis – in terms of hierarchically nested forms (identity) and geographical aggregation (location). Based on the systems approach to organizational forms, a hierarchical structure is assumed with the sub-populations nested directly under the main population. In this system, therefore, density is specified at two levels: main and sub-population density. After this, another type of computation is considered for other models, yielding a system where main and sub-populations appear hierarchically nested by geographical boundary. In this systemic structure, the population densities – both main and sub-populations – are nested under the aggregated clusters by regional boundaries and the clusters again under the whole (state). For example, the county levels are nested under the regions and the regions again under the state. The density variables are pooled by geographical boundaries to test the hypotheses about the hierarchically nested populations by geographical location. This geographical aggregation is based on the geographical identification that has been commonly used by the "audiences"

with the potential to assert legitimacy effects – the 67 counties[10] at the local level under the regional boundaries (8) [11] for the density dependence effects of geographical heterogeneity. Thus, density aggregated by the eight regions in this study is also included as an independent variable.

Control variables. For this study, the control variables can be classified into two categories. First, there are several ecological variables used in the estimation of density dependence models. Following extant density-dependence research (Cattani et al., 2003; Hannan, 1997; Wezel, 2005), entries from the previous period is included to control for the endogenous effect. In a similar vein, the linear and squared number of deceased organizations for the previous period will be considered. According to the density models, exit organizations release the resources and niche space available for new entrants (Amburgey & Rao, 1996; Hannan & Freeman, 1989; Nickel & Fuentes, 2004). Excessive exit rates of organizations, however, signal harsh conditions for potential entrants. Therefore, the relationship between organizational death and entry would be non-monolithic. In other words, certain numbers of deceased organizations would promote entry of organizations, whereas excessive exit rates would suppress new foundings of organizations. Organizational ecologists have determined that a dynamic constituting "excessive exit rates" – which signals a sufficient number of deaths to begin to suppress new foundings -- is best expressed in formulaic terms as a squared term. This dynamic is captured figuratively in the downward slope in the inverted U shape.

[10] From a focus group conducted with CEOs of Nonprofit Management Support Organizations (MSOs) from around the state in October 2009 I have concluded that most nonprofit CEOs and workers identify as the organization's primary service boundary the city/county where the organization is located. When they were asked about actual service boundary, the focus group participants emphasized regional boundaries over the city or county. MSA might therefore be more appropriate in some respects. However, charitable nonprofits have their roots in their local areas at the time of the organization's birth and also in relating to resources. MSAs do not cover large rural areas that may adjoin the metropolitan area.

[11] It is very difficult to set the geographical boundary for the effects of spatial heterogeneity. Hannan and other ecologists (Carroll, Bigelow, Seidel, & Tsai, 1996; Cattani et al., 2003; Hannan, Carroll, Dundon, & Torres, 1995) have defined different geographic entities by various criteria. The examples are national boundary, provinces, and MSAs. The common condition is whether geographical entities are distinct or relatively autonomous to each other, thus being used commonly by the public. In this study, eight regional boundaries will be used to calculate regional density. Furthermore, the eight regional boundaries are very common in making the administrative structure of regional partnership among local governments or even among private companies. Therefore, the study tests for the first time whether the eight regional units are appropriate in Florida nonprofit case.

Second, there are variables from both "supply side" and "demand side" explanations, based on economic theories which have been applied to explain the existence and phenomena of nonprofit organizations (Ben-Ner & Van Hoomissen, 1991; Galaskiewicz & Bielefeld, 1998; Gronbjerg & Paarlberg, 2001). Economic and socio-demographic factors -- local government expenditure, county population, education, median household income, poverty, racial configuration, etc. – have been used for either supply or demand variables. As the supply side variables, wealth or other resources – financial and human resources - have been assumed to influence the size and composition of nonprofit sectors because those factors serve to increase the supply of resources that can be mobilized by public or nonprofit entrepreneurs to found and sustain new organizations (Bielefeld, 2000; Corbin, 1999; Gronbjerg & Paarlberg, 2001; Saxton & Benson, 2005; Wolch & Geiger, 1983; Wolpert, 1993b) . In terms of the demand side variables, certain environmental contexts have been suggested as inherently increasing the demand for nonprofit services, such as the size of the community population and the lack of financial resources (Corbin, 1999; Gronbjerg, 2001; Gronbjerg & Paarlberg, 2001; Twombly, 2003). It is recognized that the stability or instability of resource conditions is extremely important to the birth and survival patterns of organizational populations. The economic control variables described here are consistent with other population ecology studies (Carroll & Hannan, 2000; Hannan & Freeman, 1989).

As one of the socio-economic factors, government spending has been the most contentious topic. Based on public goods theory and market/government failure theory, various studies have suggested the opposite arguments -- expanding the roles of government leads to a decreasing nonprofit sector or that nonprofit organizations have a supplementary role to fulfill the demand for public goods that cannot be provided by the government or market (Ben-Ner & Van Hoomissen, 1991; Liebschutz, 1992; Young, 2000). However, partnership theory explains that the relationships between the two sectors is essentially cooperative and complementary, thus showing a positive relationships between government spending and the size of the nonprofit sector (Bielefeld, 2000; Marcuello, 1998; O'Neill, 2002; Salamon & Anheier, 1997, 1998; Saxton & Benson, 2005).

In addition to the ecological variables, the following control variables will be included. First, median household income will be used to measure the wealth of the county in terms of financial resources. Higher educational attainment, measured by the population percentage that possesses at least a college degree in the county for those over age 25, is likely related with nonprofit size in terms of human resources as a supply factor. The availability of human and financial resources is positively related to the growth of a county's

nonprofit sector, although higher levels of wealth have been suggested by several studies as decreasing the needs for nonprofit services (Bielefeld, 2000; Corbin, 1999; Gronbjerg & Paarlberg, 2001; Saxton & Benson, 2005; Twombly, 2003; Wolch & Geiger, 1983; Wolpert, 1993b). Second, community population variables will be included: population, population change, and population density. Those variables are expected to contribute to growing needs for nonprofit services (Ben-Ner, 2002; Ben-Ner & Van Hoomissen, 1991; Salamon, 2003; Saxton & Benson, 2005). Population change is the percentage change in the population of the county. Population density is measured by population per square mile. Third, poverty is measured by the percentage of individuals below the poverty line each year to capture the community's economic status.

From a demand side explanation higher poverty level is expected to have a positive relationship with the growth of nonprofit charities. Racial heterogeneity is also included as a demand side indicator of the desire for diverse nonprofit services. It will be measured in this analysis by the index of diversity[12], developed by Gibbs and Martin (Gibbs & Martin, 1962), using census data on the percentage of racial groups comprising 8 categories[13] of the population. A perfectly homogeneous population would have a diversity index score of 0. A perfectly heterogeneous population would have a diversity index score of 1.

In this study, the percentage of residents 65 years of age and older will be included, also. The age group of the community has been found to be active in sustaining civil society as well as representing the main consumers of the services delivered by voluntary social service organizations (Saxton & Benson, 2005; Wolch & Geiger, 1983). Therefore, a high percentage of residents 65 years and over would be expected to contribute to the growth of nonprofit organizations.

Finally, local government spending will be included, as measured by total local government expenditure for human services, culture and recreation. The relationship between the government spending and nonprofit entry is not conclusive. As mentioned above, either negative or positive direction may be possible. Table 4-4 shows all variables and data sources.

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[12] Racial heterogeneity is measured by scores between 0 and 1 for each county by the following equation. This is the most common index to measure racial diversity.

$$D = 1 - \sum_{i=1}^{N} p_i^2$$

p= proportion of individuals or objects in a category
N=number of categories

[13] The categories are classified by ethnic origin code (Non Hispanic/Latino origin, Hispanic/Latino origin) and four racial codes (White, Black, American Indian/Alaska Native, Asian/Pacific islander), composing eight categories.

Table 4-4: Variables and Data Sources

Variables		Sources
Organizational founding		Calculated from the following sources. -BMFs(Business Master File) from NCCS(Nonprofit Center for Charitable Statistics) (1994 – 2007) -Florida corporation archival data from Dep. of State (Division of corporations)
Ecological (population ecology)*	Main population density, 1) $\ln(N_{c,m,t})$ 2) $N^2_{c,m,t}$ /1000	
	Sub-population density	
	Regional main density	
	Regional subpopulation density	
	Number of organizations died	
	Prior founding	
Socioeconomic /environmental (supply/demand)	Median household income/1000	American community survey Population Census(Census of Bureau) Florida statistical abstract
	Population size/1000	
	Population change	
	Population density	
	Poverty	
	Percentage of residents 65 years and older	
	Racial heterogeneity	
	Government spending	Florida office of economic & demographic research
	Educational attainment(% of having bachelor degree of 25 years and older)	American community survey Population census(Census of Bureau)

* Each ecological variable will be plugged in the models as linear (logarithmic) and squared terms (divided by 1000) to test non-monolithic effect, except for prior founding variable to control for temporal autocorrelation

Method

In line with earlier research, the density-dependent entry of organizations is modeled as an arrival process (Carroll & Hannan, 2000; Wezel, 2005). According to the modeling strategy, the arrival rate (i.e., entry rate) specified at the levels of the main population and the sub-populations is affected by the independent variables, other covariates (Lomi, 2000). According to previous studies for such arrival processes with an integer dependent variable, Poisson regression or negative binomial regression would normally represent the best method for data analysis (Carroll & Hannan, 2000; Cattani et al., 2003). Poisson regression becomes non-robust if the variance of the dependent variable exceeds its mean -- a problem called over-dispersion (Gujarati, 2003; Hoffmann, 2004; Long, 1997; Long & Freese, 2001). Over-

dispersion does not affect the coefficient estimates themselves, but the standard errors might be underestimated, thus making chi-square values over-estimated (Long, 1997). Therefore, negative binomial regression is an alternative to overcome the problem of over-dispersion (Long, 1997; Long & Freese, 2001). In this approach, a stochastic error component is added to the model. The error component has a Gamma distribution that enables the parametrization of over-dispersion (Hoffmann, 2004). Most studies have been based on the assumption of organizational similarity within a population.

However, in this study the dependent variable is measured as a time-series event count outcome by counties. Unlike previous studies that have assumed only one population or geographical similarity, the current study needs to consider heterogeneity of both organizational forms and geographical boundary. More specifically, statistical heteroskedasticity is the basic characteristic of the dataset. Each county has its own characteristics different from others, thus heteroskedasticity cannot be measured in variables. Recently, a cross-sectional time series count outcome variable with heteroskedasticity has been analyzed with XTnbreg. To check the robustness of coefficients, scholars have recommended comparing the process with the results of XTGEE[14] (generalized estimating equation) model within population averaged models (Zorn, 2001). In this study, the two methods will be used and compared.

Hypotheses specified at the main population level as a base model are tested with the model, as follows:

[14] In this study, XTnbreg (time-series negative binomial regression) analysis will be used together with XTGEE analysis to compare the results. There are two main ways to build in a statistical model; marginal and conditional. Marginal model assumes a model that holds averaged over all the clusters (sometimes called population averaged). Coefficients have the interpretation as the average change in the response (over the entire population) for a unit change in the predictor. However, conditional model assumes a model specific to each cluster (called subject specific). If one wants to know about the population using the cluster specific model, one should average it over all the clusters. Coefficients have the interpretation as the change in the response for each cluster in the population. XTGEE is a marginal model, whereas XTnbreg is a conditional model. As another advantage, XTGEE provides coefficients with robust standard errors, too. For efficient coefficient estimation and interpretation, Zorn (2001) recommends the comparison procedure. Therefore, XTnbreg and XTGEE will be used and reported to test the models at the same time. XTnbreg will be the main method to check the significance of density variables over counties and XTGEE will be provided to confirm the robustness of estimation by XTGEE. Simply stated, population averaged methods do not model the between cluster variability. In this study, XTnbreg and XTGEE coefficients should be interpreted in different ways, respectively (Molenberghs & Verbeke, 2005).

$$\lambda_{c,m}(t) = \exp(\alpha_1 N_{c,m,t-1} + \alpha_2 N_{c,m,t-1}^2 + \pi' p_t + \xi' z_t)\, \varepsilon_t$$

This model will be extended with the entry rate of sub-populations to test the effect of hierarchically nested form structure, as follows.

$$\lambda_{c,i}(t) = \exp(\alpha_1 N_{c,m,t-1} + \alpha_2 N_{c,m,t-1}^2 + \beta_1 N_{c,i,t-1} + \beta_2 N_{c,i,t-1}^2 + \pi' p_t + \xi' z_t)\, \varepsilon_{it}$$

In these models, $\lambda_{c,m}(t)$ is the entry rate of the main population at time t and $\lambda_{c,i}(t)$ is the entry rate of the sub-populations at time t. $N_{c,m,t-1}$ and $N_{c,i,t-1}$ are main population density and subpopulation density specified at the level of county, respectively. Following density delay theory, all density variables are lagged for one year to avoid problems of simultaneity. The effects from other covariates are summarized in vectors p_t and z_t – the ecological and the need/supply control variables. The need/supply vector represents the socioeconomic differences among counties. ε_{it} is the stochastic error term.

The above two models do not consider geographical hierarchy based on spatial proximity and interaction. So we add the geographically nested structure into the equation, thus using aggregated density geographically. In this study, the empirical setting is charitable nonprofit populations at the county level. Therefore, the above models are using the entry and density variables aggregated at the county level. Charitable nonprofits are based on their local community. They serve their local communities and get financial and personnel resources to operate organizations from the community. However, the regional boundary which includes the neighboring areas is assumed to be a meaningful unit to influence the ecological process of organizational populations. The models will be modified by using the regional aggregation of density to test regional effects on sub-population entry, as follows. The equation includes the regional aggregation of individual population density variable, $N_{r,i,t-1}$. Also effects of Regional main population will be included, $N_{r,m,t-1}$.

Therefore, the comprehensive model – considering the whole hierarchical structure in terms of both form and geographical location – will be the below, as follows.

$$\lambda_{c,i}(t) = \exp(\alpha_1 N_{c,m,t-1} + \alpha_2 N_{c,m,t-1}^2 + \beta_1 N_{c,i,t-1} + \beta_2 N_{c,i,t-1}^2 + \gamma_1 N_{r,i,t-1} + \gamma_2 N_{r,i,t-1}^2 + d_1 N_{r,m,t-1} + d_2 N_{r,m,t-1}^2 + \pi' p_t + \xi' z_t)\, \varepsilon_{wit}$$

CHAPTER 5

RESULTS

To test the first hypothesis, the model was estimated for the entry rate of nonprofit organizations at the main population level. The coefficients obtained from the models are presented in the first two columns of Table 5-1. The results show statistically significant density dependent effects of both legitimation and competition on the entry rate of the nonprofit organization form to the main population. Especially both XTnbreg and XTGEE show consistent and strong results[15].Thus, the hypothesis that main population density has legitimation and competitive effects on the rate of entry of organizations to the main population (H1a) is confirmed. This finding confirms the explanatory power of the standard density dependence theory as the general framework (Carroll & Hannan, 2000; Hannan & Freeman, 1989).

According to the statistical results, it seems that the basic single-population density dependence model applies best on relatively high levels of aggregation in form-related identity space. This is shown by the results from models 2.1 to 2.8 in Table. In these models, including the main population model, each population was treated as an individual population following extant studies, separate from each other and the main population. In other words, the standard single population density dependence model was used, assuming each population as the same level without considering the legitimating and competitive effects benefited from putting up an umbrella of higher level of form. From Table 5-1, the estimates for both density and density squared term are not all significant and in the right direction, different from the original density dependent model. Even several sub-population models show inconsistent results between XTnbreg and XTGEE estimations, which may not be the robust and efficient results.

The models showing the right direction and statistically significance are the four sub populations, which are Art/Culture, Health, Public and Societal benefit, and Religious

[15] The coefficients of XTnbreg with random effects are cluster specific, which means each county has a different intercept. However, XTGEE coefficients show population averaged results. In other words, the average effects across counties are reported. Unlike XTnbreg, XTGEE reports semi-robust standard errors. Therefore, the same results from the two methods indicate that the estimation of coefficients minimizes the potential errors caused by heteroscadasticity, thus suggesting strong and consistent estimates.

nonprofit population. The four sub-nonprofit populations show that the original density dependent model can be applied for the legitimating and competitive effects of organizational entry. In other words, their own density explains the change dynamics of their own population. Furthermore, the two statistical methods show the same results, which means a robust and efficient estimation.

Education, Human Services, and International and Foreign Affairs Nonprofit populations have the coefficients of density in the right direction, however, but only one of either linear or squared terms is statistically significant. The Education Nonprofit model shows a significant legitimation effect of population density in the XTnbreg analysis, but it is significant for the competitive effect in XTGEE analysis. Both analyses show the right direction as predicted in the hypothesis. This means that in the case of considering the difference of nonprofit status by counties (i.e., cluster specific or assuming different intercepts), the density of Education Nonprofits has the legitimating effects that the increasing number of Education Nonprofits leads to more entry of Education Nonprofits. However, in case of disregarding the difference of nonprofit status by counties (i.e. marginal effect or averaged effects over all counties), only the competitive effect is statistically significant in XTGEE analysis. In the same line of interpretation, the difference of two statistical analyses can be explained for Human Services Nonprofits. Lastly, Environmental Nonprofits show results in which only the squared coefficients are statistically significant. In sum, Hypothesis H1b receives only limited support, and it can thus be partially confirmed.

According to the analyses, the main population and subpopulations have different dynamics of density dependent logic. The findings indicate that a different density-dependent logic may operate within the main nonprofit population that affects the entry of organizations into the individual sub-populations. This also means that the individual subpopulations may have their own density logics. The next hypotheses test whether the heterogeneous main nonprofit population has an underlying systemic structure which causes density dependent effects in subpopulation entry beyond the boundaries of the individual subpopulations. In other words, it is a test of whether sharing socially accepted labels from the main population may have positive or negative effects on focal subpopulation entry.

The statistical test proceeds by following the previous studies to show the statistical significance by the sequential insertion of variables into the model (Bigelow & Glenn, 1997; Cattani et al., 2003; Hannan et al., 1995). To test the multilevel model about the effects of density by the geographical difference (i.e. the effects of both national-density and local density on entries of organizations), Hannan et al. (1995) and other scholars proceeded

through the analysis in several stages. For example, Bigelow et al. (1997) used the three stages to explore the model with legitimation effects of density at the national level and competition effects at the regional level, using the American automobile industry as an empirical setting. First, foundings in each region are modeled using only regional density terms. Next, foundings in each region are modeled using only the total U.S density terms. Lastly, the model is tested, which includes both national and regional terms. In this study, the hypotheses about multilevel models of identity space will be tested following the same procedure.

Table 5-1: Single Population Analysis without considering the hierarchical structure

	Main NP		Art/Culture NP		Education NP		Environment NP		Health NP	
VARIABLES	XTnbreg(R.E)	XTGEE	XTnbreg(R.E)	XTGEE	XTnbreg(R.E)	XTGEE	XTnbreg(R.E)	XTGEE	XTnbreg(R.E)	XTGEE
main NP density	0.7898***	0.7273***								
	(0.0750)	(0.1207)								
main NP density*2	-0.0008***	-0.0016***								
	(0.0003)	(0.0004)								
subNP density			0.7378***	0.4704***	0.5222***	0.3196	-0.1051	-0.0901	0.6342***	0.4469**
			(0.0938)	(0.1720)	(0.0870)	(0.2157)	(0.1116)	(0.2509)	(0.0857)	(0.1808)
sub-NP density*2			-0.0123***	-0.0150***	-0.0006	-0.0037*	-0.0790**	-0.0810***	-0.0070**	-0.0085**
			(0.0033)	(0.0040)	(0.0014)	(0.0020)	(0.0323)	(0.0229)	(0.0029)	(0.0037)
NP exit	-0.0074**	-0.0189***	0.0142	0.0233	-0.0088	-0.0162	0.0250	0.0247	0.0119	-0.0111
	(0.0036)	(0.0041)	(0.0269)	(0.0310)	(0.0209)	(0.0293)	(0.0921)	(0.1081)	(0.0219)	(0.0324)
NP exit*2	0.0981***	0.1772***	0.0007	0.0005	-0.0000	0.0002	0.0233	0.0236	-0.0009	-0.0008
	(0.0312)	(0.0420)	(0.0015)	(0.0013)	(0.0009)	(0.0011)	(0.0180)	(0.0226)	(0.0008)	(0.0010)
prior entry	0.0102***	0.0154***	0.0583***	0.1237***	0.0217***	0.0964***	-0.0352	-0.0532*	0.0511***	0.1222***
	(0.0003)	(0.0023)	(0.0065)	(0.0312)	(0.0039)	(0.0207)	(0.0216)	(0.0322)	(0.0072)	(0.0313)
population density	0.0035	0.0003	0.0021	0.0024	0.0027	0.0002	-0.0142***	-0.0036	0.0013	-0.0009
	(0.0031)	(0.0013)	(0.0031)	(0.0015)	(0.0037)	(0.0027)	(0.0052)	(0.0058)	(0.0032)	(0.0011)
population change	-0.0028	0.0009	-0.0003	0.0172	0.0253	-0.0101	0.0797***	0.0711**	-0.0078	-0.0207
	(0.0147)	(0.0110)	(0.0295)	(0.0243)	(0.0278)	(0.0180)	(0.0299)	(0.0278)	(0.0300)	(0.0281)
poverty level	-0.0286***	-0.0180	-0.0326*	-0.0380**	-0.0627***	-0.0545***	-0.0207	-0.0065	-0.0250	-0.0300**
	(0.0095)	(0.0141)	(0.0196)	(0.0157)	(0.0179)	(0.0164)	(0.0219)	(0.0215)	(0.0202)	(0.0133)
population size	-0.0213***	0.0037	-0.0043	-0.0003	0.0005	0.0086	0.0109*	0.0112	-0.0019	0.0054
	(0.0037)	(0.0030)	(0.0038)	(0.0032)	(0.0045)	(0.0061)	(0.0060)	(0.0071)	(0.0042)	(0.0040)
median income	-0.0080*	0.0048	-0.0180**	-0.0132**	-0.0242***	-0.0165***	-0.0033	0.0043	-0.0113	-0.0052
	(0.0045)	(0.0059)	(0.0077)	(0.0066)	(0.0077)	(0.0055)	(0.0111)	(0.0135)	(0.0081)	(0.0069)
government spending	-0.0011	-0.0058	0.0097*	0.0087*	0.0023	-0.0017	0.0046	0.0029	0.0045	-0.0027
	(0.0037)	(0.0043)	(0.0052)	(0.0051)	(0.0034)	(0.0036)	(0.0056)	(0.0039)	(0.0029)	(0.0031)
racial heterogeneity	1.3464***	0.0983	-0.3549	-0.5834	2.2730***	0.2340	0.4644	-1.3592	0.0861	-0.1310
	(0.5165)	(0.4930)	(0.6148)	(0.4846)	(0.7269)	(0.5126)	(0.9798)	(1.0704)	(0.6575)	(0.4066)
aging population	0.0050	0.0014	-0.0023	-0.0039	0.0097	0.0044	-0.0339**	-0.0016	0.0080	0.0054
	(0.0054)	(0.0033)	(0.0081)	(0.0066)	(0.0084)	(0.0070)	(0.0138)	(0.0154)	(0.0084)	(0.0053)
educational attainment	-0.0045	-0.0001	0.0139	0.0139*	0.0150	0.0202**	0.0443***	0.0232*	0.0230**	0.0183**
	(0.0056)	(0.0036)	(0.0095)	(0.0075)	(0.0097)	(0.0093)	(0.0132)	(0.0130)	(0.0102)	(0.0076)
Constant	-1.9107***	-1.6366***	-0.6367	-0.4256	-0.7955	-0.0320	1.1137	0.5247	-1.2368**	-1.0620
	(0.4643)	(0.5277)	(0.5939)	(0.7440)	(0.5524)	(0.6098)	(0.6888)	(0.5740)	(0.5909)	(0.6749)
Observations	938	938	938	938	938	938	938	938	938	938
Number of fips	67	67	67	67	67	67	67	67	67	67

Standard errors in parentheses. XTGEE reports semi-robust standard errors. *** p<0.01, ** p<0.05, * p<0.1

Table 5-1: Single Population Analysis without considering the hierarchical structure(continued)

	Main NP		Hunan Services NP		International/Foreign Affairs NP		Public/Societal Benefit NP		Religious NP	
VARIABLES	XTnbreg(R.E)	XTGEE	XTnbreg(R.E)	XTGEE	XTnbreg(R.E)	XTGEE	XTnbreg(R.E)	XTGEE	XTnbreg(R.E)	XTGEE
main NP density	0.7898***	0.7273***								
	(0.0750)	(0.1207)								
main NP density*2	-0.0008***	-0.0016***								
	(0.0003)	(0.0004)								
subNP density			0.7290***	0.2124	0.1341	0.2212	0.6153***	0.3769*	0.8849***	0.8076***
			(0.0741)	(0.3680)	(0.2127)	(0.1578)	(0.0846)	(0.2149)	(0.0891)	(0.1255)
sub-NP density*2			-0.0014***	-0.0024***	-0.1324***	-0.2158***	-0.0051***	-0.0060***	-0.0013***	-0.0023***
			(0.0004)	(0.0006)	(0.0500)	(0.0674)	(0.0014)	(0.0022)	(0.0003)	(0.0004)
NP exit	-0.0074**	-0.0189***	-0.0091	-0.0096	-0.1076	-0.1301	0.0089	0.0053	-0.0305**	-0.0510***
	(0.0036)	(0.0041)	(0.0086)	(0.0125)	(0.1161)	(0.1424)	(0.0216)	(0.0326)	(0.0132)	(0.0172)
NP exit*2	0.0981***	0.1772***	0.0004***	0.0006**	0.0296	0.0600*	-0.0003	-0.0001	0.0008**	0.0019***
	(0.0312)	(0.0420)	(0.0001)	(0.0003)	(0.0247)	(0.0319)	(0.0008)	(0.0021)	(0.0004)	(0.0006)
prior entry	0.0102***	0.0154***	0.0268***	0.0451***	0.0263	0.3126***	0.0322***	0.1015***	0.0280***	0.0578***
	(0.0003)	(0.0023)	(0.0012)	(0.0081)	(0.0247)	(0.0877)	(0.0042)	(0.0215)	(0.0018)	(0.0106)
population density	0.0035	0.0003	0.0010	0.0032	0.0018	0.0008	0.0037	0.0020	0.0025	0.0003
	(0.0031)	(0.0013)	(0.0030)	(0.0031)	(0.0062)	(0.0016)	(0.0035)	(0.0024)	(0.0032)	(0.0008)
population change	-0.0028	0.0009	-0.0057	-0.0048	-0.0428	-0.0813**	0.0131	0.0049	0.0251	0.0287*
	(0.0147)	(0.0110)	(0.0213)	(0.0135)	(0.0573)	(0.0330)	(0.0271)	(0.0216)	(0.0225)	(0.0162)
poverty level	-0.0286***	-0.0180	-0.0523***	-0.0525***	-0.1572***	-0.1210***	-0.0093	0.0012	-0.0313**	-0.0473***
	(0.0095)	(0.0141)	(0.0141)	(0.0132)	(0.0379)	(0.0342)	(0.0173)	(0.0205)	(0.0151)	(0.0152)
population size	-0.0213***	0.0037	-0.0105***	0.0095	0.0159*	0.0070	-0.0023	0.0021	-0.0067*	0.0027
	(0.0037)	(0.0030)	(0.0033)	(0.0073)	(0.0084)	(0.0054)	(0.0043)	(0.0055)	(0.0035)	(0.0035)
median income	-0.0080*	0.0048	-0.0145**	-0.0061	-0.0297**	-0.0072	-0.0036	0.0137**	-0.0021	-0.0068
	(0.0045)	(0.0059)	(0.0058)	(0.0085)	(0.0151)	(0.0121)	(0.0073)	(0.0067)	(0.0065)	(0.0069)
government spending	-0.0011	-0.0058	0.0030	-0.0056	0.0165*	0.0100	0.0092***	0.0010	0.0076**	0.0013
	(0.0037)	(0.0043)	(0.0035)	(0.0046)	(0.0097)	(0.0089)	(0.0034)	(0.0045)	(0.0034)	(0.0040)
racial heterogeneity	1.3464***	0.0983	0.7540	-0.1275	2.1985	0.7856	1.2711**	0.0521	1.0269*	0.9433**
	(0.5165)	(0.4930)	(0.5283)	(0.6125)	(1.3435)	(0.6324)	(0.6355)	(0.7304)	(0.5550)	(0.4515)
aging population	0.0050	0.0014	-0.0056	0.0034	0.0268	0.0261*	0.0031	0.0097*	0.0132*	0.0045
	(0.0054)	(0.0033)	(0.0067)	(0.0084)	(0.0166)	(0.0145)	(0.0083)	(0.0054)	(0.0072)	(0.0048)
educational attainment	-0.0045	-0.0001	0.0067	0.0241	0.0734***	0.0336	0.0129	0.0144	0.0006	0.0011
	(0.0056)	(0.0036)	(0.0069)	(0.0161)	(0.0185)	(0.0205)	(0.0095)	(0.0109)	(0.0072)	(0.0049)
Constant	-1.9107***	-1.6366***	-0.5329	0.5816	-0.4713	-1.1512	-1.7128***	-1.9588***	-3.1333***	-2.2860***
	(0.4643)	(0.5277)	(0.4621)	(0.7722)	(1.0438)	(1.0349)	(0.5281)	(0.4790)	(0.5557)	(0.6834)
Observations	938	938	938	938	938	938	938	938	938	938
Number of fips	67	67	67	67	67	67	67	67	67	67

Standard errors in parentheses. XTGEE reports semi-robust standard errors. The two sub-populations(mutual benefit/unclassified NP) was excluded from this analysis and the regression models did not converge for these sub-populations.*** p<0.01, ** p<0.05, * p<0.1

Table 5-2 shows model estimates when only the main density terms are included in the analysis as the second stage of the sequential test procedure, even when considering the hierarchical structure of identity. The first-order density term is positive and significant across sub-populations with the exception of the Environmental Nonprofit population, as predicted. The results show that the coefficients are robust and efficiently estimated. The second-order density term (i.e. competitive effect) produces a negative effect, except in Education and International/Foreign Affairs Nonprofit populations. Thus, there is indirect evidence of "spillover" legitimation and competitive effects from the main nonprofit population, according to these results in subpopulations. Even though Bigelow et al. (1997) studied in terms of geographical heterogeneity, the results show that the same logic of "spillover" effects can be applied for the multilevel structure of identity space. The results also confirm the existence of multilevel effects in the identity space that is inferred from the above tests of H1a and H1b.

Theoretically, even if the models of Table 5-2 proceed to estimate the direct effect of main population density on subpopulation entry without the effect of sub-population density, the results indicate that the main population shows both legitimizing and competitive effects on sub-population entry that are both statistically significant. This result provides a final confirmation for the assumption that the sub-populations form a systemic structure with hierarchical relationships to the main population, and that density-dependent effects operate across the internal boundaries of such a system. However, the results do not provide direct evidence of the multilevel structure of identity space related with the complex organizational form of a heterogeneous population. In the next stage, the full structure model should be tested with both the main population density and the sub-population density.

Table 5-2: Estimates of Main Density on Sub-population Entries

	Art/Culture NP		Education NP		Environment NP		Health NP	
VARIABLES	XTnbreg(R.E)	XTGEE	XTnbreg(R.E)	XTGEE	XTnbreg(R.E)	XTGEE	XTnbreg(R.E)	XTGEE
main NP density	0.9556***	0.5725**	0.8234***	0.6684***	-0.0292	0.2376	1.0401***	0.7162***
	(0.1164)	(0.2481)	(0.1058)	(0.1920)	(0.1431)	(0.1781)	(0.1208)	(0.2331)
main NP density*2	-0.0004*	-0.0006***	-0.0002	-0.0007***	-0.0012**	-0.0014***	-0.0004	-0.0006***
	(0.0002)	(0.0001)	(0.0002)	(0.0002)	(0.0005)	(0.0005)	(0.0002)	(0.0002)
sub-NP exit	0.0229	0.0292	-0.0104	-0.0198	0.0288	0.0068	0.0069	-0.0169
	(0.0278)	(0.0336)	(0.0212)	(0.0269)	(0.0920)	(0.1164)	(0.0215)	(0.0303)
sub-NP exit*2	-0.0001	-0.0008	0.0002	0.0012	0.0184	0.0261	-0.0010	-0.0011
	(0.0016)	(0.0014)	(0.0009)	(0.0012)	(0.0177)	(0.0245)	(0.0008)	(0.0010)
prior entry	0.0562***	0.1261***	0.0229***	0.0961***	-0.0419**	-0.0504	0.0437***	0.1228***
	(0.0066)	(0.0333)	(0.0040)	(0.0201)	(0.0214)	(0.0343)	(0.0070)	(0.0309)
population density	-0.0010	0.0008	0.0014	-0.0006	-0.0112**	-0.0007	0.0008	0.0006
	(0.0036)	(0.0011)	(0.0034)	(0.0015)	(0.0055)	(0.0057)	(0.0035)	(0.0013)
population change	0.0068	0.0234	0.0260	-0.0046	0.0804***	0.0789***	0.0074	-0.0122
	(0.0308)	(0.0276)	(0.0275)	(0.0192)	(0.0299)	(0.0292)	(0.0309)	(0.0299)
poverty level	-0.0284	-0.0397***	-0.0525***	-0.0433**	-0.0213	0.0050	-0.0170	-0.0253**
	(0.0200)	(0.0149)	(0.0178)	(0.0172)	(0.0216)	(0.0280)	(0.0199)	(0.0124)
population size	-0.0083*	-0.0029	-0.0049	-0.0010	0.0078	0.0016	-0.0099**	-0.0029
	(0.0045)	(0.0030)	(0.0040)	(0.0038)	(0.0063)	(0.0056)	(0.0047)	(0.0031)
median income	-0.0199**	-0.0142**	-0.0256***	-0.0177***	-0.0097	-0.0053	-0.0200**	-0.0100
	(0.0080)	(0.0067)	(0.0078)	(0.0063)	(0.0107)	(0.0110)	(0.0085)	(0.0068)
government spending	0.0002	0.0002	0.0043	0.0002	0.0155*	0.0193**	0.0068*	0.0032
	(0.0044)	(0.0048)	(0.0037)	(0.0037)	(0.0085)	(0.0076)	(0.0041)	(0.0029)
racial heterogeneity	-0.2718	-0.4905	2.2229***	0.2028	0.5468	-1.2841	0.2088	-0.0571
	(0.6774)	(0.4992)	(0.7052)	(0.5291)	(0.9710)	(0.9290)	(0.6939)	(0.4357)
aging population	-0.0011	-0.0042	0.0031	-0.0013	-0.0363***	-0.0079	0.0078	0.0037
	(0.0085)	(0.0065)	(0.0083)	(0.0061)	(0.0137)	(0.0128)	(0.0086)	(0.0064)
educational attainment	0.0127	0.0116*	0.0084	0.0073	0.0411***	0.0088	0.0200**	0.0129**
	(0.0099)	(0.0064)	(0.0095)	(0.0048)	(0.0139)	(0.0168)	(0.0101)	(0.0065)
Constant	-3.5432***	-2.0275	-3.3061***	-2.2522**	1.3314	-0.3374	-4.8684***	-3.4731**
	(0.7889)	(1.4858)	(0.7031)	(0.9981)	(0.8664)	(0.9562)	(0.8001)	(1.4406)
Observations	938	938	938	938	938	938	938	938
Number of fips	67	67	67	67	67	67	67	67

Table 5-2: Estimates of Main Density on Sub-population Entries (continued)

	Hunan Services NP		International/Foreign Affairs NP		Public/Societal Benefit NP		Religious NP	
VARIABLES	XTnbreg(R.E)	XTGEE	XTnbreg(R.E)	XTGEE	XTnbreg(R.E)	XTGEE	XTnbreg(R.E)	XTGEE
main NP density	0.9287***	0.6955***	0.8394***	0.5391*	0.8511***	0.6940***	0.9269***	0.7747***
	(0.0818)	(0.1734)	(0.2265)	(0.3251)	(0.1014)	(0.1618)	(0.0867)	(0.1789)
main NP density*2	-0.0007***	-0.0014***	-0.0003	-0.0006**	-0.0007***	-0.0007**	-0.0004*	-0.0010***
	(0.0002)	(0.0004)	(0.0004)	(0.0003)	(0.0002)	(0.0003)	(0.0002)	(0.0002)
sub-NP exit	-0.0070	-0.0150	0.0125	0.0218	-0.0022	0.0016	-0.0331**	-0.0529***
	(0.0086)	(0.0103)	(0.1127)	(0.1458)	(0.0212)	(0.0328)	(0.0134)	(0.0196)
sub-NP exit*2	0.0003**	0.0006*	-0.0126	-0.0209	-0.0002	-0.0009	0.0006*	0.0016**
	(0.0002)	(0.0003)	(0.0220)	(0.0304)	(0.0008)	(0.0019)	(0.0004)	(0.0007)
prior entry	0.0268***	0.0468***	0.0262	0.3309***	0.0309***	0.1028***	0.0284***	0.0585***
	(0.0012)	(0.0086)	(0.0274)	(0.0880)	(0.0039)	(0.0207)	(0.0018)	(0.0115)
population density	-0.0020	-0.0011	-0.0030	-0.0010	0.0036	0.0029*	0.0007	-0.0003
	(0.0029)	(0.0010)	(0.0057)	(0.0015)	(0.0036)	(0.0017)	(0.0033)	(0.0019)
population change	-0.0040	0.0004	-0.0074	-0.0456	0.0209	0.0145	0.0342	0.0338*
	(0.0211)	(0.0144)	(0.0594)	(0.0405)	(0.0272)	(0.0232)	(0.0226)	(0.0187)
poverty level	-0.0505***	-0.0358*	-0.1145***	-0.0803***	-0.0033	0.0113	-0.0148	-0.0315**
	(0.0137)	(0.0191)	(0.0404)	(0.0311)	(0.0171)	(0.0250)	(0.0152)	(0.0142)
population size	-0.0120***	0.0021	0.0089	0.0070	-0.0064	-0.0068**	-0.0101***	-0.0000
	(0.0037)	(0.0048)	(0.0073)	(0.0065)	(0.0043)	(0.0029)	(0.0037)	(0.0042)
median income	-0.0126**	-0.0089*	-0.0226	-0.0013	-0.0030	0.0130**	-0.0046	-0.0066
	(0.0057)	(0.0053)	(0.0158)	(0.0118)	(0.0073)	(0.0066)	(0.0066)	(0.0068)
government spending	0.0028	-0.0010	0.0019	-0.0055	0.0101***	0.0050	0.0031	-0.0015
	(0.0035)	(0.0042)	(0.0072)	(0.0078)	(0.0039)	(0.0037)	(0.0036)	(0.0050)
racial heterogeneity	0.9201*	-0.0247	2.1382	0.7905	1.1076*	-0.0629	0.7135	0.5150
	(0.5221)	(0.6008)	(1.3560)	(0.6774)	(0.6448)	(0.7019)	(0.5674)	(0.4818)
aging population	-0.0040	-0.0055	0.0211	0.0189	0.0021	0.0039	0.0088	0.0015
	(0.0066)	(0.0053)	(0.0162)	(0.0131)	(0.0084)	(0.0054)	(0.0073)	(0.0044)
educational attainment	-0.0020	0.0004	0.0378**	0.0166	0.0087	0.0018	-0.0151*	-0.0134***
	(0.0070)	(0.0044)	(0.0181)	(0.0119)	(0.0095)	(0.0058)	(0.0080)	(0.0051)
Constant	-2.6684***	-1.7737**	-5.0456***	-4.2949*	-4.3541***	-4.2270***	-3.9131***	-2.7098***
	(0.5434)	(0.8040)	(1.6035)	(2.3991)	(0.6681)	(0.7778)	(0.5851)	(0.9488)
Observations	938	938	938	938	938	938	938	938
Number of fips	67	67	67	67	67	67	67	67

Table 5-3 simultaneously takes into account the full structure of the system and the density-dependent effects of legitimation and competition from different hierarchical levels of the underlying heterogeneous population. It shows the combined effects of main population density and sub-population density on sub-population entry. The results confirm the effects of systemic structure in the identity-related form space.

The most important finding from the models of Table 5-3 is that when the whole systemic structure of the heterogeneous main population is taken into account, main population density no longer shows an effect of density-dependent competition in most sub-populations with the exception of the Education Nonprofit population. Recall that the results in Table 5-2 in which only main population density effect is tested. Both linear (legitimation effect) and squared (competition effect) terms are statistically significant across sub-populations. However, from the combined test of systemic hierarchical structure, a legitimation effect still remains for the main population density at a statistically significant level, while the competitive effect disappears. These results of eight sub-population models present the strongest evidence in support of the hypothesis that legitimation takes place at a main population level of identity space on the rate of entry of organizations to the sub-populations, but that competition does not.

In addition, in sub-populations density continues to have effects of legitimation and competition in five of the eight models of sub-population nonprofits as expected. Art/Culture Nonprofit and Religious Nonprofit populations show that the competitive effect is statistically significant, while the legitimating effect is in the right direction but not significant. For the Environmental Nonprofit population, both density terms are in the right direction, but not statistically significant. Comparing to the results of single population models (Table 5-1), significant changes are observed. This is not striking, as the results are similar to what Hannan and associates reported in the context of different density effects for geographical hierarchy (Hannan et al., 1995). Rather, the result indicates that the form-related identity space produces a similar logic of geographical heterogeneity in which more broad geographical level (national density) produces legitimation effect whereas local density operates as a competitive effect.

In sum, the results strongly confirm hypothesis H2a, but partially confirm hypothesis H2b with the exception of three nonprofit subpopulations. However, the directional effects even in the three sub-populations are as expected. Considering overall patterns for our models, the effect of main nonprofit density legitimation on sub-population entry is strong and broad for all sub-populations, while the effect of nonprofit sub-population density legitimation is

limited for five of eight sub-populations and statistically significant. Therefore, following the methods of Hannan et al. (1995), the results support H2c.

Table 5-3: Estimates of Main Density and Sub-population Density on Sub-population Entries

	Art/Culture NP		Education NP		Environment NP		Health NP	
VARIABLES	XTnbreg(R.E)	XTGEE	XTnbreg(R.E)	XTGEE	XTnbreg(R.E)	XTGEE	XTnbreg(R.E)	XTGEE
main NP density	0.9711***	0.5572**	1.1122***	1.3295***	0.1853	0.4525	1.4035***	0.8853***
	(0.2668)	(0.1908)	(0.2386)	(0.2345)	(0.2065)	(0.4608)	(0.2918)	(0.3113)
main NP density*2	0.0011	0.0005	-0.0008*	-0.0009***	-0.0008	-0.0015	0.0003	0.0002
	(0.0015)	(0.0004)	(0.0004)	(0.0002)	(0.0010)	(0.0012)	(0.0005)	(0.0006)
subNP density	0.0082	0.0048	0.2182*	0.5369*	0.2241	0.2519	0.3088*	0.1727*
	(0.2291)	(0.1980)	(0.1101)	(0.2921)	(0.1608)	(0.3780)	(0.1501)	(0.0881)
sub-NP density*2	-0.0269***	-0.0212***	-0.0040*	-0.0007	-0.0264	-0.0075	-0.0090*	-0.0085*
	(0.0073)	(0.0066)	(0.0020)	(0.0016)	(0.0705)	(0.0761)	(0.0045)	(0.0033)
sub-NP exit	0.0276	0.0222	-0.0131	-0.0152	0.0355	0.0148	0.0147	-0.0087
	(0.0278)	(0.0323)	(0.0213)	(0.0253)	(0.0925)	(0.1220)	(0.0215)	(0.0313)
sub-NP exit*2	0.0005	0.0002	0.0002	0.0012	0.0194	0.0250	-0.0010	-0.0011
	(0.0016)	(0.0015)	(0.0009)	(0.0013)	(0.0187)	(0.0287)	(0.0008)	(0.0010)
prior entry	0.0625***	0.1271***	0.0233***	0.0913***	-0.0365*	-0.0470	0.0492***	0.1233***
	(0.0065)	(0.0333)	(0.0040)	(0.0173)	(0.0218)	(0.0364)	(0.0078)	(0.0339)
population density	-0.0004	0.0019	0.0011	0.0003	-0.0128**	-0.0012	-0.0014	-0.0019
	(0.0035)	(0.0021)	(0.0034)	(0.0017)	(0.0059)	(0.0072)	(0.0039)	(0.0016)
population change	0.0074	0.0187	0.0267	-0.0047	0.0801***	0.0788**	0.0036	-0.0156
	(0.0310)	(0.0278)	(0.0276)	(0.0230)	(0.0301)	(0.0314)	(0.0317)	(0.0313)
poverty level	-0.0279	-0.0379**	-0.0550***	-0.0459***	-0.0228	-0.0026	-0.0212	-0.0251*
	(0.0203)	(0.0151)	(0.0177)	(0.0167)	(0.0221)	(0.0222)	(0.0203)	(0.0131)
population size	-0.0112**	-0.0041	-0.0094**	-0.0031	0.0082	0.0017	-0.0075	0.0010
	(0.0047)	(0.0028)	(0.0047)	(0.0035)	(0.0064)	(0.0060)	(0.0051)	(0.0057)
median income	-0.0224***	-0.0144**	-0.0260***	-0.0208***	-0.0049	-0.0015	-0.0242***	-0.0099
	(0.0080)	(0.0066)	(0.0079)	(0.0071)	(0.0113)	(0.0129)	(0.0089)	(0.0070)
government spending	0.0149***	0.0122***	0.0041	0.0027	0.0124	0.0198	0.0027	-0.0032
	(0.0057)	(0.0040)	(0.0038)	(0.0027)	(0.0111)	(0.0132)	(0.0050)	(0.0080)
racial heterogeneity	-0.7169	-0.7755	2.1418***	0.4487	0.5663	-1.2176	0.1322	-0.1485
	(0.6970)	(0.5016)	(0.7111)	(0.5337)	(0.9817)	(0.8891)	(0.7271)	(0.4739)
aging population	-0.0017	-0.0021	0.0033	-0.0050	-0.0353**	-0.0070	0.0084	0.0065
	(0.0087)	(0.0065)	(0.0085)	(0.0078)	(0.0137)	(0.0131)	(0.0089)	(0.0061)
educational attainment	0.0131	0.0143*	0.0078	0.0114	0.0410***	0.0109	0.0243**	0.0173**
	(0.0102)	(0.0073)	(0.0096)	(0.0071)	(0.0139)	(0.0159)	(0.0107)	(0.0078)
Constant	-3.3478***	-1.9634	-4.0279***	-4.0209***	0.5404	-1.0329	-5.8056***	-4.0592**
	(0.9998)	(1.8192)	(0.8782)	(0.6178)	(1.0132)	(1.7936)	(1.1587)	(1.6205)
Observations	938	938	938	938	938	938	938	938
Number of fips	67	67	67	67	67	67	67	67

Table 5-3: Estimates of Main Density and Sub-population Density on Sub-population Entries (continued)

	Hunan Services NP		International/Foreign Affairs NP		Public/Societal Benefit NP		Religious NP	
VARIABLES	XTnbreg(R.E)	XTGEE	XTnbreg(R.E)	XTGEE	XTnbreg(R.E)	XTGEE	XTnbreg(R.E)	XTGEE
main NP density	1.9594***	2.1681***	1.0469***	0.5117*	1.0628***	1.1950***	1.0178***	0.5530*
	(0.2572)	(0.2281)	(0.2472)	(0.3250)	(0.2410)	(0.2026)	(0.2867)	(0.2815)
main NP density*2	-0.0002	-0.0028***	-0.0009	-0.0003	0.0001	-0.0000	-0.0008	-0.0005
	(0.0008)	(0.0010)	(0.0005)	(0.0005)	(0.0004)	(0.0005)	(0.0007)	(0.0003)
subNP density	0.9494***	1.3177***	0.1345*	0.0684	0.1904*	0.4687*	0.1103	0.2704
	(0.2215)	(0.2726)	(0.6132)	(0.2321)	(0.0981)	(0.2750)	(0.3053)	(0.3630)
sub-NP density*2	-0.0012*	-0.0023*	-0.2361***	-0.2321***	-0.0052**	-0.0049*	-0.0022***	-0.0026***
	(0.0006)	(0.0012)	(0.0719)	(0.0548)	(0.0023)	(0.0027)	(0.0006)	(0.0007)
sub-NP exit	-0.0035	-0.0092	-0.2054	-0.0692	0.0132	0.0124	-0.0263**	-0.0515***
	(0.0086)	(0.0096)	(0.1353)	(0.1370)	(0.0218)	(0.0338)	(0.0131)	(0.0193)
sub-NP exit*2	0.0003*	0.0004	0.0518*	0.0479**	-0.0005	-0.0006	0.0008**	0.0019***
	(0.0002)	(0.0003)	(0.0300)	(0.0226)	(0.0008)	(0.0021)	(0.0004)	(0.0007)
prior entry	0.0274***	0.0406***	0.0469	0.3188***	0.0333***	0.1015***	0.0285***	0.0589***
	(0.0012)	(0.0052)	(0.0290)	(0.0921)	(0.0043)	(0.0204)	(0.0018)	(0.0111)
population density	0.0006	-0.0023	-0.0011	-0.0003	0.0004	-0.0005	0.0019	-0.0004
	(0.0036)	(0.0031)	(0.0052)	(0.0016)	(0.0039)	(0.0014)	(0.0032)	(0.0011)
population change	-0.0096	-0.0189	0.0015	-0.0558	0.0153	0.0077	0.0436*	0.0362*
	(0.0211)	(0.0183)	(0.0599)	(0.0466)	(0.0275)	(0.0212)	(0.0225)	(0.0189)
poverty level	-0.0544***	-0.0675***	-0.1032***	-0.0930***	-0.0113	0.0046	-0.0158	-0.0386***
	(0.0139)	(0.0139)	(0.0399)	(0.0326)	(0.0175)	(0.0212)	(0.0154)	(0.0137)
population size	-0.0194***	0.0009	-0.0067	-0.0020	-0.0043	-0.0035	-0.0086**	0.0015
	(0.0051)	(0.0048)	(0.0091)	(0.0053)	(0.0044)	(0.0037)	(0.0035)	(0.0038)
median income	-0.0064	-0.0048	-0.0217	-0.0061	-0.0053	0.0142*	-0.0070	-0.0083
	(0.0058)	(0.0060)	(0.0157)	(0.0134)	(0.0074)	(0.0073)	(0.0066)	(0.0072)
government spending	0.0025	0.0056***	0.0265***	0.0131	0.0081*	0.0025	0.0031	-0.0022
	(0.0034)	(0.0018)	(0.0098)	(0.0093)	(0.0043)	(0.0051)	(0.0034)	(0.0039)
racial heterogeneity	1.1910**	0.9575**	1.5356	0.5606	0.9613	-0.2761	0.9160	0.7813*
	(0.5417)	(0.4173)	(1.3769)	(0.6781)	(0.6532)	(0.7673)	(0.5736)	(0.4481)
aging population	0.0022	0.0041	0.0256	0.0217	0.0010	0.0066	0.0097	0.0001
	(0.0068)	(0.0057)	(0.0162)	(0.0154)	(0.0085)	(0.0050)	(0.0073)	(0.0041)
educational attainment	-0.0048	-0.0064	0.0414**	0.0158	0.0083	0.0071	-0.0180**	-0.0127
	(0.0071)	(0.0051)	(0.0193)	(0.0153)	(0.0097)	(0.0085)	(0.0089)	(0.0091)
Constant	-4.7787***	-4.6769***	-6.0541***	-3.7039	-4.5942***	-5.5351***	-3.8969***	-2.6206***
	(0.7382)	(0.5137)	(1.7329)	(3.0118)	(0.8651)	(0.5835)	(0.5856)	(0.9675)
Observations	938	938	938	938	938	938	938	938
Number of fips	67	67	67	67	67	67	67	67

Standard errors in parentheses

To the question -- "which systematic parts of multilevel structure influence on sub-population dynamics" – let us now add the question of geographical heterogeneity with the differentiation of identity space. The tests will be run following the same procedure of Hypothesis 2 (Table 5-2 to 5-3). First, the model with only the regional sub-population density will be regressed for the sub-population entry. Second, the sub-population density at the local level will be added into the equation. The model is the same model that Hannan and other ecologists had tested in terms of geographical heterogeneity (Bigelow & Glenn, 1997; Cattani et al., 2003; Hannan et al., 1995). Lastly, the combined structure -- the local main/sub-population density and the regional sub-population density – will be tested. These stages will be repeated for the model of regional main density.

Table 5-4 shows the results of models with only regional sub-population effects. The first-order density terms of regional sub-population density are positive and in the right direction, as expected, with the exception of International/Foreign Affairs Nonprofits. However, the results show that four of eight populations are statistically significant. Even if the effects are weak, the second-order competitive effects produce significant coefficients in five of eight populations. Also, all sub-populations show the right direction of effects. We are reminded that the models are almost the same models as in Hannan and other ecologists' geographical heterogeneity model. Thus, there is indirect evidence of "spillover" legitimation and competitive effects, as Bigelow et al. (1997) reported in terms of geographical heterogeneity. The results reconfirm the existence of multilevel effects in the geographical multilevel structure, even though all subpopulations do not show this significantly.

In sum, even if the models of Table 5-4 proceed to estimate the direct effect of only regional sub-population density on subpopulation entry, the results indicate that regional sub-populations show both legitimizing and competitive effects on sub-population entry, and both effects are both statistically significant. Although the statistical significance of effects differs for each sub-population, the signs of effects are in the right direction, as expected. However, the results do not provide direct evidence about the effects of multilevel geographical structure. In the next stage, the two terms of local subpopulation density will be added into the equations. The question is whether the models of combined effects – regional density and local density -- still show the significance of regional density effect. In other words, do the two terms of regional sup-population density hold statistical significance if the geographical multilevel effects that were reported by Hannan (1995) and Bigelow et al. (1997) are applied for the nonprofit populations.

Table 5-4: Estimates of Regional Sub-population Density on Sub-population Entries

	Art/Culture NP		Education NP		Environment NP		Health NP		Hunan Services NP		International/Foreign Affairs NP		Public/Societal Benefit NP		Religious NP	
VARIABLES	XTnbreg	XTGEE	XTnbreg	XTGEE	XTnbreg	XTGEE	XTnbreg	XTGEE	XTnbreg	XTGEE	XTnbreg	XTGEE	XTnbreg	XTGEE	XTnbreg	XTGEE
regionalSubNP density	0.2953**	0.3169**	0.3057**	0.1971**	0.1058	0.1234	0.1191	0.1460	0.0591	0.1370	-0.0949	-0.0968	0.3462***	0.2773***	0.3225**	0.2697*
	(0.1395)	(0.1291)	(0.1196)	(0.0876)	(0.1692)	(0.1981)	(0.1239)	(0.1016)	(0.1323)	(0.1229)	(0.1651)	(0.1303)	(0.1069)	(0.0977)	(0.1511)	(0.1388)
regional sub-NP density*2	-0.0005***	-0.0004***	-0.0001**	-0.0002***	-0.0011	-0.0007	-0.0003*	-0.0003**	-0.0000	-0.0000	-0.0043	-0.0055	-0.0003***	-0.0003***	-0.0000***	-0.0000***
	(0.0002)	(0.0001)	(0.0001)	(0.0001)	(0.0011)	(0.0016)	(0.0002)	(0.0001)	(0.0000)	(0.0000)	(0.0036)	(0.0037)	(0.0001)	(0.0001)	(0.0000)	(0.0000)
sub-NP exit	0.0260	0.0327	-0.0172	-0.0072	0.0106	0.0402	0.0012	-0.0213	-0.0092	-0.0247	0.0365	-0.0026	-0.0146	-0.0144	-0.0494***	-0.0568**
	(0.0299)	(0.0368)	(0.0202)	(0.0293)	(0.0920)	(0.1097)	(0.0223)	(0.0370)	(0.0111)	(0.0167)	(0.1098)	(0.1452)	(0.0211)	(0.0315)	(0.0158)	(0.0226)
sub-NP exit*2	-0.0009	-0.0012	0.0002	-0.0004	0.0172	0.0095	-0.0009	-0.0007	0.0001	0.0003	-0.0119	-0.0221	0.0000	-0.0010	0.0007	0.0011
	(0.0018)	(0.0018)	(0.0008)	(0.0012)	(0.0172)	(0.0205)	(0.0008)	(0.0012)	(0.0002)	(0.0004)	(0.0205)	(0.0322)	(0.0008)	(0.0016)	(0.0005)	(0.0007)
prior entry	0.0570***	0.1126***	0.0206***	0.0841***	-0.0448**	-0.0557*	0.0454***	0.1072***	0.0283***	0.0394***	0.0194	0.3129***	0.0275***	0.0903***	0.0324***	0.0483***
	(0.0069)	(0.0247)	(0.0041)	(0.0157)	(0.0213)	(0.0322)	(0.0080)	(0.0241)	(0.0012)	(0.0065)	(0.0244)	(0.0828)	(0.0039)	(0.0173)	(0.0018)	(0.0083)
population density	0.0039	0.0013	0.0056	-0.0001	-0.0149***	-0.0051	0.0048	0.0018	0.0023	0.0007	-0.0001	-0.0009	0.0047	0.0028	0.0059	0.0020
	(0.0044)	(0.0020)	(0.0041)	(0.0027)	(0.0053)	(0.0058)	(0.0043)	(0.0028)	(0.0033)	(0.0031)	(0.0062)	(0.0021)	(0.0040)	(0.0028)	(0.0042)	(0.0028)
population change	-0.0179	0.0039	0.0114	-0.0253	0.0905***	0.0807***	-0.0151	-0.0319	-0.0026	-0.0035	-0.0445	-0.0866***	0.0051	-0.0085	0.0206	0.0295*
	(0.0325)	(0.0190)	(0.0288)	(0.0233)	(0.0298)	(0.0273)	(0.0329)	(0.0265)	(0.0228)	(0.0158)	(0.0602)	(0.0331)	(0.0287)	(0.0248)	(0.0246)	(0.0161)
poverty level	-0.0781***	-0.0651***	-0.0929***	-0.0788***	-0.0164	-0.0012	-0.0655***	-0.0528***	-0.0975***	-0.0610***	-0.1581***	-0.1011***	-0.0428**	-0.0210	-0.0471***	-0.0612***
	(0.0205)	(0.0185)	(0.0179)	(0.0193)	(0.0212)	(0.0255)	(0.0212)	(0.0161)	(0.0158)	(0.0183)	(0.0382)	(0.0302)	(0.0176)	(0.0248)	(0.0170)	(0.0152)
population size	0.0055	0.0083*	0.0098**	0.0138***	0.0061	0.0076	0.0074	0.0130***	-0.0046	0.0158***	0.0258***	0.0177***	0.0090**	0.0080*	-0.0025	0.0160***
	(0.0043)	(0.0043)	(0.0043)	(0.0042)	(0.0058)	(0.0049)	(0.0053)	(0.0047)	(0.0036)	(0.0039)	(0.0064)	(0.0048)	(0.0044)	(0.0048)	(0.0040)	(0.0038)
median income	-0.0212**	-0.0159*	-0.0337***	-0.0121**	-0.0117	-0.0062	-0.0223**	-0.0058	-0.0066	-0.0024	-0.0224	0.0120	-0.0107	0.0161**	-0.0014	0.0024
	(0.0090)	(0.0083)	(0.0085)	(0.0059)	(0.0130)	(0.0142)	(0.0095)	(0.0078)	(0.0076)	(0.0063)	(0.0173)	(0.0132)	(0.0081)	(0.0071)	(0.0080)	(0.0072)
government spending	-0.0076**	-0.0102***	-0.0001	-0.0116***	-0.0001	-0.0032	-0.0025	-0.0098***	-0.0081***	-0.0191***	-0.0048	-0.0140**	-0.0005	-0.0064*	-0.0039	-0.0162***
	(0.0031)	(0.0034)	(0.0021)	(0.0035)	(0.0048)	(0.0041)	(0.0027)	(0.0033)	(0.0028)	(0.0046)	(0.0047)	(0.0069)	(0.0021)	(0.0039)	(0.0030)	(0.0036)
racial heterogeneity	0.3986	-0.1513	3.6244***	0.6984	0.5469	-1.4851	0.7444	0.0024	0.8025	0.0060	2.4598*	0.8280	2.0736***	0.6388	0.9904	0.6820
	(0.8008)	(0.5982)	(0.8520)	(0.6526)	(0.9907)	(1.0007)	(0.8708)	(0.5578)	(0.7714)	(0.7349)	(1.3520)	(0.6975)	(0.7516)	(0.7077)	(0.8543)	(0.6959)
aging population	0.0143	0.0100	0.0189**	0.0236**	-0.0341**	-0.0019	0.0181*	0.0203**	0.0034	0.0093	0.0311*	0.0354**	0.0204**	0.0284***	0.0201**	0.0180*
	(0.0097)	(0.0100)	(0.0095)	(0.0093)	(0.0139)	(0.0140)	(0.0102)	(0.0098)	(0.0082)	(0.0099)	(0.0170)	(0.0152)	(0.0093)	(0.0101)	(0.0096)	(0.0093)
educational attainment	0.0555***	0.0416***	0.0437***	0.0395***	0.0429***	0.0200	0.0678***	0.0474***	0.0239***	0.0304***	0.0793***	0.0446**	0.0540***	0.0379***	0.0155*	0.0168*
	(0.0098)	(0.0122)	(0.0093)	(0.0092)	(0.0130)	(0.0142)	(0.0105)	(0.0127)	(0.0077)	(0.0099)	(0.0157)	(0.0182)	(0.0089)	(0.0088)	(0.0085)	(0.0100)
Constant	-0.5826	-1.2591	-1.3380	-0.7819	0.6921	0.1863	-0.3645	-1.1920	1.9038*	0.2507	-0.6309	-2.0219*	-2.5026***	-3.1052***	-1.5601	-1.3035
	(1.0409)	(0.9949)	(0.9448)	(0.7740)	(0.9402)	(1.0786)	(0.9894)	(0.8052)	(1.0089)	(0.9674)	(1.1713)	(1.0814)	(0.8308)	(0.7538)	(1.2189)	(1.0774)
Observations	938	938	938	938	938	938	938	938	938	938	938	938	938	938	938	938
Number of fips	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5-5 shows the results of the combined effects of local and regional sub-population density. Strikingly, considering the lower level of population density within the same population, the regional terms of population density do not show a statistically significant effect. The only consistent results from Table 5-4 is that the signs of effects are the same and in the right direction as expected. Rather, the results show almost the same sign and statistical significance with Table 5-1 that reports the results of single population analysis. The results differ from the results of Hannan (1995) and Bigelow et al. (1997) in that higher level density holds for legitimating effect whereas the lower level density contains the competitive effect, even if the research was based on the population and geographical definition of population in ways that are different from this study. This may mean that the nature of nonprofit organizations, with regard to entry density effects, is different from such industrial settings as automobile manufacturers (Bigelow & Glenn, 1997; Hannan et al., 1995). That is, nonprofit organizational populations may have different dynamics. The result rejects the part of hypothesis H3a related with the regional sub-population effect.

Lastly, Table 5-6 reports the results of models in which the main population effect is added into the previous models. Across the sub-populations, the regional effects disappear in the equations. The results lead to the same conclusion with the previous models (Table 5-5). Even if the directions of coefficients are in the right direction with several exceptions, the statistical significance almost disappears for both legitimation and competitive effects when we add the local main population density terms. Also, the main population effect changes the statistical significance of sub-population density terms in Table 5-5, which tests the regional sub-population effect and the local sup-population effect. This leads to similar results with Table 5-3 that estimates effects of main density and sub-population density on sub-population entries. Even if the values of coefficients are different, the directions of signs and significance are almost the same. Again, the result strongly rejects the part of hypothesis H3a related with the regional sub-population effect. In sum, the results from Table 5-4~6 indicate that the regional sub-population density does not impact the entry of sub-populations. Only when the regional sub-population density is considered alone, is the regional density statistically significant. However, when other levels of nonprofit populations are considered, the term effects disappear. This leads us to infer that local sub-population density within the same population has a stronger effect on entry of a nonprofit sub-population, unlike Hypothesis H3b and H3c. Furthermore, the results offer evidence that the nature of "operating" nonprofits are highly rooted in the local community with regard to the birth and operation of these organizations (Boris & Steuerle, 2006; Corbin, 1999; Gronbjerg & Paarlberg, 2001).

Table 5-5: Estimates of Regional and Local Sub-population Density on Sub-population Entries

	Art/Culture NP		Education NP		Environment NP		Health NP		Hunan Services NP		International/Foreign Affairs NP		Public/Societal Benefit NP		Religious NP	
VARIABLES	XTnbreg	XTGEE	XTnbreg	XTGEE	XTnbreg	XTGEE	XTnbreg	XTGEE	XTnbreg	XTGEE	XTnbreg	XTGEE	XTnbreg	XTGEE	XTnbreg	XTGEE
regionalSubNP density	0.1535	0.2336*	0.1667	0.1229	0.0939	0.0983	-0.0995	0.0318	0.0038	0.0520	-0.1617	-0.1289	0.1400	0.1712	0.0388	0.0417
	(0.1181)	(0.1296)	(0.1117)	(0.0868)	(0.1747)	(0.1947)	(0.1081)	(0.1049)	(0.0982)	(0.0896)	(0.1658)	(0.1375)	(0.1014)	(0.1077)	(0.1200)	(0.0864)
regional sub-NP density*2	-0.0002	-0.0002	-0.0001	-0.0001***	-0.0002	0.0003	0.0000	-0.0001	0.0000	0.0000	0.0003	-0.0009	-0.0001	-0.0001***	0.0000	-0.0000
	(0.0002)	(0.0001)	(0.0001)	(0.0000)	(0.0012)	(0.0017)	(0.0002)	(0.0001)	(0.0000)	(0.0000)	(0.0041)	(0.0036)	(0.0001)	(0.0000)	(0.0000)	(0.0000)
subNP density	0.7241***	0.4851***	0.5102***	0.3039	-0.1180	-0.0987	0.6472***	0.4422**	0.7340***	0.2177	0.1290	0.1649	0.5929***	0.3551*	0.8891***	0.8051***
	(0.0945)	(0.1657)	(0.0872)	(0.2149)	(0.1142)	(0.2478)	(0.0869)	(0.1872)	(0.0748)	(0.3660)	(0.2128)	(0.1765)	(0.0857)	(0.2078)	(0.0917)	(0.1288)
sub-NP density*2	-0.0110***	-0.0130***	0.0002	-0.0037*	-0.0773**	-0.0847***	-0.0073**	-0.0079**	-0.0017***	-0.0024***	-0.1352**	-0.1978***	-0.0041***	-0.0049**	-0.0014***	-0.0023***
	(0.0036)	(0.0040)	(0.0015)	(0.0020)	(0.0347)	(0.0271)	(0.0031)	(0.0037)	(0.0004)	(0.0006)	(0.0565)	(0.0675)	(0.0016)	(0.0023)	(0.0003)	(0.0004)
sub-NP exit	0.0127	0.0225	-0.0088	-0.0133	0.0256	0.0240	0.0116	-0.0118	-0.0090	-0.0099	-0.0968	-0.0991	0.0069	0.0017	-0.0313**	-0.0511***
	(0.0269)	(0.0305)	(0.0208)	(0.0290)	(0.0921)	(0.1062)	(0.0219)	(0.0326)	(0.0087)	(0.0122)	(0.1240)	(0.1359)	(0.0216)	(0.0326)	(0.0133)	(0.0178)
sub-NP exit*2	0.0008	0.0006	0.0000	0.0006	0.0233	0.0241	-0.0009	-0.0008	0.0005***	0.0006**	0.0273	0.0517*	-0.0002	0.0001	0.0008**	0.0019***
	(0.0015)	(0.0013)	(0.0009)	(0.0013)	(0.0179)	(0.0219)	(0.0008)	(0.0010)	(0.0001)	(0.0003)	(0.0263)	(0.0304)	(0.0008)	(0.0021)	(0.0004)	(0.0007)
prior entry	0.0579***	0.1222***	0.0211***	0.0960***	-0.0353	-0.0524	0.0516***	0.1222***	0.0270***	0.0450***	0.0295	0.3135***	0.0311***	0.1002***	0.0282***	0.0577***
	(0.0066)	(0.0304)	(0.0040)	(0.0205)	(0.0217)	(0.0322)	(0.0071)	(0.0313)	(0.0013)	(0.0081)	(0.0253)	(0.0879)	(0.0043)	(0.0211)	(0.0019)	(0.0106)
population density	0.0017	0.0019	0.0020	0.0001	-0.0142***	-0.0040	0.0013	-0.0010	0.0013	0.0032	0.0021	0.0005	0.0032	0.0019	0.0025	0.0002
	(0.0031)	(0.0013)	(0.0037)	(0.0025)	(0.0052)	(0.0059)	(0.0032)	(0.0011)	(0.0030)	(0.0031)	(0.0062)	(0.0018)	(0.0035)	(0.0024)	(0.0032)	(0.0008)
population change	-0.0058	0.0179	0.0181	-0.0201	0.0815***	0.0717***	-0.0062	-0.0237	-0.0020	-0.0038	-0.0459	-0.0925***	0.0061	-0.0026	0.0281	0.0286*
	(0.0303)	(0.0233)	(0.0282)	(0.0198)	(0.0301)	(0.0276)	(0.0308)	(0.0282)	(0.0214)	(0.0136)	(0.0597)	(0.0320)	(0.0276)	(0.0239)	(0.0229)	(0.0168)
poverty level	-0.0320	-0.0341**	-0.0637***	-0.0545***	-0.0203	-0.0044	-0.0258	-0.0299**	-0.0525***	-0.0523***	-0.1584***	-0.1194***	-0.0107	0.0002	-0.0310**	-0.0469***
	(0.0196)	(0.0153)	(0.0178)	(0.0171)	(0.0219)	(0.0214)	(0.0202)	(0.0128)	(0.0142)	(0.0134)	(0.0380)	(0.0333)	(0.0173)	(0.0212)	(0.0152)	(0.0154)
population size	-0.0051	-0.0022	-0.0011	0.0085	0.0105*	0.0111	-0.0010	0.0052	-0.0107***	0.0090	0.0172**	0.0104	-0.0032	0.0009	-0.0073**	0.0025
	(0.0039)	(0.0032)	(0.0046)	(0.0054)	(0.0061)	(0.0075)	(0.0043)	(0.0036)	(0.0033)	(0.0071)	(0.0084)	(0.0063)	(0.0043)	(0.0050)	(0.0036)	(0.0033)
median income	-0.0193**	-0.0178**	-0.0247***	-0.0128**	-0.0068	-0.0007	-0.0093	-0.0043	-0.0173***	-0.0094	-0.0220	0.0028	-0.0048	0.0130**	-0.0054	-0.0074
	(0.0082)	(0.0072)	(0.0084)	(0.0062)	(0.0131)	(0.0146)	(0.0084)	(0.0079)	(0.0065)	(0.0081)	(0.0173)	(0.0140)	(0.0078)	(0.0063)	(0.0070)	(0.0074)
government spending	0.0092*	0.0075	0.0022	-0.0009	0.0046	0.0027	0.0042	-0.0025	0.0034	-0.0054	0.0168*	0.0074	0.0087**	0.0010	0.0075**	0.0014
	(0.0053)	(0.0048)	(0.0035)	(0.0032)	(0.0056)	(0.0042)	(0.0029)	(0.0029)	(0.0034)	(0.0046)	(0.0100)	(0.0093)	(0.0035)	(0.0042)	(0.0034)	(0.0039)
racial heterogeneity	-0.0715	-0.2898	2.6994***	0.5658	0.4872	-1.4384	-0.1245	-0.0434	0.6553	-0.0835	2.0136	0.7188	1.6461**	0.4867	1.0418*	0.9960**
	(0.6494)	(0.5371)	(0.7958)	(0.4894)	(0.9939)	(1.0189)	(0.6959)	(0.4831)	(0.5555)	(0.5950)	(1.3556)	(0.6503)	(0.6868)	(0.6549)	(0.6088)	(0.4523)
aging population	0.0000	-0.0026	0.0144	0.0119*	-0.0347**	-0.0028	0.0073	0.0074	-0.0079	0.0023	0.0293*	0.0312*	0.0072	0.0160**	0.0110	0.0050
	(0.0085)	(0.0069)	(0.0089)	(0.0070)	(0.0142)	(0.0158)	(0.0088)	(0.0057)	(0.0070)	(0.0083)	(0.0171)	(0.0164)	(0.0087)	(0.0069)	(0.0078)	(0.0049)
educational attainment	0.0150	0.0149**	0.0169*	0.0218**	0.0457***	0.0241*	0.0225**	0.0187**	0.0040	0.0242	0.0734***	0.0359	0.0156	0.0170	-0.0012	0.0014
	(0.0096)	(0.0073)	(0.0099)	(0.0095)	(0.0137)	(0.0136)	(0.0103)	(0.0079)	(0.0072)	(0.0161)	(0.0187)	(0.0221)	(0.0098)	(0.0107)	(0.0074)	(0.0049)
Constant	-1.5355*	-1.7711**	-1.9061**	-1.0436*	0.7859	0.2312	-0.7019	-1.3058**	-0.3869	0.3313	-0.1827	-1.1609	-2.5818***	-3.0745***	-3.2642***	-2.5739***
	(0.8981)	(0.7561)	(0.8797)	(0.5950)	(0.9648)	(1.0669)	(0.8629)	(0.5861)	(0.7809)	(0.8953)	(1.1985)	(1.1184)	(0.7833)	(0.6406)	(0.9969)	(0.5639)
Observations	938	938	938	938	938	938	938	938	938	938	938	938	938	938	938	938
Number of fips	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 5-6: Estimates of Regional Sub-population density, Local Main Population and Sub-population Density on Sub-population Entries

	Art/Culture NP		Education NP		Environment NP		Health NP		Hunan Services NP		International/Foreign Affairs NP		Public/Societal Benefit NP		Religious NP	
VARIABLES	XTnbreg	XTGEE	XTnbreg	XTGEE	XTnbreg	XTGEE	XTnbreg	XTGEE	XTnbreg	XTGEE	XTnbreg	XTGEE	XTnbreg	XTGEE	XTnbreg	XTGEE
regionalSubNP density	0.1057	0.2073	0.1326	0.0764	0.0665	0.0554	-0.0753	0.0464	-0.0378	0.0441	-0.2910*	-0.1811	0.1621	0.1985*	0.1420	0.0670
	(0.1322)	(0.1681)	(0.1093)	(0.0845)	(0.1761)	(0.2015)	(0.1184)	(0.1063)	(0.0995)	(0.1037)	(0.1661)	(0.1457)	(0.1037)	(0.1027)	(0.1282)	(0.0956)
regional sub-NP density*2	-0.0001	-0.0001	-0.0001	-0.0001	-0.0000	0.0005	0.0001	-0.0000	0.0000*	0.0000	0.0015	0.0009	-0.0001	-0.0002***	-0.0000	-0.0000
	(0.0002)	(0.0001)	(0.0001)	(0.0001)	(0.0012)	(0.0016)	(0.0002)	(0.0001)	(0.0000)	(0.0000)	(0.0043)	(0.0035)	(0.0001)	(0.0000)	(0.0000)	(0.0000)
main NP density	0.9410***	0.5142	1.1050***	1.2994***	0.1753	0.4472	1.4073***	0.8938***	1.9590***	2.1629***	1.1113***	0.5318	1.0707***	1.1847***	1.0453***	0.5570
	(0.2696)	(0.3922)	(0.2417)	(0.2439)	(0.2089)	(0.4589)	(0.2938)	(0.3044)	(0.2548)	(0.2252)	(0.2525)	(0.4147)	(0.2406)	(0.2162)	(0.2926)	(0.4744)
main NP density*2	-0.0011**	0.0006	-0.0007	-0.0008***	-0.0008	-0.0016	0.0003	0.0002	-0.0002	-0.0028***	0.0008	0.0002	0.0000	-0.0000	-0.0009**	-0.0005
	(0.0005)	(0.0004)	(0.0005)	(0.0003)	(0.0010)	(0.0012)	(0.0005)	(0.0007)	(0.0008)	(0.0010)	(0.0006)	(0.0005)	(0.0004)	(0.0005)	(0.0004)	(0.0003)
subNP density	0.0206	0.0534	0.2230*	0.5242*	0.2272	0.2556	0.2984*	0.1805*	0.9458***	1.3111***	0.1769	0.0101	0.2201*	0.4833*	0.1511	0.2644
	(0.2308)	(0.2023)	(0.1095)	(0.2988)	(0.1610)	(0.3734)	(0.1310)	(0.0866)	(0.2197)	(0.2718)	(0.2136)	(0.2613)	(0.1180)	(0.2774)	(0.3136)	(0.3556)
sub-NP density*2	-0.0260***	-0.0202***	-0.0037	-0.0003	-0.0270	0.0045	-0.0104*	-0.0085	-0.0010*	-0.0023	-0.2447***	-0.2191***	-0.0039	-0.0038	-0.0022***	-0.0026***
	(0.0073)	(0.0061)	(0.0027)	(0.0017)	(0.0712)	(0.0808)	(0.0060)	(0.0082)	(0.0007)	(0.0018)	(0.0738)	(0.0591)	(0.0025)	(0.0031)	(0.0006)	(0.0007)
sub-NP exit	0.0260	0.0215	-0.0140	-0.0145	0.0353	0.0149	0.0145	-0.0088	-0.0028	-0.0094	-0.1920	-0.0410	0.0107	0.0097	-0.0269**	-0.0518***
	(0.0277)	(0.0321)	(0.0213)	(0.0256)	(0.0925)	(0.1201)	(0.0215)	(0.0316)	(0.0086)	(0.0096)	(0.1404)	(0.1353)	(0.0219)	(0.0341)	(0.0132)	(0.0198)
sub-NP exit*2	0.0005	0.0002	0.0003	0.0012	0.0195	0.0252	-0.0009	-0.0011	0.0003**	0.0004	0.0485	0.0402*	-0.0004	-0.0004	0.0008**	0.0019**
	(0.0016)	(0.0015)	(0.0009)	(0.0013)	(0.0187)	(0.0280)	(0.0008)	(0.0010)	(0.0002)	(0.0003)	(0.0310)	(0.0223)	(0.0008)	(0.0021)	(0.0004)	(0.0007)
prior entry	0.0620***	0.1254***	0.0226***	0.0912***	-0.0366*	-0.0466	0.0499***	0.1233***	0.0277***	0.0405***	0.0539*	0.3204***	0.0321***	0.1003***	0.0284***	0.0587***
	(0.0065)	(0.0321)	(0.0041)	(0.0173)	(0.0218)	(0.0366)	(0.0078)	(0.0337)	(0.0012)	(0.0051)	(0.0300)	(0.0915)	(0.0043)	(0.0200)	(0.0019)	(0.0111)
population density	-0.0008	0.0015	0.0007	0.0002	-0.0129**	-0.0014	-0.0014	-0.0019	0.0004	-0.0023	-0.0004	-0.0004	0.0002	-0.0006	0.0017	-0.0005
	(0.0036)	(0.0019)	(0.0034)	(0.0018)	(0.0060)	(0.0074)	(0.0039)	(0.0016)	(0.0036)	(0.0031)	(0.0052)	(0.0019)	(0.0039)	(0.0014)	(0.0032)	(0.0011)
population change	0.0022	0.0195	0.0221	-0.0093	0.0813***	0.0786**	0.0094	-0.0156	-0.0056	-0.0174	0.0006	-0.0636	0.0087	0.0007	0.0417*	0.0361*
	(0.0318)	(0.0266)	(0.0281)	(0.0239)	(0.0303)	(0.0316)	(0.0326)	(0.0328)	(0.0212)	(0.0180)	(0.0622)	(0.0444)	(0.0279)	(0.0241)	(0.0227)	(0.0192)
poverty level	-0.0275	-0.0341**	-0.0558***	-0.0453***	-0.0226	-0.0013	-0.0212	-0.0243*	-0.0556***	-0.0672***	-0.1071***	-0.0931***	-0.0119	0.0043	-0.0154	-0.0379***
	(0.0203)	(0.0152)	(0.0177)	(0.0171)	(0.0221)	(0.0220)	(0.0204)	(0.0130)	(0.0141)	(0.0138)	(0.0399)	(0.0302)	(0.0175)	(0.0224)	(0.0155)	(0.0136)
population size	-0.0114**	-0.0056**	-0.0100**	-0.0030	0.0081	0.0020	-0.0066	0.0004	-0.0178***	0.0006	-0.0047	0.0016	-0.0054	-0.0050	-0.0097***	0.0011
	(0.0048)	(0.0025)	(0.0049)	(0.0034)	(0.0065)	(0.0063)	(0.0052)	(0.0052)	(0.0052)	(0.0045)	(0.0090)	(0.0055)	(0.0045)	(0.0033)	(0.0036)	(0.0036)
median income	-0.0230***	-0.0187**	-0.0278***	-0.0195**	-0.0076	-0.0052	-0.0243***	-0.0108	-0.0084	-0.0077	-0.0089	0.0037	-0.0069	0.0128*	-0.0098	-0.0091
	(0.0086)	(0.0075)	(0.0085)	(0.0080)	(0.0133)	(0.0143)	(0.0094)	(0.0080)	(0.0066)	(0.0062)	(0.0173)	(0.0162)	(0.0080)	(0.0073)	(0.0072)	(0.0076)
government spending	0.0142**	0.0113***	0.0038	0.0030	0.0123	0.0200	0.0021	-0.0030	0.0034	0.0059***	0.0278***	0.0113	0.0081*	0.0026	0.0033	-0.0022
	(0.0058)	(0.0039)	(0.0038)	(0.0027)	(0.0112)	(0.0136)	(0.0050)	(0.0078)	(0.0034)	(0.0016)	(0.0101)	(0.0096)	(0.0043)	(0.0049)	(0.0035)	(0.0039)
racial heterogeneity	-0.5211	-0.5483	2.5056***	0.6250	0.5675	-1.2978	-0.0677	-0.0687	1.0034*	0.9777**	1.3247	0.4361	1.3577*	0.2063	1.1691*	0.8641*
	(0.7294)	(0.6091)	(0.7848)	(0.5558)	(0.9955)	(0.8604)	(0.7704)	(0.5408)	(0.5646)	(0.4469)	(1.3684)	(0.7170)	(0.6989)	(0.6973)	(0.6435)	(0.4775)
aging population	0.0004	-0.0010	0.0060	-0.0015	-0.0360**	-0.0083	0.0064	0.0071	-0.0004	0.0029	0.0298*	0.0255	0.0050	0.0131**	0.0106	0.0008
	(0.0090)	(0.0067)	(0.0090)	(0.0088)	(0.0142)	(0.0138)	(0.0092)	(0.0064)	(0.0069)	(0.0060)	(0.0168)	(0.0166)	(0.0089)	(0.0062)	(0.0080)	(0.0042)
educational attainment	0.0146	0.0152**	0.0089	0.0123*	0.0419***	0.0113	0.0224**	0.0177**	-0.0080	-0.0066	0.0387**	0.0161	0.0108	0.0097	-0.0183**	-0.0124
	(0.0104)	(0.0073)	(0.0098)	(0.0071)	(0.0145)	(0.0169)	(0.0109)	(0.0080)	(0.0073)	(0.0054)	(0.0197)	(0.0160)	(0.0099)	(0.0081)	(0.0090)	(0.0091)
Constant	-3.8872***	-3.0242**	-4.8455***	-4.5196***	0.3598	-1.1363	-5.3338***	-4.3570***	-4.3403***	-4.8581***	-5.7905***	-3.5589	-5.6206***	-6.7911***	-4.8198***	-3.0928***
	(1.1862)	(1.2031)	(1.1112)	(0.8247)	(1.1664)	(1.8927)	(1.3680)	(1.3165)	(0.9509)	(0.8201)	(1.7690)	(2.9485)	(1.0785)	(0.9449)	(1.0649)	(0.6934)
Observations	938	938	938	938	938	938	938	938	938	938	938	938	938	938	938	938
Number of fips	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

In the next stage for examining the question --"which systemic parts have impact on population entries --Table 5-7 reports the effect of regional main population in the higher geographical boundary of identity space. Following the previous test procedure, the models of Table 5-7 shows the results of models with only regional main identity form in the complex heterogeneous population. The first-order density terms of regional sub-population density are positive and in the right direction across all sub-populations, as expected. However, the results show that six of eight populations are statistically significant whereas four populations are significant in the regional sub-density models which tested the effects of regional sub-populations on entries of subpopulations in the previous part (above Table5-4).

Even if the sizes of effects are weak, the second-order competitive effects produce significant coefficients in six of eight populations and in the expected direction. Even two sub-populations that do not show statistical significance – Environment Nonprofits and Human Service Nonprofits - are in the right directions with regard to expected effects. Thus, there are "spillover" legitimation and competitive effects at the regional main identity form, as Bigelow et al. (1997) reported in terms of geographical heterogeneity. The results reconfirm the existence of multilevel effects of identity form even in the geographical multilevel structure, even though all subpopulations do not show significant effects.

In sum, the results indicate that the regional main identity-form shows both legitimizing and competitive effects on sub-population entry, and both are statistically significant. Although the statistical significance of effects differs for each sub-population, the signs of effects are in the right direction, as expected. However, the results do not provide direct evidence about the effects of higher identity form in the geographical structure. In the next stage, the two terms of local subpopulation density will be added into the equations, as in the previous testing procedure. The question is whether the models of combined effects – regional main density, local main density, and local sub-population density -- still show the significance of regional main density effect.

The next sequential two stages will include local density variables into the equations. In other words, if the geographical multilevel effects that were reported by Hannan (1995) and Bigelow et al. (1997) were applied for our nonprofit populations, the two terms of regional main form density find statistically significant effects at the next two stages. However, when either local main density or local sup-population density is inserted in the equations, the disappearance of statistical significance in the coefficients of regional main form indicates that regional identity is less likely to influence the entry of sub-populations than local identity.

Table 5-7: Estimates of Regional Main-population density on Sub-population Entries

	Art/Culture NP		Education NP		Environment NP		Health NP		Hunan Services NP		International/Foreign Affairs NP		Public/Societal Benefit NP		Religious NP	
VARIABLES	XTnbreg	XTGEE	XTnbreg	XTGEE	XTnbreg	XTGEE	XTnbreg	XTGEE	XTnbreg	XTGEE	XTnbreg	XTGEE	XTnbreg	XTGEE	XTnbreg	XTGEE
regionalMainNP density	0.3280**	0.3013**	0.3245**	0.1999**	0.2296	0.1990	0.1744*	0.1782*	0.1031	0.1892	0.0677*	0.1735*	0.4249***	0.2889**	0.2559**	0.2423*
	(0.1415)	(0.1247)	(0.1328)	(0.1007)	(0.1709)	(0.2066)	(0.0850)	(0.1195)	(0.1388)	(0.1247)	(0.0329)	(0.0844)	(0.1297)	(0.1166)	(0.1305)	(0.1273)
regional main NP density*2	-0.0035***	-0.0031***	-0.0024**	-0.0035***	-0.0019	-0.0018	-0.0020**	-0.0025**	-0.0003	-0.0017	-0.0025***	-0.0050***	-0.0048***	-0.0045***	-0.0005	-0.0023***
	(0.0012)	(0.0009)	(0.0011)	(0.0012)	(0.0016)	(0.0020)	(0.0003)	(0.0011)	(0.0009)	(0.0011)	(0.0002)	(0.0019)	(0.0011)	(0.0013)	(0.0011)	(0.0009)
sub-NP exit	0.0255	0.0346	-0.0172	-0.0084	0.0116	0.0389	0.0005	-0.0210	-0.0093	-0.0246	0.0377	0.0096	-0.0190	-0.0150	-0.0492***	-0.0573**
	(0.0302)	(0.0370)	(0.0203)	(0.0296)	(0.0919)	(0.1108)	(0.0222)	(0.0373)	(0.0110)	(0.0166)	(0.1112)	(0.1406)	(0.0210)	(0.0313)	(0.0158)	(0.0223)
sub-NP exit*2	-0.0009	-0.0013	0.0002	-0.0003	0.0171	0.0103	-0.0009	-0.0007	0.0001	0.0003	-0.0128	-0.0220	0.0002	-0.0010	0.0007	0.0011
	(0.0018)	(0.0019)	(0.0008)	(0.0012)	(0.0172)	(0.0206)	(0.0008)	(0.0012)	(0.0002)	(0.0004)	(0.0207)	(0.0288)	(0.0008)	(0.0016)	(0.0005)	(0.0007)
prior entry	0.0569***	0.1128***	0.0207***	0.0842***	-0.0449**	-0.0552*	0.0440***	0.1070***	0.0283***	0.0394***	0.0194	0.3136***	0.0262***	0.0908***	0.0325***	0.0481***
	(0.0070)	(0.0249)	(0.0041)	(0.0157)	(0.0214)	(0.0323)	(0.0081)	(0.0241)	(0.0012)	(0.0065)	(0.0244)	(0.0820)	(0.0040)	(0.0177)	(0.0018)	(0.0082)
population density	0.0044	0.0014	0.0054	-0.0001	-0.0153***	-0.0050	0.0051	0.0021	0.0022	0.0006	-0.0001	-0.0009	0.0053	0.0031	0.0062	0.0020
	(0.0044)	(0.0021)	(0.0041)	(0.0028)	(0.0052)	(0.0056)	(0.0043)	(0.0028)	(0.0033)	(0.0030)	(0.0062)	(0.0019)	(0.0041)	(0.0027)	(0.0041)	(0.0027)
population change	-0.0151	0.0055	0.0106	-0.0251	0.0897***	0.0790***	-0.0136	-0.0305	-0.0029	-0.0053	-0.0411	-0.0954***	0.0049	-0.0069	0.0222	0.0298*
	(0.0326)	(0.0189)	(0.0289)	(0.0234)	(0.0297)	(0.0268)	(0.0329)	(0.0264)	(0.0228)	(0.0158)	(0.0604)	(0.0337)	(0.0288)	(0.0250)	(0.0246)	(0.0161)
poverty level	-0.0773***	-0.0653***	-0.0919***	-0.0775***	-0.0171	-0.0018	-0.0648***	-0.0527***	-0.0968***	-0.0613***	-0.1614***	-0.1028***	-0.0401**	-0.0205	-0.0468***	-0.0600***
	(0.0206)	(0.0185)	(0.0180)	(0.0192)	(0.0212)	(0.0253)	(0.0211)	(0.0159)	(0.0157)	(0.0187)	(0.0380)	(0.0304)	(0.0176)	(0.0246)	(0.0170)	(0.0152)
population size	0.0047	0.0082*	0.0096**	0.0134***	0.0054	0.0067	0.0073	0.0126***	-0.0048	0.0155***	0.0249***	0.0165***	0.0086*	0.0081*	-0.0024	0.0158***
	(0.0043)	(0.0043)	(0.0043)	(0.0042)	(0.0058)	(0.0047)	(0.0053)	(0.0048)	(0.0036)	(0.0038)	(0.0065)	(0.0046)	(0.0045)	(0.0047)	(0.0040)	(0.0038)
median income	-0.0215**	-0.0151*	-0.0346***	-0.0128**	-0.0140	-0.0059	-0.0235**	-0.0065	-0.0071	-0.0023	-0.0280*	0.0098	-0.0097	0.0180**	-0.0019	0.0008
	(0.0090)	(0.0082)	(0.0086)	(0.0061)	(0.0116)	(0.0134)	(0.0098)	(0.0083)	(0.0072)	(0.0057)	(0.0167)	(0.0122)	(0.0082)	(0.0071)	(0.0082)	(0.0076)
government spending	-0.0077**	-0.0104***	-0.0000	-0.0114***	0.0003	-0.0021	-0.0024	-0.0098***	-0.0080***	-0.0187***	-0.0049	-0.0131*	-0.0005	-0.0066*	-0.0041	-0.0162***
	(0.0032)	(0.0035)	(0.0021)	(0.0035)	(0.0048)	(0.0037)	(0.0026)	(0.0033)	(0.0028)	(0.0044)	(0.0047)	(0.0067)	(0.0022)	(0.0039)	(0.0030)	(0.0036)
racial heterogeneity	0.4081	-0.1917	3.5050***	0.6341	0.7487	-1.2366	0.8084	-0.0330	0.8889	0.1184	2.6850*	1.2572*	2.0853***	0.5292	0.9505	0.6709
	(0.8055)	(0.5930)	(0.8346)	(0.6475)	(1.0076)	(1.0697)	(0.8670)	(0.5517)	(0.7760)	(0.7104)	(1.4068)	(0.7041)	(0.7571)	(0.7732)	(0.8511)	(0.6984)
aging population	0.0141	0.0101	0.0171*	0.0216**	-0.0342**	0.0001	0.0180*	0.0195*	0.0039	0.0109	0.0309*	0.0403***	0.0206**	0.0279***	0.0193**	0.0171*
	(0.0098)	(0.0101)	(0.0094)	(0.0091)	(0.0137)	(0.0137)	(0.0102)	(0.0100)	(0.0082)	(0.0101)	(0.0173)	(0.0145)	(0.0094)	(0.0104)	(0.0095)	(0.0093)
educational attainment	0.0547***	0.0411***	0.0447***	0.0404***	0.0421***	0.0203	0.0674***	0.0475***	0.0242***	0.0305***	0.0782***	0.0445**	0.0549***	0.0379***	0.0155*	0.0171*
	(0.0098)	(0.0122)	(0.0093)	(0.0092)	(0.0129)	(0.0137)	(0.0104)	(0.0122)	(0.0076)	(0.0098)	(0.0156)	(0.0185)	(0.0090)	(0.0085)	(0.0086)	(0.0100)
Constant	-1.5630	-1.9252	-2.0210*	-1.1514	-0.5949	-0.9215	-1.1039	-1.7806	1.4235	-0.4283	-1.2529	-3.7523**	-3.9991***	-3.8445***	-1.3805	-1.3665
	(1.3536)	(1.2569)	(1.2091)	(0.9929)	(1.4780)	(1.7692)	(1.3814)	(1.1087)	(1.2654)	(1.1592)	(2.2295)	(1.5960)	(1.1916)	(1.1191)	(1.2067)	(1.0847)
Observations	938	938	938	938	938	938	938	938	938	938	938	938	938	938	938	938
Number of fips	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5-8 shows the combined effects of local sub-population density and regional main population density. Unlike the regional sub-population density (Table 5-5), the regional main form of population density holds a statistically significant effect in five of eight populations. And all populations show that the signs of effects are the same and in the right direction as expected. In other words, the four nonprofit populations -- Art/Culture Nonprofits, Education Nonprofits, Public benefit Nonprofits, and Religious Nonprofits –benefit from increasing numbers in the regional main identity form. However, the competitive effects of regional main form are not statistically significant. Only two of five populations which are significant in the previous tests retain significant relationships. According to the squared term of local sub-population density, the local level of sub-population density contains the competitive effect. All populations are statistically significant in the squared term of local nonprofit sub-populations.

Table 5-9 reports the results of models in which the local main population effect is added into the equation of regional main-population and local sub-population density. The models test which parts of the systemic structure with the three density effects have stronger effects on sub-population entries. As local main form density is inserted in the equations, significant changes occur. The effects of regional main form disappear in the equations across all sub-populations, even if the directions of coefficients are in the right direction with the exception of the Human Services Nonprofit population. Also, the effects of local main population change the statistical significance of sub-population density terms in Table 5-8, which tests the regional main-population effect and the local sup-population effect. This leads to a similar result as Table 5-3, which estimated effects of main density and sub-population density on sub-population entries. Even if the values of coefficients are slightly different, the directions of signs and significance are almost the same. Again,this result strongly rejects the part of hypothesis H3a related with the regional main-population effect.

In sum, the results from Table 5-7 to Table 5-8 indicate that regional main population density does not have an impact on the entry of nonprofit sub-populations. Only when the regional main-population density is considered without the local main population density effects (Table 5-7 ~8), do the effects of regional main density achieve statistically significant results. However, when local level nonprofit population effects are considered, the term effects disappear. This leads us to infer that the local main population density has stronger impact than the regional main population density on entry of nonprofit organizations in nonprofit sub-populations. In the same line of the previous results about regional sub-population density (Table 5-4~7), the results reconfirm that the nature of “operating”

nonprofits is highly rooted in the local community for the birth and operation of these organizations (Boris & Steuerle, 2006; Corbin, 1999; Gronbjerg & Paarlberg, 2001).

Table 5-8: Estimates of Regional Main-population density and Local Sub-population density on Sub-population Entries

	Art/Culture NP		Education NP		Environment NP		Health NP		Hunan Services NP		International/Foreign Affairs NP		Public/Societal Benefit NP		Religious NP	
VARIABLES	XTnbreg	XTGEE	XTnbreg	XTGEE	XTnbreg	XTGEE	XTnbreg	XTGEE	XTnbreg	XTGEE	XTnbreg	XTGEE	XTnbreg	XTGEE	XTnbreg	XTGEE
regionalMainNP density	0.1551*	0.2032*	0.1749*	0.1216*	0.1956	0.1491	0.0881	0.0477	0.0458	0.1016	0.0612	0.0883	0.1596*	0.1569*	0.0383*	0.0536*
	(0.0794)	(0.1176)	(0.0845)	(0.0604)	(0.1772)	(0.2078)	(0.1267)	(0.1179)	(0.1016)	(0.1045)	(0.2364)	(0.1864)	(0.0730)	(0.0704)	(0.1012)	(0.0208)
regional main NP density*2	-0.0008*	-0.0009	-0.0017*	-0.0024***	-0.0007	-0.0005	0.0006	-0.0004	0.0009	-0.0003	-0.0002	-0.0028	-0.0017*	-0.0021**	-0.0009	-0.0002
	(0.0003)	(0.0009)	(0.00082)	(0.0009)	(0.0017)	(0.0018)	(0.0013)	(0.0009)	(0.0009)	(0.0006)	(0.0025)	(0.0019)	(0.0008)	(0.0010)	(0.0010)	(0.0005)
subNP density	0.7312***	0.4831***	0.5097***	0.3045	-0.1252	-0.0899	0.6431***	0.4451**	0.7331***	0.2168*	0.1267	0.1514	0.5960***	0.3582*	0.8908***	0.8058***
	(0.0947)	(0.1676)	(0.0872)	(0.2155)	(0.1132)	(0.2456)	(0.0866)	(0.1847)	(0.0748)	(0.1061)	(0.2160)	(0.1724)	(0.0858)	(0.2064)	(0.0915)	(0.1268)
sub-NP density*2	-0.0115***	-0.0136***	0.0002	-0.0036*	-0.0746**	-0.0782***	-0.0076**	-0.0082**	-0.0016***	-0.0023***	-0.1313**	-0.1715**	-0.0043***	-0.0051**	-0.0014***	-0.0023***
	(0.0036)	(0.0039)	(0.0015)	(0.0020)	(0.0346)	(0.0249)	(0.0031)	(0.0036)	(0.0004)	(0.0006)	(0.0542)	(0.0671)	(0.0015)	(0.0023)	(0.0003)	(0.0004)
sub-NP exit	0.0126	0.0240	-0.0088	-0.0142	0.0272	0.0243	0.0115	-0.0114	-0.0095	-0.0102	-0.1013	-0.0794	0.0066	0.0018	-0.0312**	-0.0512***
	(0.0269)	(0.0307)	(0.0209)	(0.0292)	(0.0921)	(0.1081)	(0.0219)	(0.0328)	(0.0086)	(0.0123)	(0.1259)	(0.1383)	(0.0217)	(0.0329)	(0.0133)	(0.0178)
sub-NP exit*2	0.0008	0.0005	0.0000	0.0006	0.0229	0.0239	-0.0009	-0.0008	0.0005***	0.0006**	0.0283	0.0447	-0.0002	0.0001	0.0008**	0.0019***
	(0.0015)	(0.0013)	(0.0009)	(0.0013)	(0.0179)	(0.0225)	(0.0008)	(0.0010)	(0.0001)	(0.0003)	(0.0267)	(0.0315)	(0.0008)	(0.0021)	(0.0004)	(0.0007)
prior entry	0.0580***	0.1225***	0.0212***	0.0960***	-0.0351	-0.0524	0.0517***	0.1222***	0.0268***	0.0450***	0.0274	0.3135***	0.0309***	0.1006***	0.0282***	0.0576***
	(0.0066)	(0.0307)	(0.0040)	(0.0206)	(0.0218)	(0.0325)	(0.0072)	(0.0312)	(0.0013)	(0.0080)	(0.0250)	(0.0873)	(0.0044)	(0.0217)	(0.0018)	(0.0106)
population density	0.0018	0.0020	0.0019	-0.0000	-0.0143***	-0.0037	0.0014	-0.0009	0.0013	0.0030	0.0019	0.0001	0.0035	0.0020	0.0026	0.0002
	(0.0031)	(0.0013)	(0.0037)	(0.0025)	(0.0052)	(0.0057)	(0.0032)	(0.0011)	(0.0030)	(0.0030)	(0.0062)	(0.0019)	(0.0035)	(0.0023)	(0.0032)	(0.0008)
population change	-0.0030	0.0187	0.0182	-0.0190	0.0811***	0.0712***	-0.0046	-0.0218	-0.0025	-0.0053	-0.0447	-0.1007***	0.0067	-0.0013	0.0286	0.0288*
	(0.0303)	(0.0234)	(0.0283)	(0.0196)	(0.0300)	(0.0274)	(0.0307)	(0.0281)	(0.0214)	(0.0135)	(0.0600)	(0.0329)	(0.0276)	(0.0243)	(0.0229)	(0.0167)
poverty level	-0.0313	-0.0349**	-0.0630***	-0.0538***	-0.0208	-0.0045	-0.0254	-0.0295**	-0.0513***	-0.0518***	-0.1574***	-0.1171***	-0.0100	0.0005	-0.0309**	-0.0465***
	(0.0196)	(0.0154)	(0.0178)	(0.0171)	(0.0219)	(0.0210)	(0.0202)	(0.0130)	(0.0142)	(0.0135)	(0.0378)	(0.0334)	(0.0173)	(0.0208)	(0.0152)	(0.0155)
population size	-0.0054	-0.0021	-0.0013	0.0082	0.0095	0.0097	-0.0011	0.0050	-0.0113***	0.0086	0.0165*	0.0099	-0.0033	0.0011	-0.0073**	0.0023
	(0.0039)	(0.0032)	(0.0046)	(0.0054)	(0.0061)	(0.0071)	(0.0043)	(0.0037)	(0.0034)	(0.0069)	(0.0085)	(0.0063)	(0.0044)	(0.0053)	(0.0036)	(0.0032)
median income	-0.0200**	-0.0174**	-0.0254***	-0.0134**	-0.0078	0.0005	-0.0105	-0.0054	-0.0174***	-0.0089	-0.0273	0.0017	-0.0045	0.0142**	-0.0055	-0.0080
	(0.0083)	(0.0072)	(0.0086)	(0.0064)	(0.0120)	(0.0143)	(0.0087)	(0.0083)	(0.0063)	(0.0079)	(0.0168)	(0.0130)	(0.0079)	(0.0064)	(0.0071)	(0.0076)
government spending	0.0094*	0.0080*	0.0022	-0.0010	0.0050	0.0034	0.0042	-0.0025	0.0034	-0.0055	0.0164*	0.0054	0.0091***	0.0011	0.0074**	0.0014
	(0.0053)	(0.0047)	(0.0035)	(0.0032)	(0.0056)	(0.0040)	(0.0029)	(0.0030)	(0.0034)	(0.0046)	(0.0098)	(0.0093)	(0.0035)	(0.0043)	(0.0034)	(0.0039)
racial heterogeneity	-0.1066	-0.3546	2.6319***	0.5055	0.6844	-1.1964	-0.0799	-0.0516	0.7665	0.0278	2.1207	1.0760	1.6251**	0.3763	1.0432*	1.0181**
	(0.6527)	(0.5252)	(0.7818)	(0.4881)	(1.0150)	(1.0794)	(0.6958)	(0.4719)	(0.5645)	(0.5624)	(1.4172)	(0.6557)	(0.6899)	(0.7486)	(0.6053)	(0.4518)
aging population	-0.0008	-0.0030	0.0131	0.0103	-0.0342**	-0.0009	0.0067	0.0065	-0.0072	0.0041	0.0272	0.0347**	0.0067	0.0152**	0.0111	0.0049
	(0.0086)	(0.0071)	(0.0088)	(0.0072)	(0.0141)	(0.0152)	(0.0089)	(0.0060)	(0.0070)	(0.0087)	(0.0175)	(0.0154)	(0.0088)	(0.0071)	(0.0076)	(0.0050)
educational attainment	0.0145	0.0147**	0.0174*	0.0223**	0.0454***	0.0240*	0.0220**	0.0186**	0.0045	0.0246	0.0738***	0.0374*	0.0155	0.0167	-0.0013	0.0015
	(0.0096)	(0.0075)	(0.0099)	(0.0096)	(0.0135)	(0.0131)	(0.0103)	(0.0077)	(0.0071)	(0.0162)	(0.0187)	(0.0218)	(0.0098)	(0.0105)	(0.0074)	(0.0049)
Constant	-1.9101*	-2.0784**	-2.2533**	-1.2344	-0.3358	-0.6371	-0.5009	-1.4781*	-0.7924	-0.2231	-0.0445	-2.4126	-3.0689***	-3.3467***	-3.3089***	-2.7129***
	(1.1591)	(0.9585)	(1.1177)	(0.7625)	(1.5245)	(1.7532)	(1.2083)	(0.8123)	(0.9473)	(0.9328)	(2.2778)	(1.5656)	(1.1203)	(0.9486)	(0.9752)	(0.5567)
Observations	938	938	938	938	938	938	938	938	938	938	938	938	938	938	938	938
Number of fips	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5-9: Estimates of Regional Main-population density, Local Main Population density, and Sub-population density on Sub-population Entries

	Art/Culture NP		Education NP		Environment NP		Health NP		Hunan Services NP		International/Foreign Affairs NP		Public/Societal Benefit NP		Religious NP	
VARIABLES	XTnbreg	XTGEE	XTnbreg	XTGEE	XTnbreg	XTGEE	XTnbreg	XTGEE	XTnbreg	XTGEE	XTnbreg	XTGEE	XTnbreg	XTGEE	XTnbreg	XTGEE
regionalMainNP density	0.1018	0.1683	0.1453	0.0955	0.1626	0.0803	0.0759	0.0490	0.0262	0.0385	0.2308	0.0188	0.1472	0.1541*	0.0964	0.0672
	(0.1332)	(0.1581)	(0.1217)	(0.0966)	(0.1814)	(0.2129)	(0.1383)	(0.1254)	(0.1043)	(0.1065)	(0.2435)	(0.2274)	(0.1253)	(0.0885)	(0.1061)	(0.1004)
regional main NP density*2	-0.0009	-0.0008	-0.0011	-0.0012	-0.0004	-0.0001	-0.0012	-0.0000	0.0013	0.0002	-0.0000	-0.0018	-0.0015	-0.0022**	-0.0002	-0.0003
	(0.0013)	(0.0010)	(0.0013)	(0.0011)	(0.0017)	(0.0018)	(0.0014)	(0.0010)	(0.0009)	(0.0007)	(0.0026)	(0.0022)	(0.0013)	(0.0009)	(0.0012)	(0.0007)
main NP density	0.9432***	0.5157*	1.1095***	1.3072***	0.1484	0.4359	1.4102***	0.8930***	1.9630***	2.1612***	1.0872***	0.5088	1.0549***	1.1797***	1.0208***	0.5496*
	(0.2699)	(0.2533)	(0.2412)	(0.2438)	(0.2114)	(0.4608)	(0.2925)	(0.3080)	(0.2559)	(0.2240)	(0.2495)	(0.4226)	(0.2406)	(0.2062)	(0.2899)	(0.2514)
main NP density*2	-0.0011**	-0.0006*	-0.0007*	-0.0008***	-0.0008	-0.0015	-0.0003	-0.0002	-0.0002	-0.0028***	0.0009	0.0003	0.0001	-0.0000	-0.0009**	-0.0005
	(0.0005)	(0.0003)	(0.0003)	(0.0003)	(0.0010)	(0.0012)	(0.0005)	(0.0007)	(0.0009)	(0.0011)	(0.0006)	(0.0005)	(0.0004)	(0.0005)	(0.0004)	(0.0003)
subNP density	0.0228	0.0482	0.2267*	0.5291*	-0.2194	-0.2467	0.3039*	0.1778*	0.9492***	1.3093***	0.1715	0.0042	0.2001*	0.4774*	-0.1217	0.2740
	(0.2316)	(0.2090)	(0.1102)	(0.2984)	(0.1612)	(0.3748)	(0.1495)	(0.0846)	(0.2205)	(0.2693)	(0.2150)	(0.2514)	(0.0978)	(0.2712)	(0.3094)	(0.3626)
sub-NP density*2	-0.0263***	-0.0204***	-0.0038	-0.0003	-0.0261	-0.0079	-0.0103*	-0.0086*	-0.0009	0.0023	-0.2382***	-0.2038***	-0.0044*	-0.0041	-0.0022***	-0.0026***
	(0.0074)	(0.0061)	(0.0027)	(0.0017)	(0.0708)	(0.0774)	(0.0059)	(0.0042)	(0.0012)	(0.0018)	(0.0719)	(0.0584)	(0.0024)	(0.0031)	(0.0006)	(0.0007)
sub-NP exit	0.0260	0.0225	-0.0141	-0.0146	0.0363	0.0150	0.0143	-0.0086	-0.0032	-0.0093	-0.1963	-0.0324	0.0110	0.0090	-0.0269**	-0.0520***
	(0.0278)	(0.0322)	(0.0213)	(0.0256)	(0.0925)	(0.1214)	(0.0215)	(0.0317)	(0.0086)	(0.0096)	(0.1401)	(0.1368)	(0.0219)	(0.0344)	(0.0132)	(0.0199)
sub-NP exit*2	0.0005	0.0002	0.0003	0.0013	0.0193	0.0251	-0.0009	-0.0011	0.0003**	0.0004	0.0498	0.0371*	-0.0004	-0.0004	0.0008**	0.0019**
	(0.0016)	(0.0015)	(0.0009)	(0.0013)	(0.0187)	(0.0284)	(0.0008)	(0.0010)	(0.0002)	(0.0003)	(0.0309)	(0.0219)	(0.0008)	(0.0022)	(0.0004)	(0.0007)
prior entry	0.0621***	0.1257***	0.0227***	0.0912***	-0.0365*	-0.0467	0.0500***	0.1233***	0.0276***	0.0405***	0.0512*	0.3187***	0.0321***	0.1006***	0.0284***	0.0587***
	(0.0066)	(0.0325)	(0.0041)	(0.0172)	(0.0219)	(0.0366)	(0.0078)	(0.0337)	(0.0012)	(0.0052)	(0.0297)	(0.0921)	(0.0044)	(0.0206)	(0.0019)	(0.0110)
population density	-0.0007	0.0016	0.0006	0.0002	-0.0129**	-0.0012	-0.0015	-0.0019	0.0005	-0.0023	-0.0006	-0.0006	0.0002	-0.0005	0.0018	-0.0004
	(0.0035)	(0.0019)	(0.0034)	(0.0018)	(0.0059)	(0.0072)	(0.0039)	(0.0016)	(0.0037)	(0.0031)	(0.0052)	(0.0019)	(0.0039)	(0.0013)	(0.0032)	(0.0011)
population change	0.0036	0.0196	0.0222	-0.0087	0.0810***	0.0783**	0.0093	-0.0148	-0.0058	-0.0177	0.0003	-0.0718	0.0095	0.0012	0.0425*	0.0364*
	(0.0317)	(0.0266)	(0.0282)	(0.0242)	(0.0301)	(0.0312)	(0.0324)	(0.0325)	(0.0212)	(0.0182)	(0.0623)	(0.0473)	(0.0280)	(0.0242)	(0.0227)	(0.0192)
poverty level	-0.0273	-0.0352**	-0.0553***	-0.0445***	-0.0231	-0.0014	-0.0213	-0.0246*	-0.0547***	-0.0670***	-0.1039***	-0.0910***	-0.0116	0.0042	-0.0155	-0.0376***
	(0.0203)	(0.0152)	(0.0177)	(0.0171)	(0.0222)	(0.0218)	(0.0204)	(0.0130)	(0.0140)	(0.0138)	(0.0397)	(0.0308)	(0.0175)	(0.0219)	(0.0154)	(0.0136)
population size	-0.0116**	-0.0053**	-0.0102**	-0.0033	0.0075	0.0013	-0.0065	0.0005	-0.0184***	0.0006	-0.0053	0.0009	-0.0052	-0.0044	-0.0094***	0.0010
	(0.0048)	(0.0025)	(0.0049)	(0.0034)	(0.0065)	(0.0060)	(0.0052)	(0.0052)	(0.0052)	(0.0045)	(0.0090)	(0.0057)	(0.0045)	(0.0034)	(0.0036)	(0.0034)
median income	-0.0231***	-0.0177**	-0.0284***	-0.0201**	-0.0088	-0.0039	-0.0249***	-0.0115	-0.0082	-0.0068	-0.0146	0.0022	-0.0061	0.0150**	-0.0095	-0.0097
	(0.0086)	(0.0074)	(0.0086)	(0.0084)	(0.0122)	(0.0143)	(0.0096)	(0.0083)	(0.0064)	(0.0062)	(0.0167)	(0.0143)	(0.0080)	(0.0074)	(0.0072)	(0.0077)
government spending	0.0144**	0.0115***	0.0038	0.0030	0.0125	0.0202	0.0022	-0.0030	0.0033	0.0059***	0.0266***	0.0097	0.0080*	0.0023	0.0032	-0.0022
	(0.0058)	(0.0038)	(0.0039)	(0.0027)	(0.0112)	(0.0134)	(0.0050)	(0.0079)	(0.0034)	(0.0017)	(0.0099)	(0.0099)	(0.0043)	(0.0049)	(0.0035)	(0.0039)
racial heterogeneity	-0.5452	-0.6017	2.4575***	0.6163	0.7270	-1.1527	-0.0482	-0.0931	1.0575*	0.9886**	1.2719	0.6678	1.2719*	0.0384	1.1122*	0.8751*
	(0.7303)	(0.5939)	(0.7702)	(0.5540)	(1.0148)	(0.9284)	(0.7665)	(0.5290)	(0.5733)	(0.4559)	(1.4095)	(0.8096)	(0.7005)	(0.7718)	(0.6343)	(0.4876)
aging population	0.0000	-0.0012	0.0050	-0.0023	-0.0355**	-0.0070	0.0062	0.0064	-0.0002	0.0034	0.0264	0.0278*	0.0043	0.0121*	0.0101	0.0006
	(0.0091)	(0.0069)	(0.0088)	(0.0087)	(0.0141)	(0.0132)	(0.0093)	(0.0066)	(0.0070)	(0.0059)	(0.0173)	(0.0146)	(0.0089)	(0.0065)	(0.0078)	(0.0042)
educational attainment	0.0142	0.0151**	0.0093	0.0126*	0.0423***	0.0115	0.0225**	0.0176**	-0.0075	-0.0067	0.0409**	0.0190	0.0107	0.0095	-0.0180**	-0.0123
	(0.0104)	(0.0074)	(0.0098)	(0.0071)	(0.0143)	(0.0164)	(0.0108)	(0.0079)	(0.0072)	(0.0054)	(0.0195)	(0.0157)	(0.0100)	(0.0081)	(0.0090)	(0.0092)
Constant	-4.1222***	-3.2165***	-5.1808***	-4.8305***	-0.5199	-1.5764	-5.1252***	-4.4596***	-4.4329***	-4.9206***	-4.5582*	-3.9584*	-5.8312***	-6.8660***	-4.6149***	-3.1631***
	(1.4064)	(1.2028)	(1.3074)	(1.0376)	(1.6058)	(2.2157)	(1.6367)	(1.3298)	(1.0895)	(0.9733)	(2.5177)	(2.0824)	(1.3295)	(1.0048)	(1.0200)	(0.6252)
Observations	938	938	938	938	938	938	938	938	938	938	938	938	938	938	938	938
Number of fips	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

From the previous tests two main findings are observed. First, in the identity space, the main form mainly shows a legitimating effect on the entries of nonprofit sub-populations, while competitive effects are contained largely in the sub-populations. This indicates that the systemic structure of multilevel form matters. Second, considering the geographical heterogeneity of both main form and sub-forms, the regional effects do not hold statistical significance. This means that the local dynamics have stronger effects than the regional dynamics on organizational entry into populations. However, the findings are somewhat indirect evidence in terms of not considering the whole systemic structure.

Table 5-10 shows the combined effects of the whole systemic structure. The overall patterns of models finally confirm the initial findings from the previous tests. The legitimating effect of local main nonprofit density is statistically significant in seven of eight populations, taking into account the whole systemic structure. Even if the Environmental Nonprofit population is not significant, the sign of legitimation effect is in the right direction. However, only two of eight populations show significant coefficients in the competitive effect of the local main population. The competitive effects are mainly contained in the local sub-population, as the coefficients of squared terms in the local sub-population density variables show statistical significance in seven of eight populations. For the legitimation effects of local individual populations, four of eight populations show statistical significance. Therefore, the results not only bring final support for hypothesis H2a, but also partially disconfirm hypothesis H2b. The effect of density-dependent legitmation is stronger for the main identity form than for individual sub-population forms, considering the significant coefficients of the main form across most populations. This indicates that H2c is supported. In sum, there is an existence and significant effects of multilevel identity form in the heterogeneous population.

The regional effects, however, are confirmed with no effects on the entries of nonprofit sub-populations. With all density variables in the whole hierarchical structure of the populations, the four regional effects of both main and individual population do not hold statistically significant results. Even in some population models, the signs are opposite what was predicted. Therefore, hypothesis H3a is disconfirmed. The sequential tests about the regional effects showed that there is a “spill over” effect with models testing the regional variables alone. Together with the local effects of main and individual population, the patterns of regional variables have no significant effects on either legitimation or competition at all. This indicates that both legitimation and competition effects are highly rooted in the local level. This finding thus disconfirms hypothesis H3b, but at the same time supports hypothesis H3c.

Table 5-10: Estimates of Whole Systemic Structure on Sub-population Entries

	Art/Culture NP		Education NP		Environment NP		Health NP		Hunan Services NP		International/Foreign Affairs NP		Public/Societal Benefit NP		Religious NP	
VARIABLES	XTnbreg	XTGEE	XTnbreg	XTGEE	XTnbreg	XTGEE	XTnbreg	XTGEE	XTnbreg	XTGEE	XTnbreg	XTGEE	XTnbreg	XTGEE	XTnbreg	XTGEE
main NP density	0.8870***	0.5473*	1.0919***	1.2793***	0.1136	0.4261	1.3466***	0.8507***	1.8811***	2.1849***	1.0275***	0.3951	1.2198***	1.4244***	1.2796***	0.4940*
	(0.2754)	(0.2642)	(0.2411)	(0.2323)	(0.2134)	(0.4587)	(0.3042)	(0.3138)	(0.2631)	(0.2412)	(0.2497)	(0.4249)	(0.2521)	(0.2960)	(0.3334)	(0.2486)
main NP density*2	-0.0010**	-0.0006*	-0.0008*	-0.0010***	-0.0009	-0.0014	-0.0002	-0.0000	0.0002	-0.0026**	0.0006	-0.0002	-0.0001	0.0000	-0.0010	-0.0005*
	(0.0005)	(0.0003)	(0.0004)	(0.0003)	(0.0010)	(0.0015)	(0.0005)	(0.0006)	(0.0009)	(0.0010)	(0.0006)	(0.0005)	(0.0005)	(0.0004)	(0.0015)	(0.0002)
subNP density	0.0601	0.0441	0.2156*	0.4962*	-0.1807	-0.2382	0.2552*	0.1550*	0.8714***	1.3439***	0.1494	0.0328	0.3394*	0.6265**	0.4136	0.3481
	(0.2358)	(0.1994)	(0.1091)	(0.2831)	(0.1648)	(0.3799)	(0.1191)	(0.0752)	(0.2314)	(0.2882)	(0.2168)	(0.2523)	(0.2043)	(0.3175)	(0.3617)	(0.4658)
sub-NP density*2	-0.0247***	-0.0201***	-0.0039*	-0.0010	-0.0178	-0.0043	-0.0096*	-0.0077*	-0.0016*	-0.0019*	-0.2571***	-0.1929***	-0.0033*	-0.0041*	-0.0023***	-0.0026***
	(0.0073)	(0.0054)	(0.0017)	(0.0016)	(0.0734)	(0.0965)	(0.0046)	(0.0034)	(0.0008)	(0.0009)	(0.0762)	(0.0532)	(0.0016)	(0.0020)	(0.0007)	(0.0006)
regionalMainNP density	-0.1596	-1.5292*	0.6109	0.6639	0.6440	0.2798	0.3362	0.0334	0.6649	-0.3661	-0.0001	0.4284	-1.2406**	-2.1221*	-1.1898	0.3993
	(0.9423)	(0.9046)	(0.8011)	(0.7310)	(0.4967)	(0.6766)	(0.6988)	(0.5251)	(0.5996)	(0.5669)	(0.3264)	(0.3679)	(0.6267)	(1.2324)	(0.7567)	(0.8821)
regional main NP density*2	0.0114	0.0130	0.0050	0.0105	0.0007	-0.0102	0.0018	0.0052	-0.0083	-0.0032	0.0351	0.0311***	0.0062	0.0066	-0.0037	0.0031
	(0.0090)	(0.0120)	(0.0066)	(0.0071)	(0.0100)	(0.0185)	(0.0069)	(0.0066)	(0.0058)	(0.0044)	(0.0444)	(0.0111)	(0.0056)	(0.0088)	(0.0097)	(0.0064)
regionalSubNP density	0.2382	1.7062*	-0.3268	0.2135	-0.5117	-0.1506	-0.3601	0.0005	-0.6235	0.4258	-0.0352	-0.0424	1.1721**	1.9463*	1.4487	-0.3498
	(0.9370)	(1.0017)	(0.6660)	(0.5675)	(0.4701)	(0.6176)	(0.5971)	(0.4417)	(0.5795)	(0.5583)	(0.0366)	(0.0502)	(0.5226)	(1.0596)	(0.9083)	(0.9073)
regional sub-NP density*2	-0.0016	-0.0018	-0.0004	-0.0007**	-0.0012	0.0073	-0.0001	-0.0006	0.0002	0.0001	0.0117	0.0347	-0.0005	-0.0005	0.0000	-0.0001
	(0.0011)	(0.0016)	(0.0004)	(0.0003)	(0.0072)	(0.0136)	(0.0008)	(0.0007)	(0.0002)	(0.0001)	(0.0125)	(0.0439)	(0.0003)	(0.0005)	(0.0002)	(0.0001)
sub-NP exit	0.0292	0.0166	-0.0167	-0.0134	0.0415	0.0098	0.0138	-0.0092	-0.0008	-0.0108	-0.2077	0.0109	0.0123	0.0044	-0.0254*	-0.0509***
	(0.0276)	(0.0317)	(0.0214)	(0.0255)	(0.0931)	(0.1225)	(0.0216)	(0.0311)	(0.0086)	(0.0096)	(0.1429)	(0.1474)	(0.0218)	(0.0338)	(0.0133)	(0.0187)
sub-NP exit*2	0.0004	0.0004	0.0005	0.0014	0.0182	0.0262	-0.0009	-0.0010	0.0003*	0.0004	0.0490	0.0243	-0.0005	-0.0004	0.0007**	0.0019***
	(0.0016)	(0.0015)	(0.0009)	(0.0014)	(0.0189)	(0.0292)	(0.0008)	(0.0010)	(0.0002)	(0.0003)	(0.0312)	(0.0255)	(0.0008)	(0.0021)	(0.0004)	(0.0007)
prior entry	0.0629***	0.1250***	0.0227***	0.0901***	-0.0358	-0.0466	0.0493***	0.1229***	0.0278***	0.0402***	0.0664**	0.3320***	0.0336***	0.0976***	0.0279***	0.0584***
	(0.0065)	(0.0311)	(0.0041)	(0.0165)	(0.0221)	(0.0364)	(0.0080)	(0.0333)	(0.0012)	(0.0049)	(0.0312)	(0.0847)	(0.0044)	(0.0183)	(0.0019)	(0.0108)
population density	-0.0023	0.0014	0.0011	0.0004	-0.0118*	-0.0032	-0.0020	-0.0025	0.0002	-0.0026	-0.0025	-0.0040	0.0010	0.0006	0.0006	-0.0000
	(0.0038)	(0.0019)	(0.0035)	(0.0018)	(0.0066)	(0.0092)	(0.0040)	(0.0020)	(0.0036)	(0.0032)	(0.0052)	(0.0025)	(0.0038)	(0.0015)	(0.0034)	(0.0014)
population change	-0.0014	0.0203	0.0225	-0.0101	0.0748**	0.0736**	0.0069	-0.0175	-0.0091	-0.0187	-0.0189	-0.0776	0.0153	0.0024	0.0354	0.0391**
	(0.0319)	(0.0278)	(0.0281)	(0.0240)	(0.0309)	(0.0307)	(0.0328)	(0.0328)	(0.0212)	(0.0184)	(0.0633)	(0.0478)	(0.0279)	(0.0254)	(0.0232)	(0.0177)
poverty level	-0.0301	-0.0321**	-0.0556***	-0.0422**	-0.0247	-0.0060	-0.0239	-0.0287**	-0.0583***	-0.0692***	-0.1068***	-0.1103***	-0.0099	0.0083	-0.0155	-0.0376***
	(0.0204)	(0.0151)	(0.0178)	(0.0176)	(0.0228)	(0.0230)	(0.0208)	(0.0138)	(0.0144)	(0.0141)	(0.0405)	(0.0363)	(0.0177)	(0.0209)	(0.0155)	(0.0137)
population size	-0.0095*	-0.0057**	-0.0099**	-0.0027	0.0053	0.0037	-0.0055	0.0020	-0.0176***	0.0015	-0.0023	0.0124**	-0.0056	-0.0059*	-0.0093**	0.0005
	(0.0049)	(0.0027)	(0.0049)	(0.0033)	(0.0073)	(0.0091)	(0.0055)	(0.0056)	(0.0053)	(0.0048)	(0.0087)	(0.0055)	(0.0044)	(0.0033)	(0.0037)	(0.0030)
median income	-0.0257***	-0.0239***	-0.0306***	-0.0289***	0.0008	-0.0088	-0.0267***	-0.0137	-0.0081	-0.0110	-0.0003	0.0148	-0.0059	0.0143*	-0.0054	-0.0119
	(0.0091)	(0.0092)	(0.0090)	(0.0103)	(0.0145)	(0.0138)	(0.0100)	(0.0092)	(0.0073)	(0.0068)	(0.0175)	(0.0140)	(0.0080)	(0.0077)	(0.0078)	(0.0096)
government spending	0.0137**	0.0108**	0.0039	0.0023	0.0141	0.0187	0.0025	-0.0023	0.0034	0.0051***	0.0321***	0.0088	0.0084**	0.0022	0.0038	-0.0019
	(0.0058)	(0.0044)	(0.0038)	(0.0028)	(0.0116)	(0.0165)	(0.0051)	(0.0076)	(0.0033)	(0.0018)	(0.0102)	(0.0086)	(0.0043)	(0.0045)	(0.0035)	(0.0037)
racial heterogeneity	-0.5778	-0.5626	2.4805***	0.4360	1.1567	-1.2141	-0.1261	-0.0945	1.1105*	0.8928**	1.6220	1.4532*	1.2741*	0.3067	1.1450*	0.9111*
	(0.7360)	(0.6042)	(0.7930)	(0.5606)	(1.0776)	(0.9979)	(0.7732)	(0.5353)	(0.5728)	(0.4460)	(1.4407)	(0.8724)	(0.6898)	(0.6367)	(0.6710)	(0.5064)
aging population	-0.0021	-0.0049	0.0061	-0.0046	-0.0313**	-0.0055	0.0059	0.0056	0.0018	0.0016	0.0341*	0.0422***	0.0059	0.0167***	0.0130	0.0002
	(0.0093)	(0.0081)	(0.0093)	(0.0095)	(0.0144)	(0.0122)	(0.0093)	(0.0066)	(0.0071)	(0.0059)	(0.0181)	(0.0148)	(0.0089)	(0.0059)	(0.0086)	(0.0049)
educational attainment	0.0150	0.0147**	0.0090	0.0127*	0.0383***	0.0120	0.0238**	0.0185*	-0.0093	-0.0049	0.0411**	0.0208	0.0075	0.0023	-0.0194**	-0.0120
	(0.0106)	(0.0073)	(0.0100)	(0.0074)	(0.0146)	(0.0169)	(0.0111)	(0.0095)	(0.0075)	(0.0058)	(0.0193)	(0.0181)	(0.0099)	(0.0063)	(0.0093)	(0.0099)
Constant	-2.9755	0.9784	-6.7509***	-9.4906***	-2.2681	-2.1650	-6.1425**	-4.0526*	-5.7233***	-4.2067***	-6.2743**	-6.9833***	-1.9853	-0.8290	-4.4762***	-3.3756***
	(2.7782)	(3.3816)	(2.5252)	(2.5375)	(2.3059)	(2.9824)	(2.5604)	(2.3575)	(1.5230)	(1.3101)	(2.9923)	(1.5106)	(2.1231)	(3.4575)	(1.2219)	(0.6783)
Observations	938	938	938	938	938	938	938	938	938	938	938	938	938	938	938	938
Number of fips	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Among control variables across all tests, several consistent patterns are observed. First, population exit variables (both linear and squared term) do not show significant effects in these nonprofit populations. This is opposite the results found in Hannan and other ecologists' studies. However, mixed results about deceased organizations have been reported (Baum & Amburgey, 2002; Baum & Mezias, 1992; Baum & Singh, 1994b; Carroll & Hannan, 2000; Cattani et al., 2003).

Second, the results of this study report statistical significance more for supply-side variables than demand-side variables from economic theories that explain the existence and proliferation of nonprofit organizations. Most significant and consistent patterns across the models are observed from four control variables: poverty level, median income, government spending, educational attainment. The variable of poverty level in counties shows a negative relationship pattern with regard to individual entries into the population. This variable has been used to measure the demand side explanation that is supposed to be in a positive relationship with the entries of nonprofit organizations. But in the current study higher poverty level for a county is associated with fewer entries of nonprofit organizations – in contradistinction to the popular market failure/government failure explanation.

Median income as one of the supply side factors is in the negative direction, which is opposite what was predicted. The results from both poverty and income variables may indicate that high income areas are less likely to depend on nonprofit organizations to get the kinds of services that nonprofit organizations serve, because well-to-do households can afford to buy the services with better quality from private markets. However, two variables, government spending and educational attainment, are in the positive direction, even though not all models show statistical significance but are consistent in the sign of direction. Higher government spending does appear to relate to more entries of nonprofits. In addition, the higher percentage of the population holding at least a college degree, the more entries of nonprofits are seen. These results partially confirm the supply-side explanation (Ben-Ner & Van Hoomissen, 1991; Gronbjerg & Paarlberg, 2001; Salamon, 2003).

Table 5-11 summarizes the results of the study.

Table 5-11: Summary of Analysis

Hypotheses about density effects on entry of organizations	Predicted direction	Results
No systemic structure (a single population)		
H1a: A *legitimation (positive linear) and a competitive effect (negative squared) of main population density to main population*	+ -	Both Confirmed
H1b: A *legitimation (positive) and a competitive effect (negative) of sub-population density to the sub-populations*	+ -	Partially confirmed
Considering systemic structure of identity forms		
H2a: A *legitimation (positive) but not a competitive (negative) effect of main population density to the subpopulations*	+ - (insignificant)	Both Confirmed
H2b: A *legitimation (positive) and a competitive (negative) effect of sub-population density to the subpopulations*	+ -	Partially Confirmed
H2c: S*tronger legitimation effects of main population density than sub-population density*	Main density	Confirmed
Considering systemic structure of identity forms in spatial heterogeneity		
H3a: *The density of both main population and sub-populations has a legitimation (positive) and a competitive (negative) effect to the sub-populations that are members of the cluster*	+ -	Both Rejected
H3b: *The effect of density-dependent legitimation is stronger for regional density than local density of individual sub-populations*	Regional density	Rejected
H3c: *The effect of density-dependent competition on sub-population entry is stronger for local level of sub-population density than regional density*	Local density	Confirmed

CHAPTER 6

DISCUSSION AND CONCLUSION

Despite a long-running debate about the existence and nature of the nonprofit sector, scholars rarely make clear how organizations constitute the sector, nor do they describe how this sector evolves. Scholars have typically focused on one of two conceptions about the sector -- either as a unitary sector or as individual sub-areas of a nonprofit sector. The following questions, often sidestepped by nonprofit scholars, provide an underpinning for the current study: is there a nonprofit sector as has been asserted by some scholars? If there is a nonprofit sector, how does the nonprofit sector evolve? What is problematic about this inquiry is that there exist various distinctive types of nonprofit organizations that cannot easily be integrated into a notion of a unitary nonprofit sector. On the other hand, they cannot be treated as being completely different from others. So, how can this diversity of nonprofit organizations be understood? And how can the organizational dynamics of nonprofit organizations be explained? Does a "broad," unitary nonprofit sector have its own dynamics of organizational change regardless of sub-components within the sector? Or do sub-population nonprofit organizations have their unique dynamics regardless of the existence of a "broad" nonprofit sector? If so, are there distinguishable effects of a "broad" nonprofit sector on the evolution of sub-populations of nonprofits? These questions are not only related to nonprofit studies, but also to the main questions of the population ecology perspective.

One of the main research questions in organizational ecology has been "why are there so many kinds of organizations." From this question related with the mechanisms creating organizational diversity, how such organizational variation affects patterns of mutualism and competition in organizational populations is another important question among others related to understanding the organizational world (Baum & Singh, 1994a; Hannan & Freeman, 1977). This study was undertaken to develop the ecological approach further in understanding how organizational founding unfolds in populations with high internal heterogeneity caused by the complexity of the underlying organizational form. As noted earlier, a majority of existing empirical research in organizational ecology has focused on simple organizational forms or populations defined by a single product – service market. Furthermore, the concept of organizational form has not been clearly applied in defining empirical populations, even though there is great theoretical importance for this concept in

organizational ecology studies.

In reality, populations are often heterogeneous, and a special type of heterogeneity is related to the complexity of organizational forms. However, few research efforts have been directed at studying how mutualistic and competitive forces shape organizational founding in heterogeneous populations characterized by complex organizational forms. Following existing theory and research, a systems approach was chosen to analytically approach form complexity and thus capture related population heterogeneity in terms of form identity. This undertaking was combined with the question of spatial heterogeneity that has been studied by existing research. The idea in this research is to understand complex organizational forms in terms of the underlying, nested sub-forms that are less complex. In simple theoretical terms, two or more simple sub-forms are hierarchically nested under a single complex main form. This study also combined an investigation of geographically nested structure that has been studied by existing research, and thus a still more complex structure is observed. Hypotheses were derived regarding density-dependence effects of legitimation and competition on organizational entry or founding in a heterogeneous population characterized by such systems of organizational forms.

A series of hypotheses were empirically tested with data on the nonprofit sector in Florida counties for the period 1994-2007. The mission-driven main form – charitable nonprofit organization – is complex enough that popular and scholarly audiences typically associate a heterogeneous set of organizations to it. These organizations operate in diverse service areas with a multitude of objectives and strategies.

Using readily available data ten sub-forms and related sub-populations can be identified within the nonprofit sector. Each of these sub-forms holds a less complex organizational form that is more clearly defined by a specific product-service. Unlike the popular conception of nonprofit studies, the results showed that what is presumed to be a nonprofit sector is not a single unified sector, but a set of diverse sub-populations with benefits coming from adapting the general nonprofit organizational form. In other words, each nonprofit sub-population has its own evolutionary logic, but is influenced by development of the collective nonprofit area (i.e., the main identity form) that is recognized as a collective identity covering the whole sub-nonprofit populations (i.e., sub-identity form).

The results of the analysis can be summarized under several themes. In the hierarchical two-level system of identity form, main-population density has a strong density dependent effect of legitimation on sub-population nonprofit entry. In other words, the entry or foundings of new nonprofits into a unique product-service sub-population benefit

considerably from the legitimacy of the broader population of nonprofit organizations. Various scholars have advanced the argument, based on information asymmetries and transactions costs theory, that consumers who lack complete information or judgment skills about a particular service are more likely to trust an organization whose basic intentions are not profit-generating (Ott, 2001). In particular, when such services are complex and difficult to analyze, when the consumer is incompetent to judge (children, elderly, disabled), or when the purchaser is not the consumer, there is often a general trust felt toward nonprofits in general, whereas one might not extend the same trust toward profit-seeking organizations (Young, 1998b; Hansmann, 1987). The present analysis which finds that main form legitimacy benefits sub-population foundings resonates with the general thesis that the general form benefits from consumers' trust toward nonprofits.

In contrast, the competitive effects of density are almost completely contained within the individual sub-populations. That is, whereas legitimacy effects that are experienced by a distinctive sub-population form apparently spread to other new nonprofit ventures that enter the sub-population, organizations within a same population compete with each other within a narrow and specific niche. Hypothetically consider art nonprofit organizations. Within a certain area, the existence of art nonprofit organizations may legitimize and promote the entries of other organizations, providing the legitimized reputation as a nonprofit form to other sub-populations at the level of the whole nonprofit sector. However, most art nonprofit organizations may share and need the same types of resources -- the size of potential audience, limited governmental support to art areas, etc. Without expanding the size of resource pools, therefore, the limited resources would lead to competition among the art organizations. Therefore, among art organizations the competitive effects of density are contained within the art nonprofit sub-population.

When regional variables, which are based on geographical competition and legitimation extended from the concept of identity form, are incorporated in the analysis, regional legitimation and competition of both main and sub-populations do not show any significant effect, whereas these relationships did show statistical significance in the models with only regional variables. We found in contrast that the population dynamics of nonprofit organizations are highly influenced by local, i.e., county dynamics, but not the broader regional dynamics. This suggests that those who found new nonprofits draw primarily on locally or community-defined needs or justifications, and these effects do not extend to the more broadly configured geographic region.

A number of key findings can be inferred from the above results. First, the systemic

structure of the population matters. In other words, entry into the population by individual nonprofits in mission sub-sectors is affected by the other parts and levels of the system. When the individual nonprofit sub-populations are observed in isolation from the rest of the system, the density dependent effects work in ambiguous directions and show their own distinctive logics within the sub-population. However, when the broader systemic structure is incorporated in the analysis, the different units and levels have clear communal interdependence and exert mutualistic and competitive forces on one another. This means that sub-populations simply cannot be integrated upward into a nonprofit sector, but they are influenced by the hierarchical systemic structure – i.e, a downward effect from the higher form into the sub-population identity space.

Second, the results in which regional density variables show no effects in most models are different from a number of earlier studies based on empirical tests of industrial organizations in the geographical context. This may be interpreted as meaning that, by comparison to many of their for-profit counterparts, nonprofit organizations are strongly rooted in, attached to, and defined by the local community. Industrial organizations or settings need perhaps to gain a broad commercial reputation from other geographic areas in order to generate profits and organizational survival. In other words, the survival base of industrial organizations would be broader, whereas charitable nonprofits are by nature based on strong support from local constituents and networks tied to localities. Therefore, the statistically insignificant results of regional variables show the nature of charitable nonprofit organizations that mostly are small in size and deeply rooted in localities. This may be a component of the nature of charitable nonprofits that is different from nonprofit foundations that do not provide nonprofit services directly but focus on fundraising activities. This has important implications for nonprofit managers who might want to expand service boundaries of a nonprofit organization. There is an implied question that extends from this: how exactly is a nonprofit organization deeply rooted in a local community and how does it come to be recognized as a unique organization for the community.

The following sections elaborate the implications of the present study on organizational theory, population ecology, and density dependence theory. These are followed by implications for nonprofit studies and management practice. After that, limitations of the study and questions for future research are discussed. Finally, conclusions are drawn regarding the general contributions of the study.

Theoretical implications to organizational theory

The present study contributes to organizational theory by shedding additional light on the mechanisms that create organizational diversity, how such diversity is structured, and what implications such diversity has on the mutualistic and competitive interdependencies between organizations.

Several mechanisms work together to create and maintain organizational diversity. The diversity of organizations and organizational properties mirror the contemporaneous diversity of their social and material environments (Aldrich, 2001; Freeman & Hannan, 1983; Hannan & Freeman, 1977, 1989). In this study, however, organizational diversity is created and maintained in a process by which audiences directly and indirectly screen individual organizations' conformity to specific rule-like codes that are attached to the collective identities of forms (Hsu & Hannan, 2005; Polos et al., 2002). Some organizational forms are such that a relatively high number of distinct audiences associate a diverse set of codes to a specific, complex form (Hannan, 2005; Hsu & Hannan, 2005; Ruef, 2000). For such forms, a diverse set of organizations is important to follow the abstract code, even when the dynamics may support specific, narrower identity codes, thus creating heterogeneous populations.

The hierarchical systemic nature of social structures has been stressed in the ecological studies of both human ecology (Freeman & Audia, 2006; Hawley, 1950) and organizational ecology (Hannan & Freeman, 1977; Poole & Van de Ven, 2004), together with the open systems perspective on organizations. Organizational phenomena and evolutionary processes can be studied at various levels of analysis to extend understanding of our knowledge, ranging from individuals and events to intraorganizational units, and to organizational communities (Amburgey & Rao, 1996; Astley, 1985; Baum & Amburgey, 2002). These levels form social systems that have hierarchical structures with nested levels and related sub-units. The present study shows how complex organizational forms can be systems of hierarchically nested sub-forms, thus generating organizational populations with salient sub-populations mirroring the internal structure of the complex form.

In this study, it was proposed and confirmed that such systemic structures of organizational identity-based form have impacts on the mutualistic and competitive relationships of organizational populations. Interdependencies that generate legitimation are more easily transmitted beyond system boundaries than relationships that drive ecological competition for resources within the environment (Ruef, 2000, 2004).

Implications for population ecology and density dependence theory

Even though scholars have stressed the importance of defining populations and various efforts to capture population heterogeneity, the concept of organizational form has not been robustly applied in specifying empirical populations (Hsu & Hannan, 2005). As a result, much research on organizational ecology has focused on simple organizational forms, often disregarding internal heterogeneity. Having identified the general abundance of studies with simple empirical populations, this study examined whether and how the ecological approach could be applicable to complex organizational populations and forms. Nonprofit organizations provided the complex forms and populations for the empirical material for the analysis.

The findings of the present study show that the identity approach and form complexity within what on first glance appears to be a "unitary" population are relevant bases for conceptualizing organizational forms and therefore empirical populations. In this study it became apparent that the ostensible "unitary" nonprofit sector has a complex organizational form with a broadly defined main identity and several underlying sub-identities. In other words, we presume that a variety of different audiences exist with varying levels of power to affect the survival and founding of nonprofit organizations. We suggest that these audiences include governments, nonprofit customers, donors, nonprofit employees and other significant stakeholders. Each audience associates a different but common set of identity codes to the main and sub-identities. In turn, the individual sub-identity forms have different levels of importance for each audience. Therefore, the relative importance of the main form varies across the individual sub-populations as the empirical analyses have shown. The present study has demonstrated that the systemic structure of identity forms can be an approach to define populations in the context of complex organizational forms. The study also shows that the systemic structure has effects on the density dependent dynamics within heterogeneous populations.

The present study provides clues for linking this work to the studies of community ecology (Astley, 1985; Astley & Van de Ven, 1983; Dobrev et al., 2006; Ruef, 2000, 2004). As community ecology emphasizes the symbiotic relationships between populations that occupy the same social and economic spaces, the current study finds that individual sub-populations have positive interrelationships with the existence of other organizations.

The study also extends the area of density dependence theory and has several implications for this body of research. In the research streams of density dependence theory previous studies have not explicitly addressed the application of how density processes of

legitimation and competition operate in heterogeneous populations characterized by complex organizational forms. Only a few studies have investigated the implications of population heterogeneity in the spatial and multilevel context (Cattani et al., 2003; Hannan, 1997; Lomi, 2000; Wezel, 2005). Although this study has relied on previous studies about spatial heterogeneity to understand how audiences and the resulting identity forms categorize firms into different subpopulations, the complex structure of collective identities in heterogeneous populations is the main topic in this study, unlike the ways that previous studies have mainly focused on heterogeneity caused by physical and environmental differences. For example, the niche overlap approach is based on the idea of how the overlap between organizations' environmental niches affects the processes of organizational entry (Baum & Korn, 1994; Carroll & Hannan, 2000).

More specifically, for density dependence theory and research, the present study shows that form complexity creates significant impacts on the operation of the density dependent processes of legitimation and competition. First, it was observed that the densities of the individual sub-populations do not alone have enough power to explain organizational entry when observed in isolation from the rest of the system. However, significant effects could be identified when the systemic structure of the whole heterogeneous population was considered. This finding indicates that the overall heterogeneous population and its systemic structure have a relatively strong impact on how density dependent processes of organizational entry operate within heterogeneous populations characterized by complex organizational forms.

A second major finding is that legitimation generally operates on a broader level than competition in identity space. In the combined models, effects of legitimation are broad and significant at the main identity level, while competitive effects are contained at the sub-population level. This study shows that only at the sub-population level are organizations similar enough to compete for the same resources from the environments, because each of the sub-populations represents a distinct product or service market.

Third, the present study enables one to determine from which parts of the system legitimation and competitive effects originate – the local main and sub-form level, the regional main, and sub-form level. The results show that regional densities of both legitimation and competitive effects are significant when the local density variables are ignored. However, the inclusion of the local level shows that the regional effects of both main and sub-forms disappear. This is different from other studies, leading us to infer that nonprofit organizations differ from the other industrial organizations in terms of the

geographic bases of their legitimacy and identities.

In sum, several implications for theory and research in density dependence theory are suggested. First, future research should seek to consider the organizational variation in the level of complexity of the underlying organizational form. Second, a systemic structure should be considered in capturing population heterogeneity, which is often called the multilevel approach (Carroll & Hannan, 2000; Poole & Van de Ven, 2004). Third, even if this study simulates the existing classification of nonprofit organizations that public audiences and employers themselves report, the identity-based approach to organizational forms provides a new way to define populations. Future exploration might well include other classifications by other identity forms.

Implications for nonprofit studies and management practice

For a nonprofit sector study, most importantly, this study provides a significant clue about understanding the existence and nature of the nonprofit sector. Even if Salamon and Anheir's five-part definition about nonprofit organizations (1996) has not so intended, most who subscribe to this model simply take a leap of faith in asserting that a society's nonprofit sector is the total of all organizations that fit the definition. Nonprofit scholars have not had a clear answer about how nonprofit organizations constitute the sector nor about its dynamics over time. As a consequence of unclear answers about boundaries and composition of the sector, nonprofit scholars have typically focused on one of two conceptions about the sector -- either as a unitary sector or as individual sub-areas of the nonprofit sector without considering other nonprofit dimensions. These and other conceptual disagreements have fueled a lively debate about the nature and importance of the sector for several decades.

This study shows, however, that both conceptions are partially wrong and at the same time partially correct. That is, a nonprofit sector is a heterogeneous population with constituent mission sub-populations, as this study suggests. A sector is neither unitary nor inherently separated. In sum, the overall effects on entries of new organizations into sub-populations are not only contained in the main form, but also in the sub-populations.

The separation approach should be revised to consider the downward effects of systemic structure and its relationships. This study shows that individual sub-sector nonprofits have their own dynamic, which have an impact on their own population entry processes. These dynamics take on both/either legitimating or competitive power processes. The models with only within-population density showed statistical significance for both effects in most populations. This supports the separation conception of the sector. However,

the inclusion of the main identity variables changes significance at the sub-population level. As the systemic structure of identity forms takes into account, the nonprofit sub-population mainly holds the statistical significance of competitive effect. Even other models with the regional effects add the same evidence.

The unitary conception, on the contrary, should consider the upward effects of systemic structure and the relative autonomous dynamics within each nonprofit sub-population. Overall patterns across the statistical models show the significant legitimating effects of main population form on the entry of nonprofits into sub-populations. However, the density variables of sub-populations in the combined models retain statistical significance, even though the overall patterns are significant only in the competitive effects. This means that the population dynamics of nonprofit organizations cannot be explained exclusively at the level of the whole nonprofit sector.

This study has important implications for managerial practice in nonprofit issues. First, the entry of new nonprofit organizations is strongly related to entrepreneurs' decisions to create organizations to pursue emerging opportunities. Although the internal strengths and weaknesses of organizations are important, this study illuminates how external population dynamics may affect entrepreneurs' decisions – and certainly the outcomes of these decisions -- to enter business. For example, potential founders may adopt insights on how diverse audiences perceive existing and emerging organizational types and how the identity forms affect organizational viability. The existence of related forms and organizations under an overarching main form clearly affects the viability of creating new organizations. At the same time, resource constraints may generate competitive pressure and thus hinder organizational entry. However, this study shows that such effects are primarily limited to the mission sub-population level and do not generally affect entry into the main nonprofit population. This suggests that competitive pressures come from nonprofits with similar missions, and less so from nonprofits in the broader nonprofit population. As I exemplified in the previous section, the existence of art nonprofits and their services legitimize new entries of nonprofit organizations because adoption of a nonprofit form provide positive cognitive benefits to new entrants regardless of the differences in mission areas, which assists new entrants to survive. However, narrow niche space for the art nonprofit sub-population limits the supportive ability of other art nonprofit organizations; that is, it promotes competitive effects that take resources from other art organizations.

Combining the effects from different levels, it is possible to infer which kind of external settings are most favorable for entrepreneurial activity, and where the entry of new

nonprofit organizations is at its toughest. This will have impact on the potential founders' decision on which niches and sub-populations to enter and how to match the externally enforced identities for organizational viability.

Second, three major implications can be identified for managers. It may be advantageous for individual organizations to follow and even replicate existing organizational forms that have attained considerable amounts of legitimation. Similarly, inertia – i.e., sticking to the selected form – promotes consistency and thus legitimacy in the eyes of various audiences. Firms should be active in promoting the legitimation of the whole nonprofit sector, as well as the sub-forms they belong to. The understanding of complex population dynamics may be helpful for managers to identify and avoid settings with strong competitive pressures. For example, a much more favorable setting for entry would be one with high main population density and small sub-population density. In such settings, the legitimation of the sub-form would be relatively easy, and, on the other hand, competition for sub-form specific resources would still be relatively low.

The study has another important implication for nonprofit managers seeking to expand service boundaries of a nonprofit organization. Charitable nonprofits are by nature based on strong support from local constituents and solid network relations within the locality, whereas the survival base of industrial organizations would be broader. Therefore, the insignificant results of regional variables show the nature of charitable nonprofit organizations that mostly are small in size and deeply rooted in localities. This may be a significant feature of charitable nonprofits that is different from nonprofit foundations that do not provide services directly but focus on fundraising and fund-distribution activities. As noted earlier, a relevant, unresolved question is how an organization is deeply rooted in a local community and how it comes to be recognized as a unique organization within the community.

Limitations and Questions for Future Research

The study has some limitations and questions left open for future research. First, the study relies on simple systemic structures that combine identity and geographic heterogeneity. The first features a single main population and several sub-populations that are directly nested under the main population. It thus considers which parts of multilevel structure of identity forms influence nonprofit sub-populations. The second and whole structure adds a geographical difference at both the main and sub-population level, testing which parts of the whole systemic structure influence the entries of nonprofit sub-populations. Despite the

statistical significant results of these structures to the nonprofit organizations in Florida counties, complex organizational forms might have several other types of systemic structures that are beyond those captured in the present analysis. These possibilities present a potential avenue for future exploration. This means that researchers need to understand the processes by which new forms acquire identity — the microdynamics of how people define new and meaningful identities and their forms. Furthermore, to understand these kinds of microdynamics related with the processes by which identities are created and maintaned, researchers may need to draw on qualitative methods to track and explain the processes of identification.

A second possible limitation relates to the generalizability of the theory and findings beyond nonprofit organizations in Florida to other settings with complex organizational forms – including nonprofit populations in other states and countries. Of course, the systemic structures have to be made specific to the context, but the general idea of a systemic structure should be generalizable to other complex forms. As discussed in the previous chapters, the density variable itself is relatively generalizable across time, geography and the organizational setting. The same applies for the density variables used in the present study. Thus, in general, the findings should be relatively generalizable to other settings with heterogeneous populations characterized by complex organizational forms. This is a strength of the ecological approach in general. However, the ecological approach does not consider other context-specific variables that could bring additional explanatory power, using the types of control variables to become standardized variables such as period effects, GDP, and prior organizational foundings. In this study, the context-specific variables drawn from the economic theory bring additional explanatory power, but could also be potential limitations. This raises the question of generalizabilty to other areas. Again, studies that extend to other settings and times offer future possibilities.

Third, the present study examined density-dependent effects originating from within the county boundaries and the eight regional boundaries in Florida. However, the results about the regional effects of broader boundaries do not show statistical significance, while the models with only the regional effects show significance. This does not necessarily mean that spatial heterogeneity is not meaningful for nonprofits in Florida. One could argue that part of the density dependent effects of legitimation and competition originate from types of boundaries that are different from those constituted by the eight regional boundaries in Florida. Thus, additional insight and a still broader systems perspective could have been adopted by including MSAs or even State level measures of density. However, the scope of

the present study was restricted to the eight regional boundaries for practical reasons. A plausible avenue for future research, nonetheless, would be to include still broader levels of analysis and see whether the effects of legitimation and competition still operate as predicted by the theory. Probably new organizational settings may have different geographical boundary and criteria. Therefore, to find the meaningful boundary and criteria, researchers can take advantage of the qualitative method and research.

Finally, the present study does not allow for the possibility that other ecological mechanisms could bring additional explanation to organizational entry in heterogeneous populations characterized by complex organizational forms. For example, a fruitful avenue for future research would be to investigate how the dynamics of niche width and resource partitioning theory (Carroll, 1985; Dobrev, 2001) would operate given the systemic structure of the heterogeneous population.

Conclusion

The present study was motivated by several key areas of interest. First, in the line of nonprofit studies, defining the nature of the nonprofit sector as a "unitary" sector or focusing on a specific sub-mission area could be questionable. Sticking to these conceptions may ignore the dynamic nature of nonprofit populations and sub-areas. Thus, the intention of this study was to challenge a dominant conception of a unitary nonprofit sector. In other words, the study was interested in how to understand a real picture of diverse nonprofit organizations and their dynamics, not a single nonprofit sector. Second, from the nonprofit question the theoretical attention of this study was on population-level mutualistic and competitive processes that guide organizational entry and organizational evolution. Third, the study sought to contribute to the understanding of organizational diversity and its implications for the processes of organizational evolution.

To do this, the domain of organizational ecology was chosen as the conceptual and methodological basis, with density dependence as the focal theoretical framework. Building on the identity approach to organizational forms, a hierarchical approach was adopted to capture variation within complex forms. And following existing studies, the systemic complexity of population was added in terms of spatial location differences. The several hypotheses were tested with data from the nonprofit organization sector in Florida counties between 1994 and 2007. Many of the hypotheses received either full or partial support. However, the hypotheses incorporated with the regional legitimation and competition were

rejected. The first key finding was that the systemic structure of a complex form and the related heterogeneous population has strong implications on density-dependence entry. The second key finding was that, in such settings, legitimation tends to operate on a broader level than competition in identity space. Third, it is less important for operating nonprofit organizations to make efforts to form the regional identity than the local identity-forming effort, because the locality appears to be the basis of survival and operation.

The study yields several extensions, implications and future research interests to organizational theory, organizational ecology, and density dependence studies. Especially in the arena of nonprofit studies, theoretical issues and managerial implications are also discussed. Despite some limitations, the present study has been able to generate a strong contribution that addresses theory and practice in the areas of organizational theory and nonprofit studies. It also adds significantly to the existing body of work in the broad domain of organizational ecology studies.

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