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Exploring Niche Alteration in Nonprofit Organizations

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Abstract

The organizational niche is a concept integral to organizational ecology, reflecting an organization's mission, expertise, capacity, and viability. The choice of niche is crucial to the viability of the organization; however, the reasons organizations alter their niche are poorly understood. We hypothesize that nonprofit organizations alter their niche to reduce environmental pressure and gain access to resources. The results indicate that niche alteration predicts increases in total revenue with average increases in revenue from program services and contributions (depending on measure). Additionally, nonprofits that are younger and larger, with more concentrated revenue, are more likely to alter their niche.

Keywords: organizational ecology, organizational niche, NTEE codes, revenue, nonprofit organizations

Introduction

Nonprofit organizations are subject to immense environmental pressure, including fluctuations in demand for services, changes to tax laws, macroeconomic trends, and direct competition (Carroll & Stater, 2009; Mayer et al., 2012; Thornton, 2006; Tuckman & Chang, 1991; Wicker et al., 2015). The population ecology of organizations (hereon, organizational ecology) focuses on the role of these forces in the transformation of organizations (Carroll, 1984; Hannan & Freeman, 1977). While transformations such as organizational founding and types of exits have received substantial attention (Baum & Oliver, 1996; Hager et al., 2004; Lu et al., 2020; Park et al., 2021; Twombly, 2003), less attention has been paid to structural adaptations among nonprofit organizations.

The organizational niche characterizes the productive capacities and resource requirements of the organization (Baum & Singh, 1994; Hannan & Freeman, 1977); among nonprofits the niche is often the starting point for financial and program planning, and has been emphasized for its implications for nonprofit's community connections, the organization's financial structure, and the competition they face (author; Hannan & Freeman, 1989; Paarlberg & Varda, 2009; Young, 2007). Prior research has often treated the organizational niche as a static feature, however, organizations are dynamic and active agents that may alter their niche in response to stimuli, such as competition and opportunities (Baum & Singh, 1996). The contribution of this article is to test the ecological propositions related to why nonprofits alter their niche (measured using the national taxonomy of exempt entity codes). While motivated by organizational ecology, we participate in the tradition of ecological studies that depart from population based inference (sometimes called "demographic analysis") and seek to understand the behavior of individual organizations (Baum & Singh, 1994, 1996; Paarlberg et al., 2018; Paarlberg & Hwang, 2017; Sullivan et al., 2021). We posit that organizations alter their niche to

increase access to resources (revenue), and the likelihood of an organization altering their niche is a function of selection pressure and structural inertia, where selection pressure represents the forces motivating adaptation and change among organizations, while structural inertia represents the forces that allow organizations to sustain their current structure (Baum & Singh, 1996; Hannan & Freeman, 1984, 1989).

Organizational Ecology

Organizational ecology is a branch of organizational theory with a rich history in the nonprofit sector, as it originated in the study of labor unions, and has continued to generate research since (Abzug, 1999). Broadly, organizational ecology borrows metaphors and concepts from human ecology and evolution to link environmental conditions to organizational processes, focusing on founding, variation, and dissolution. Organizational ecology is often used to understand alterations to organizational structure over time, as well as how such alterations are constrained by environmental conditions. The theory couples environmental features, including threats and density, with organization-specific features, such as structural inertia, organizational size, and niche (Carroll, 1984; Hannan & Freeman, 1977, 1984, 1989). In this section, we review the core concepts which motivate three key hypotheses.

Organizational niche

The concept of the organizational niche has been fundamental to organizational sociology and organizational ecology since it was adapted from its biological origins, where niche refers to the status of an organism in its community (Hannan & Freeman, 1989). The organizational niche is focused on the resources required by the organization as well as its patterns of resource consumption, which have geographic and competitive components. In other words, the niche corresponds to "where it is and what it does" (Baum & Oliver, 1996). Nonprofits are commonly

identified with their mission. The niche and mission are distinct, however, as missions often

encode aspirations of impact, or suggestions about productive capacities, and vary arbitrarily

between organizations. In contrast, the niche is a property of organizational populations, and is

focused on the intersection of the resources the population requires to survive and reproduce

their structure, as well as their productive capacities (Hannan & Freeman, 1977; McKelvey,

2020). The organizational niche has been used extensively in nonprofit research, as different

niche segments respond differently to environmental conditions (Baum & Oliver, 1996; Jeong &

Cui, 2020), competition in fundraising (Paarlberg & Hwang, 2017; Thornton, 2006), and retain

different financial structures (author). The organizational niche was formalized by Hannan et al.

(2003), and it becomes clear that the organizational niche can be altered, just as the status of an

organization in its environment changes. The following sections explore explanations of this

phenomenon.

Adaptation/selection pressure

Selection pressure is an essential component of organizational ecology, and is often noted

as something that precedes and drives variation in organizations (Carroll, 1984; Hannan &

Freeman, 1989). Under perspectives of adaptation, the relationship between the environment and

the organization is reflected in decisions that constitute learning (Donaldson, 2001), while

stricter evolutionary adherents view organizational variation as essentially random (Carroll,

1984; Hannan & Freeman, 1977). Importantly, the organizational niche defines the boundaries of

selection pressures (Hannan et al., 2003; Paarlberg & Hwang, 2017). Niche density describes the

shared resource requirements among organizations providing similar services in a geographic

region, which may foster competition or provide opportunities for collaboration (Baum & Oliver,

1996; McPherson, 1983). Primarily, environmental adaptation or selection pressure come from

competition or environmental constraints. Nonprofits regularly compete for resources such as donations and contracts, and respond to competition by decreasing expenses (Paarlberg & Hwang, 2017; Thornton, 2006). However, nonprofits may also avoid competition by specializing or differentiating programs and benefit from proximity to other organizations through increased legitimacy, access to networks, and collaboration (Baum & Oliver, 1996; Paarlberg & Hwang, 2017; Paarlberg & Varda, 2009).

The study of environmental pressure has often centered around financial vulnerability. Tuckman & Chang (1991) define an organization to be financially vulnerability to the extent that "it is likely to cut back its service offerings immediately when it experiences a financial shock" (p. 445). Using this definition, a financially vulnerable organization is under immense environmental pressure and facing imminent structural change. They suggest that some characteristics of financially vulnerable organizations include limited access to equity balances, few revenue sources, low administrative costs, and low operating margins. Indeed, higher revenue diversification and operating margins have been linked to stronger financial positions (Chang & Tuckman, 1994), lower revenue volatility (Carroll & Stater, 2009; Mayer et al., 2012), lower insolvency risk (Frumkin & Keating, 2011), and lower risk of dissolution (Lu et al., 2020; D. J. Mayer, 2022).

Niche alteration as a response to pressure

Organizations are constantly changing in ways they anticipate to be adaptive, yet unstable environments often lead in unpredictable outcomes (March, 1981). Although organizational change is inevitable, different theories posit different structures for the process. Lifecycle and evolutionary theories hold that the change sequence is cumulative. In lifecycle theories, change is sparked by external/environmental events which are mediated by the logic of the entity, while

evolutionary theories suggest the environment retains organizations that best fit the niche (van de Ven & Poole, 1995). However, organizations facing selection pressure are rarely resigned to demise, and rather seek alternative modes of operation, including specialization or reformulation (Hannan & Freeman, 1977, 1984). These are forms of strategic change, or "discrete changes in a firm's business, corporate, or collective strategies" (Rajagopalan et al., 1997, p. 50). In their description of the rational perspective on Rajagopalan et al. (1997) suggest environmental conditions influence change strategies directly as managers often consider a set of strategic alternatives. Clearly, when faced with environmental pressure, one option available to organizations is to alter their niche, with the goal of enhancing their viability by increasing fit with their environment.

Considering the way organizations adapt to pressure, Hannan & Freeman (1984) suggest "organizations seldom succeeded in making radical changes to their structure in the face of environmental threats," (p. 148), and rather, most environmental variation occurs through dissolution and founding. Baum & Singh, (1996) were among the first to study organizations altering their niche to sustain operations. They conceptualize niche alteration as a movement in the resource space, suggesting a change in niche is a change in core features that may include shifts, expansions, and contractions. It is likely this regularly occurs in the nonprofit sector as well, as nonprofit scholars have noted that the goal of many nonprofit managers is to sustain and expand services (Bowman, 2011), and organizational crisis or other problems may spark innovation learning, and change (Durst & Newell, 2001; Mano, 2010). Nonprofit organizations are often aware of impending environmental pressure, for example Kearns (2007) observed organizations that alter their niche by expanding services to procure additional revenue sources in an effort to reduce resource dependence. Irvin & Kavvas (2020) describe the change in the

missions of family foundations, suggesting changes may often occur in response to external pressure, including societal and regulatory changes. Consistent with this literature, we posit nonprofits alter their niche to increase access to resources, described in hypothesis one.

Hypothesis 1: An alteration to the organizational niche predicts higher revenue.

Structural inertia

Structural inertia refers to the propensity of an organization to "resist deviating from existing structural schemes" (Schwarz, 2012, p. 4), from which it follows that organizations with higher structural inertia will have a higher capacity to resist change (Hannan & Freeman, 1984; Schwarz, 2012). There are several important components of structural inertia, including the size and legitimacy of the organization (Schwarz, 2012). For example, high levels of investment in equipment or infrastructure may make an organization less likely to deviate from their current patterns of work (Hannan & Freeman, 1977). Consistent with this view, increases in assets are associated with reduced revenue volatility, higher growth, and decreased likelihood of dissolution (Chikoto-Schultz & Neely, 2016; Lu et al., 2020; W. J. Mayer et al., 2012). On the other hand, organizational size is often a sign of flexibility, and larger organizations may be more capable of motivating resources to affect change (Rajagopalan et al., 1997).

Legitimacy describes the fit between an organization's activates and environment (Aldrich & Pfeffer, 1976), and high legitimacy enhances the viability of organizations through strong connections and increased access to resources (Hager et al., 2004; Wiewel & Hunter, 1985). Maintaining legitimacy often means adhering to norms, as organization's that deviate from existing structures may reduce the fit with their environment (Meyer & Rowan, 1977). This makes legitimacy an integral component of inertia as it may raise the cost of structural change in organizations, as changes risk reducing legitimacy with material implications. Organizational age

is most commonly associated with these constructs, and is thought to increase alongside structural inertia (Meyer & Rowan, 1977) as it "takes time for organizations to develop enduring exchange relations with key actors in the environment" (Hannan & Freeman, 1984, p. 160). Consistent with this view, younger nonprofits are more likely to dissolve, as well as be less (financially) specialized (Bielefeld, 2000; Fischer et al., 2011; Hager et al., 2004; Lu et al., 2020). Consistent with this literature, we suggest niche alteration is a function of selection pressure and structural inertia, described below in hypotheses 2.1 and 2.2.

Hypothesis 2.1: Higher selection pressure predicts a higher probability of niche alteration.

Hypothesis 2.2: Higher structural inertia predicts a lower probability of niche alteration.

The Current Study

With respect to observed variation, organizational ecologists have held that inertia is so strong that organizations rarely succeed in achieving structural change (Hannan & Freeman, 1984). However, when environmental pressure overwhelms inertial forces, organizations may alter their niche in an effort to alleviate competition and enhance access to resources (Baum & Singh, 1996; Hannan & Freeman, 1977). In this study we investigate the role of environmental pressure and structural inertia in niche alteration among nonprofit organizations. Consistent with theories of adaptation, we hypothesize that nonprofit organizations alter their niche as an adaptive strategy, increasing access to resources in the short term.

Hypothesis 1: An alteration to the organizational niche predicts higher revenue. As discussed above, we suggest two countervailing forces of structural change, selection pressure and structural inertia (Baum & Singh, 1996; Hannan & Freeman, 1984, 1989). Selection pressure is the primary driver of structural change among organizations, while structural inertia

may raise the costs of changes and allow organizations to withstand pressure, reducing the likelihood of an organization altering their niche.

Hypothesis 2.1: Higher selection pressure predicts a higher probability of niche alteration.

Hypothesis 2.2: Higher structural inertia predicts a lower probability of niche alteration. Consistent with organizational ecology, we theorize that selection pressure precedes variation (Carroll, 1984). To account for the temporal ordering of selection pressure and variation, we use a 1-year lag in measures of selection pressure and structural inertia.

Methods and Materials

The form-990 is the "return of organization exempt from income tax", that is submitted annually to the Internal Revenue Service (IRS) for tax purposes and describes the financial standing of nonprofit organizations. The data for the analysis were reached by drawing publicly available form-990 data from the National Center for Charitable Statistics (NCCS), using the core files from 2009-2014 (*NCCS Core File*, 2009-2014). In 2006 the IRS made substantial changes to the form-990, which can make comparison difficult. The implementation of the changes was completed by 2009, the starting period for our study. Our reliance on the NTEE codes, described below, further complicates the choice of data as the most recent documentation about the NCCS coding process was released in 2007 (National Center for Charitable Statistics, 2007), leading us to select the data closest to the release of the documentation after the rollout of the new form-990. Finally, although more data are available, our interest in lagged variables and variables that indicate a difference from the prior year, leads us to exclude organizations that are not observed in each year of our panel (this is similar to other studies using lagged variables, namely, Mayer et al., 2012). Although this limits external validity, it is necessary to avoid a

situation where an organization may disappear from the data for a period, only to reappear with a different structure or niche (wherein, it would be difficult to make inferences about how or when the change occurred, without adding assumptions). Including more years would consequently reduce the number of organizations in our sample greatly, possibly removing smaller and more vulnerable nonprofits that are of interest in our study[1].

There are well known limitations to the use of form-990 data, such as their focus on organizations rather than establishments, the conflation of important revenue and asset categories, and the availability of data only on organizations that submit the more extensive tax forms (e.g., not the 990-N). This often excludes many religious organizations, and those with average revenue under 50,000 dollars. Despite these limitations, they remain a viable tool for supporting research on nonprofit finance and management (Seaman & Young, 2018), and Yetman et al. (2009) have found that the 990-T is closely related to the public 990 data for the main features selected in this study, such as larger revenue categories and assets. We remove duplicate cases, as well as cases with erroneous data such as negative revenues, assets, or expenses (Feng et al., 2014).

The data initially contained a panel of six years with 2,293,491 observations. However, we limit the sample to organizations within the 50 US states and Washington DC, as well as to 501(c)(3) public charities with a known major group (we exclude group "z," the known unknown). Additionally, excluding organizations with errors increases reliability as organizations with more financial capacity may have access to more sophisticated accounting, and consequently more reliable 990 data (Feng et al., 2014; Keating et al., 2008). As a result of the case selection process described, the sample was reduced to 1,029,030 observations of 205,806 organizations (each observed over five years).

Variables

Organizational niche and niche alteration

National Tax-Exempt Entity (NTEE) codes represent the most widely accepted classification for nonprofit organizations (D. A. Carroll & Stater, 2009; Fischer et al., 2011; Jeong & Cui, 2020; Kim, 2015; Lu et al., 2020; D. J. Mayer, 2022; Thornton, 2006). In general, the NTEE code assigned to an organization represents its "primary purpose" which is distinct from, though often related to, its activities. The NTEE code can be selected by the organization, however, the NCCS also assigns NTEE codes based on the information included in the tax documents or request for exemption (e.g., forms 990 or 1023). These codes have distinct strengths and weaknesses. The code given to IRS in the submission of tax documents has the advantage of being selected by organizational members and in this sense corresponds to the process by which nonprofits select into a niche. The disadvantage of the IRS submitted NTEE code is that little is known about the selection or change of these codes. In contrast the NCCS coding process is well documented: if an organization does not have a clear institutional purpose, the code is assigned based on the primary programmatic activities of the organization, or the information in their request for exemption. The NCCS coding process discourages focusing on the name of organization, and assign the NTEE code based primarily on the 990 submitted by the organization, such that an organization's classification may be reassessed with the submission of each 990 (National Center for Charitable Statistics, 2007). However, a limitation of this code is its reliance on the NCCS, rather than organizational members.

Change is fundamentally difficult to measure, in their review of the strategic change literature Rajagopalan et al. (1997) recommend addressing this methodological challenge by using multiple indictors to obtain a "more holistic operationalization that is closer to the

underlying construct." This recommendation is apt in our setting as the two widely accepted indicators retain distinct strengths and weaknesses. Accordingly, we measure the niche using both NTEE codes (the "core code" or full alpha-numeric combination). Using the NTEE code to describe the organization's niche, it follows that a change in niche is described by a change in NTEE code. Alteration of the organization's current niche, by selection of a new niche, is represented by an indicator for a change of NTEE code between organization-years, such that the indicator holds the value 1 when a change has occurred from the previous year, and 0 elsewhere.

Selection pressure, niche density, and structural inertia

As discussed above, a financially vulnerable organization is under heavy pressure, accordingly we employ indicators of financial vulnerability as measures of selection pressure. These include revenue diversification and operating margin (Carroll & Stater, 2009; Chang & Tuckman, 1994; Mayer et al., 2012; Tuckman & Chang, 1991). Diversity indices are common approaches to measuring revenue diversification/concentration in nonprofit research (Chang et al., 2018), although researchers have taken different approaches to quantifying diversity and similarity, for example, many cite the Hirschman-Herfindahl index however multiply the result by different constants (Fischer et al., 2011; W. J. Mayer et al., 2012). Here, we calculate a measure of diversification in a similar fashion summing over the squared revenue shares and subtracting the result from one. Our measure of diversification includes revenue from program services, contributions, investments, fundraising, and rent. Similar to prior studies the operating margin is measured by dividing net income (revenue – expenses) by total revenue.

Competition and density are important components of organizational ecology (Carroll, 1984), where the organizational niche and geography define the boundaries of these features (Carroll, 1984; Hannan et al., 2003). Prior studies have differed in their use of overlap or density

with respect to the organizational niche (Paarlberg & Hwang, 2017; Thornton, 2006), however, we employ a measure of niche density as the number of organizations in the same niche and county such that niche density indicates shared resource requirements (this approach is similar to measures used in Thornton, 2006). This allows us to examine the extent to which organizations compete or cooperate within their niche (Baum & Oliver, 1996). Note that because our variables are lagged by one year, in the event that an organization alters its niche, density is measured as the number of organizations from the niche they exit. Recall that structural inertia increases with legitimacy, organizational size, and the level of investment in equipment and infrastructure (Hannan & Freeman, 1977, 1984). We use the organization's ruling date, the year their exempt status was approved, as a measure of organizational age (Fischer et al., 2011; Lu et al., 2020; D. J. Mayer, 2022). Prior studies have differed in their measurement of organizational size, sometimes employing the number of employees or assets, however, there appears to be some consensus on expenses (Carroll & Stater, 2009; Hwang & Powell, 2009; Mayer et al., 2012). Consequently, we use total expenses as a measure of size. Our research aims also require a measure of the organization's investment in infrastructure and equipment, which is measured using total assets (Bowman et al., 2018).

Niche alteration and adaptation

To test hypothesis 1.1 we employ a fixed effects model, estimated by ordinary least squares, with fixed effects for organizations and time. This controls for unmeasured time constant variables, and shocks to organizations in a time period. In this case there are several reasonable sources of time constant unobserved heterogeneity among organizations and years, for example, organizations may have repeating or long-term contracts, or some number of establishments that exist through our observation period. Importantly, particulars about the

location of an organization may signal credibility and give organizations improved access to

resources (Joassart-Marcelli & Wolch, 2003). There may also be shocks specific to a year that

are not accounted for by our covariates and apply across groups (Wicker et al., 2015). We

include the covariates described above, that precede niche alteration (using a 1-year lag) and

explain variation in its timing. Equation (1) gives our empirical specification.

$$ln(y_{ij}) = \gamma_c C_{ij} + X_{ij-1}\lambda + \tau_j + v_i + \epsilon_{ij} \tag{1}$$

In equation (1) y_{ij} represents the revenue category (such as a total, program, or contributed

revenue) for organization i in year j. C_{ij} indicates whether organization *i* altered its niche in year

j. τ_j is a vector of T-1 year fixed effects, and v_i a vector of I-1 organizational fixed effects, for I

organizations and T years, respectively, where ϵ_{ij} is a disturbance term. The matrix X includes

covariates that confound the relationship between C_{ij} and y_{ij}, as well as vary over *i* and *j*. Note

that the use of lags in this specification is not motivated by an identification strategy but rather

by theoretical considerations, as we seek a contemporaneous effect conditional on lagged

effects[2]. The parameter γ_c is of primary interest in this specification, as $\gamma_c > 0$ may provide

evidence of niche alteration as an adaptive strategy employed by organizations, as it increases

access to resources. In all fixed effects models, we also use cluster-robust standard errors,

clustered at the county level, accounting for correlated errors within the county.

Selection pressure, structural inertia, and niche alteration

To examine hypotheses 2.1 and 2.2 we employ generalized estimating equations (GEE).

The GEE can be thought of as a generalization of the familiar generalized linear model and has

several desirable characteristics. It is often referred to as "semi-parametric," as it only requires

specification of the first two moments, rather than a fully specified distribution. Additionally, the

GEE averages over the population yielding an interpretation of a population average, even under

non-identity link functions, and is consistent even when the working correlation matrix is mis-specified (Fitzmaurice et al., 2011). This allows us to avoid the problems of high dimensional fixed effects in maximum likelihood estimation, as well as the ability to examine time-invariant features such as ruling date. Further, it permits the model to leverage the full sample, while using a specification with organizational fixed effects would amount to selection on the dependent variable.

The formulation of the GEE leads to a quasi-likelihood which complicates model comparison. However, information criteria have been adjusted to this setting, which allows us to employ the "quasi likelihood under the independence model criterion" (QIC) to select a working correlation matrix (Pan, 2001; Yan & Fine, 2004). We select the working correlation matrix under an additive mean model, with conventional candidate structures including independence, exchangeable, and autoregressive of order one. The linear specification is shown in equation (2).

$$\pi(\mathbb{E}[c_{ij}]) = \nu + \gamma_1 d_i + \gamma_2 a_{ij} + \gamma_3 e_{ij} + \lambda_1 r_{ij} + \lambda_2 o_{ij} + \lambda_3 s_{ij} \qquad (2)$$

In equation (2) c_{ij} is a change that occurs for organization i at time j, π is the familiar logit link which transforms the expectation and is the canonical link function for the binomial distribution. ν is a constant, the gammas correspond to measures of structural inertia, where d_i, a_{ij}, and e_{ij}, are the organization's age (ruling date), investment in infrastructure and equipment (assets), and size (expenses), respectively. The lambdas correspond to measures of selection pressure, where r_{ij}, o_{ij}, and s_{ij}, are revenue diversification, operating margin, and niche density, respectively. Finally, we pair the GEE with heteroskedastic consistent standard errors.

Results

We first present a brief description of the data used in the study, followed by the results of the fixed effects models used to examine the effect of niche alteration on an organization's revenue, and finally the results from the generalized estimating equations.

Description of data

Table 1 shows the average characteristics of our panel and a description of each variable. All variables measured in dollars are adjusted such that they represent 2020 dollars. It shows that the average organization is roughly 31 years old, and its niche is shared by just over 12 organizations. As is typical, we see the financial characteristics and niche density have heavy right tails, with high standard deviations. This leads us to log transform our measures of revenue, niche density, total assets, and total expenses in all empirical models. We also computed zero-order correlations for all independent variables to check for potential (multi)collinearity. The highest correlation by absolute value were found between total assets and total expenses, when both are logged, was just over .65, while the second highest was -.338, between rule date and total assets. However, these were not high enough to result in any changes to our approach.

[Table 1]

The NTEE core codes can be aggregated into "major groups", which represent their broader sector, and typically include five categories: health, education, human services, arts, and other. The panel includes a collection of organizations from each major group in the sector, with the largest portion in human services. We see roughly three percent of all organization-years are coded as showing an alteration in organizational niche measured by the NCCS, occurring in around eight percent of all nonprofits included in the sample. Changes to the IRS NTEE code happen less frequently, occurring in under one percent of the observations in the sample and just under two percent of the nonprofits in our sample.

Inferential results

We present the results of our fixed effects models for revenue, testing hypothesis 1.1 for niche alterations using both measures. The challenge with high dimensional fixed effects models is the amount of variance accounted for by the fixed effects which may make some effects difficult to detect, and the restriction to identification on contemporaneous effects. Despite this, the models show that selection of a new niche predicts an increase in total revenue and contributions, while the results for revenue from program services depend on the choice of measure. The results using the NTEE code provided by the NCCS are found in table 2.

[Table 2]

Table two shows the models account for a large share of the variation in log revenue, with r-squared ranging from nearly .8 to .9. Using the NCCS indicator, niche alteration predicts an increase of just under 5 percent in total revenue, 7 percent in program service revenues, and 4.8 percent in contributed revenues. The results change slightly when the niche alteration is measured using the IRS code, shown in table 3. Using the IRS indicator, table 3 shows an alteration in niche predicts an increase in total revenue of nearly 7 percent, as well as a 25 percent increase in contributed revenue (this estimate has particularly high variance, with confidence interval ranging from 8 to 45 percent). However, the model fails to find a statistically significant effect for revenue from program services using the IRS indicator.

[Table 3]

Tables 2 and 3 show consistent results for control variables, as increases in niche density predict decreases in revenue from program services and contributions. Increases in operating margin predict increased total revenue, while revenue diversification is positively related to revenue from program services, although negatively related to total revenue and contributions.

The results of the marginal models for niche alteration using both indicators are presented in table 4. Using the NCCS indicator, the lowest QIC was found for an independent working correlation matrix with the order of results preferring simpler structures, independence < exchangeable < AR1 (AR1 = 259,244.1, exchangeable = 259,129.3, independence = 259,114.7), while the choice of working matrix made little difference using the code reported to the IRS. Note that the interpretation of assets, expenses, and niche density are complicated by the log transform, such that the exponentiation of the coefficient corresponds to a multiplicative increase in odds for an increase equal to the base (e ≈ 2.71). Table 4 shows the results of the two marginal models, each with the independent working correlation matrix, including a model for each indicator of niche alteration. In both models the constant reflects the low base rate of niche alterations in our sample, corresponding to those with few organizations in their niche, few assets, expenses, with low operating margins, and highly concentrated revenue.

[Table 4]

Using the NCCS code as an indicator of niche, the model implies that a one-year increase in rule date increases the odds of an organization altering their niche by a factor of 1.03, and higher diversification reduces the likelihood of an organization altering their niche (OR: .739), holding the other features constant. It also shows that increases in niche density predict decreases in the likelihood of nonprofits altering their niche (OR: .886). Additionally, nonprofits with higher expenses and assets are more likely to alter their niche. The results from the same model using the IRS indicator show slight differences. Nonprofits that are younger (OR: 1.006) and have more assets (OR: 1.111) remain at higher risk of altering their niche. However, using this indicator, total expenses are no longer a significant predictor of niche alteration, and while the estimate for revenue diversification is similar (OR: .685), it has much higher variance. Finally,

the results using the IRS indicator suggest nonprofits with higher operating margins have a higher likelihood of altering their niche (OR: 1.165).

Discussion

Nonprofit organizations are dynamic actors that must anticipate and respond to a range of pressures. This study proposed that one form of change, niche alteration, is an adaptive strategy employed by nonprofits to enhance access to resources. Using two indicators of niche alteration the results of our study show niche alteration is relatively rare, however, a distinct phenomenon in the nonprofit sector exercised by a non-negligible number of organizations, a finding consistent with arguments of ecological theorists. Table 2 shows the results broadly support the adaptation perspective, as niche alteration leads to improved financial standing including increases in total revenue, with increases in one or both of the major subcategories, depending on the choice of indicator. This supports the theory of adaptation in niche alteration as well as hypothesis 1.1, as niche alteration and other forms of structural change may be strategically employed by nonprofits, alleviating selection pressure, and ultimately yielding greater access to resources (Donaldson, 2001; Hannan & Freeman, 1989; Rajagopalan et al., 1997). In his description of the normative theory of nonprofit finance, Young (2007) suggests a link between the organizational niche and financing operations when he writes "…we allow for the possibility of secondary effects wherein nonprofits adjust their missions to ensure adequate funding" (p. 341), and the evidence presented by our fixed effects models is consistent with this description of nonprofit behavior. Short of theoretical considerations, revenue increases are important in their own right, as they may allow organizations to build assets and become more financially stable (Bowman, 2011).

The results show partial support for hypothesis 2.2, which proposed higher structural inertia predicts a lower probability of niche alteration. The results suggest younger organizations are more likely to alter their niche. This is consistent with the "liability of newness" described in Stinchcombe (1965) and incorporated into organizational ecology through the relationship between organizational age and legitimacy (Hannan & Freeman, 1984; Meyer & Rowan, 1977), suggesting legitimacy may contribute to structural inertia and protect against structural change. This finding also builds on contemporary nonprofit research showing younger organizations are often more vulnerable (Lu et al., 2020; D. J. Mayer, 2022; Park et al., 2021). Indeed, younger organizations may have less invested in the identity of their organization, and consequently less to lose by changing it, while older organizations may have deeper connections in their communities and a broader range of tools available to resist change. The results suggest organizations with more assets and expenses are also more likely to alter their niche. This is inconsistent with ecological perspectives on inertia and hypothesis 2.2, which posits that larger organizations are more stable and deeply routinized, and consequently more inert (Hannan & Freeman, 1984; Schwarz, 2012). Theories of strategic change however suggest that size and assets may give organizations increased flexibility, enhancing their ability to execute changes (Rajagopalan et al., 1997).

We find similarly mixed results for hypothesis 2.1, which proposed a positive relationship between selection pressure and the probability of niche alteration. We suggest financially vulnerable nonprofits are under higher amounts of pressure and find revenue diversification decreases the probability of niche alteration. Despite this, estimates for operating margin are consistent with zero, or positive, depending on the choice of indicator. Competition is a core component of selection pressure, however, our measure of competition, niche density,

shows a negative relationship, or estimates consistent with no relationship, with a change in niche. The finding related to revenue diversification build on the substantial prior which suggests revenue diversification may mitigate environmental threats (Chang et al., 2018), reducing pressure to change. The nonprofit literature is replete with possible mechanisms as revenue diversification provides many benefits to organizations, such as reduced volatility, as well as reduced risk of insolvency and dissolution by enhanced connections and the ability to exchange sources (Carroll & Stater, 2009; Frumkin & Keating, 2011; Hager et al., 2004; Lu et al., 2020; Mayer et al., 2012), which may assist in mediating environmental threats (Hannan & Freeman, 1977, 1989). Another possible reading of these data is that revenue concentration may precede niche alteration as part of a movement toward specialization in pursuit of growth (Chikoto & Neely, 2014).

Using the NCCS indicator, our results also suggest that higher niche density decreases the likelihood of niche alteration. Taken with the negative relationship between niche density and revenue from program services in the fixed effects models, these results may indicate evidence of density dependence, which describes the resources provided to organizations in thick markets (including legitimacy), and may explain why high density may support organizations in maintaining their focus (Carroll, 1984; Hannan & Freeman, 1977). For example, it is possible these organizations may exist in high density regions from the start of the study period and have specialized with differentiated services to mitigate the effects of competition.

Limitations

The mixed results of our marginal models raise the possibility of misspecification, for which there are two primary possibilities. The first is due to the possibility of niche alteration due to mission drift or creep. Our study posits that organizations alter their niche to procure

resources and stave off competition and environmental threats. However, pursing increases in

revenue can lead organizations to drift away from their mission (Jones, 2007). Further, it is

possible that some of these organizations were incentivized to alter their niche in response to

monetary inducements from larger organizations, exchanging autonomy for resources (Aldrich &

Pfeffer, 1976). Clearly, if increases in revenue precede and cause niche alteration, either by

incentivizing alteration or allowing other issues to creep into the scope of the organization, our

empirical models are not well conditioned. This raises the second possibility of niche alteration

as a proactive strategy, as nonprofits may anticipate environmental threats and change their focus

to enhance viability or meet unmet demand.

There are also concerns with the data used in this study, for example, the form-990 data

do not include organizations that do not submit 990s, such as those with lower revenues or

assets. Additionally, as mentioned above, they conflate important revenue categories. As a result

of this, the measure of revenue diversification is limited, and further, is not capable of discerning

between revenue streams. Our measure of organizational niche, while consistent with the

literature, does not have several desirable properties of a measure of organizational niche. There

are several limitations to note about our measure of niche density, it focuses on the number of

organizations and does not capture resource expenditure (Paarlberg & Hwang, 2017), and it

assumes the niche is shared by organizations (opposed to asymmetric competition), a property

relaxed in theoretical work (Hannan et al., 2003). Our study also relies on a change in NTEE

code to measure a change in niche. The NTEE codes are widely used in nonprofit research,

however, they have been subject to criticism for limiting nonprofits to a single category and

obscuring otherwise heterogenous groups (Fyall et al., 2018).

Conclusion & Future Research

An organization's choice of niche is an important decision that impacts their members and the communities in which they reside. This paper has described the organizational niche and its role in the ecology of the nonprofit sector. Using two measures of niche alteration we find evidence that niche alteration is adaptive and does enhance the organization's access to resources, with mixed evidence for the hypothesis that niche alteration is a response to selection pressure and structural inertia. The study has investigated an understudied organizational response, and the results emphasize a form of dynamism among nonprofit organizations not previously studied.

There are advantages to studying niche selection in this context. Through this approach we avoid much of the heterogeneity involved in subjective self-assessments, including "paper-only" changes (Durst & Newell, 2001). Averaging over paper-only changes may compare the antecedents of change for organizations that alter the use of software and those that engage in wholesale organizational restructuring. Previous research using 990 data has not addressed the possibility that organizations change niche and may underestimate the dynamism of nonprofit organizations. While this study has demonstrated that niche alteration is adaptive on average, heterogeneity almost certainly remains. Future research may investigate such heterogeneity and assist in identifying situations when structural change is most advantageous. This study has used archival data to explore niche alterations, and while niche alterations predict increases in total revenue and contributions on average, more research is needed on the perspectives of stakeholder groups and the human resource implications when nonprofits make large scale changes. Approaching stakeholders and human resources, qualitative approaches may be particularly advantageous, capable of capturing the necessary nuance. One possibility is that the increase in revenue comes from identifying a new pool of donors, or competing for contracts, through

altering their niche, however, these questions can only be answered with an alternative design. Additionally, the ability to execute niche alteration with existing staff capacities is an open question for nonprofit researchers.

Another lens on organizational niche, arguably, can be derived from public-facing statements made by nonprofits, conventionally seen in organizational mission statements. The analysis of mission statements and their modification over time offers the opportunity to assess an organization's leadership explicit thinking as to niche alteration. Research on nonprofit mission statements is limited but has demonstrated the value of analyzing these narrative descriptions as a way of examining strategic focus in relation to organizational operations and finance (Kirk & Nolan, 2010; Pandey, Kim, & Pandey, 2017). Future research would need to examine how assessing mission statements over time could provide further insight into the question of adaptation of organizational niche, and how it may be paired with other information to capture resource requirements in addition to productive capacities.

Notes

1. Using data from 2009-2019 results in 94,660 nonprofits that meet the inclusion criteria, a

reduction of 56 percent.

2. A sensitivity analysis, available upon request, shows our primary results are not sensitive to

the exclusion of contemporaneous variables. This is done by examining the fixed effects models

with contemporaneous (X_{ij}) as well as lagged (X_{ij-1}) covariates.

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Table 1. Descriptive statistics of organizational characteristics and financial indicators (n = N =1,029,030)

Variable	Description of measure	Mean	Standard deviation
Revenue diversification[a]	$1 - \sum_i \left(\frac{s_i}{t}\right)^2$ for I revenue categories	0.589	0.408
Organizational age (rule date)	Date of recognized exempt status	1989.791	15.961
Niche density	Count of organizations in the NTEE and county	12.077	34.92
Total revenue[b]	Sum of revenue	6.039	124.406
Contributed revenue[b]	Total contributed revenue	1.204	13.697
Program service revenue [b]	Total program service revenue	4.593	120.27
Total assets[b]	Total assets (end of year)	7.612	111.014
Total expenses[b]	Sum of expenses	5.666	116.348
Operating margin	(Total revenue – Total expenses) / Total revenue	0.009	0.259

Organizational characteristics

		Count	Percent
Niche alteration (NCCS)[c]	Different NCCS NTEE code than prior year	29,000	2.818
Niche alteration (IRS)[c]	Different IRS NTEE code than prior year	3,485	0.034
Arts, culture, and humanities		114,008	11.079
Education		159,568	15.507
Health		130,186	12.651
Human services		388,032	37.708
Other		237,237	23.054

[a] This measure includes 5 categories, program services, contributions, investments, fundraising, and rent.
[b] Millions of dollars
[c] This describes the number of all observations where a change occurs, however, 1.7 percent of organizations change the code provided by the IRS and nearly 7.7 percent experience a change in code provided by the NCCS.

Table 2. Full results for fixed effects models, NCCS niche alteration and revenue streams (N =1,029,030)

Predictor	Total			Program Services			Contributions		
	Estimate		SE	Estimate		SE	Estimate		SE
Niche alteration	0.049	***	0.01	0.070	***	0.017	0.047	**	0.014
(ln) Niche density[1]	0.002		0.007	-0.041	**	0.015	-1.399	***	0.022
Revenue diversification[1]	-0.166	***	0.017	1.698	***	0.028	-0.03	**	0.01
(ln) Total expenses[1]	0.389	***	0.009	0.241	***	0.007	0.198	***	0.006
Operating margin[1]	0.481	***	0.012	0.00		0.001	0.00		0.002
(ln) Total assets[1]	0.094	***	0.005	0.108	***	0.005	0.056	***	0.004
R^2	.799			.892			.827		

Note: † $p < .10$ * $p < .05$ ** $p < .01$ *** $p < .001$. We omit the summary of the year and organization fixed effects. SE is the cluster-robust standard error, clustered at the county.
[1] Indicates a variable that is lagged by one year.

Table 3. Full results for fixed effects models, IRS niche alteration and revenue streams (N =1,029,030)

Predictor	Revenue Category					
	Total		Program Services		Contributions	
	Estimate	SE	Estimate	SE	Estimate	SE
Niche alteration	0.068 **	0.023	-0.006	0.045	0.231 **	0.076
(ln) Niche density[1]	0.001	0.007	-0.043 **	0.015	-0.045 **	0.016
Revenue diversification[1]	-0.166 ***	0.017	1.698 ***	0.028	-1.987 ***	0.036
(ln) Total expenses[1]	0.389 ***	0.009	0.241 ***	0.007	0.283 ***	0.01
Operating margin[1]	0.481 ***	0.012	0.001	0.002	0.001	0.001
(ln) Total assets[1]	0.094 ***	0.005	0.108 ***	0.005	0.079 ***	0.007
R^2	.799		.892		.820	

Note: † $p < .10$ * $p < .05$ ** $p < .01$ *** $p < .001$. We omit the summary of the year and organization fixed effects. SE is the cluster-robust standard error, clustered at the county.
[1] Indicates a variable that is lagged by one year.

Table 4. Results for GEE, including selection pressure, competition, structural inertia, and NCCS and IRS niche alteration (N =1,029,030)

Predictor	NCCS Niche alteration			IRS Niche alteration		
	Estimate		SE	Estimate		SE
Constant	-59.742	***	1.601	-18.279	***	4.034
Structural Inertia						
Rule date	0.028	***	0.001	0.006	**	0.002
(ln) Total assets[1]	0.030	***	0.005	0.106	***	0.012
(ln) Total expenses[1]	0.022	***	0.006	0.018		0.013
Selection Pressure						
(ln) Niche density[1]	-0.121	***	0.006	-0.017		0.013
Revenue diversification[1]	-0.302	***	0.019	-0.379	†	0.201
Operating margin[1]	0.025		0.026	0.153	*	0.071
QIC/QICu	259114.7/259104.4			46359.7/46359.1		

Note: † $p < .10$ * $p < .05$ ** $p < .01$ *** $p < .001$. Estimates are presented in the raw, log odds, form. Both models use an independent working correlation matrix. SE is the heteroskedastic consistent standard error.
[1] Indicates a variable that is lagged by one year