

Version: May 2017

## A Donor-based Concept of Nonprofit Competition

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**Abstract:** This paper proposes a new definition of nonprofit markets based on individual-level donor behavior and donor-nonprofit network ties. Empirically defining markets in the nonprofit sector has been difficult, because the well-established empirical industrial organization method of market definition uses price data, and it is therefore not applicable to nonprofit donations. Instead, nonprofit scholars rely on market definitions based on an organization's subsector and geographic location. However, these definitions fail to capture important facts about donor behavior. This paper defines nonprofits as competitors if they have overlapping donors. The definition is validated with data from the Combined Federal Campaign (CFC). The validation exercise shows that the new market definition predicts donor substitution among organizations 58% more accurately than the standard nonprofit market definition based on an organization's subsector and geographic location. The CFC data and this donor-based market definition are also used to examine an important nonprofit policy issue—the relationship between market concentration and nonprofit spending on overhead.

## ***I. Introduction***

Nonprofit organizations in the United States are often advised to distinguish their work from their competitors to increase the number and amount of donations they receive. Because donations are the most important source of revenue for nonprofit organizations, defining competitors accurately is important.<sup>1</sup> If nonprofit leaders are not able to correctly identify their organizations' competitors, then they will not be able to devise effective competitive strategies. Nonprofit leaders typically have an easy time recognizing competitors with similar services. A local dog rescue organization may easily identify a local humane society as a competitor for donations. The leaders of the dog rescue organization may have a more difficult time deciding if other, less-similar organizations are competitors, including organizations such as a local wildlife rescue organization, a national dog rescue organization, a national animal rights advocacy organization, or a local park organization that maintains dog parks around the city. Finally, the organization's leaders may wonder if their fundraising is likely to be affected by focusing events in the news that spur a rise in disaster giving or political giving. The set of competitors arguably depends on the preferences and profile of the dog rescue's donors. If most of the donors identify primarily as dog-lovers, then national dog-related organizations are also important competitors. If most donors are those who adopted from the organization in the past and are interested in giving to organizations they use personally, the local dog park would be an important competitor, but other totally non-pet organizations such as local libraries or museums may also be competitors. Finally, if most donors give because they are opposed to euthanizing abandoned

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<sup>1</sup> For 52 percent of nonprofits, donations make up more than 50 percent of the revenue. Other sources of revenue include government grants and contracts, investment income, and income earned from the sale of goods and services. Figures are based author's own calculations from National Center for Charitable Statistics Core Data files. The calculation captures only nonprofits that are required to file annually with the IRS. The percentage of revenue from donations is based on a six-year average (2007-2012). In addition, donations are the largest source of revenue for several sectors, including arts and culture, environment and animals, international, and other public charities (which include religious charities).

pets, then other animal activism organizations would be important competitors. The current models of nonprofit competition ignore donor characteristics and behavior, and instead focus on defining nonprofit competition based on classifications of the nonprofit's mission area.

In this paper, I propose a new method of defining nonprofit markets. The new market definition method is based on empirical analysis of individual-level donor decisions. Donor decisions shape a network of nonprofits, where connections between nonprofits are determined by the number of donors that they share. Nonprofits connected by shared donors form a competitive market. To evaluate the performance of the market definition and demonstrate its usefulness, I implement the empirical procedure using individual-level giving data from the Combined Federal Campaign (CFC), which is the workplace giving program of the federal government. I show that my market definition predicts future donor substitutions between nonprofits more accurately than standard market definitions. This more accurate definition lends credibility to research about the effects of competition on nonprofit behavior. Finally, I use the data from the CFC and this improved market definition procedure to examine the relationship between market concentration and nonprofit spending on overhead. I find that the new market definition generates different conclusions from the traditional definition about the relationship between market concentration and overhead in the nonprofit sector.

Nonprofit organizations compete in multiple ways. Some forms of nonprofit competition are the same as in the typical for-profit case, because some nonprofits provide goods and services to paying customers. For instance, nonprofit theatres compete to sell tickets, and universities compete to attract tuition-paying students. Other forms of nonprofit competition, however, are not experienced by a for-profit firm, at least in the same way. One of these is competition for

donors, the focus of this paper. Theatres compete for donations that are not tied to ticket sales, and universities compete for dollars both to fund buildings and to fund scholarships that will be utilized by non-paying students. Donors can be thought of as either providers of capital or as “third-party payers” for these types of nonprofit goods and services. In practice, nonprofits engage in competition using various means, such as marketing the organization to current and prospective donors.

Empirically modeling competition among either for-profit firms or nonprofit organizations involves two implicit steps: defining the set of competitive organizations and measuring the intensity of competition among these organizations (Wong et al. 2005). This paper concentrates on defining the set of competitive organizations in the market. If the market is not correctly defined, then any measure of competition will not be accurate.<sup>2</sup> In the context of competition for donations, the relevant market is the set of nonprofit organizations that consumers perceive as substitutes. Consumers choose among these organizations when making a donation decision.

Complicating this market definition in the nonprofit context is the fact that the goods and services nonprofits produce are not homogeneous. If nonprofits produced just a few types of identical products, then an organization’s competitors would be easy to identify. Instead, nonprofits produce heterogeneous goods and services differentiated along several dimensions.

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<sup>2</sup> Economists have long sought to summarize the competitive intensity facing firms within a market in a single index. Competitive intensity is a concept regarding firm behavior, but this behavior is difficult to observe. Therefore, most indexes have instead measured market concentration, a measure of structure. While it is commonly recognized that such indexes can be no more than approximations of industry competitiveness on their own without other assumptions (Seaman et al. 2014), they are a useful starting point for discussion. The Herfindahl-Hirschman Index (HHI) is the most commonly used measure of competitive intensity. It measures the extent to which resources are concentrated among few, presumably oligopolistic, organizations or distributed among many, potentially competitive, organizations. It is calculated by taking the sum of the squared market shares for each firm in the market. Usually, values are measured using integers from 0 to 10,000.

The programs offered by theatres, after-school programs, and community improvement organizations vary in multiple ways among organizations, making defining competitors difficult.

When confronting such heterogeneity among goods produced by for-profit companies, industrial organization economists typically use models of cross-price elasticity to define the relevant market.<sup>3</sup> They observe how consumers change their spending on one good in response to changes in the price of another good. A significant spending change indicates that two firms are competitors. In the nonprofit sector, this technique can be used when organizations charge prices for their goods and services. If an enterprising theatre lowers its ticket prices and attracts many new audience members, then other theatres that lose audience members are considered competitors to the enterprising theatre.<sup>4</sup> Cross-price elasticity models cannot be used in the context of donations, however, because no set prices exist. Instead, nonprofit researchers use models that define the market based on a combination of subsector (such as health, education, etc. – the nonprofit equivalent of an industry) and geographic boundaries (typically metropolitan statistical areas or MSAs).

Using subsectors and MSA's to jointly define local subsector markets for donations is not ideal for two reasons. First, donation decisions do not fit neatly into the local subsector paradigm, and second, data quality at the local subsector level is poor. The first of these reasons is the most important. Defining the geographic and the subsector boundaries for donative markets is difficult. Geographic market definitions are complicated by the fact that, while some

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<sup>3</sup> A positive cross-price elasticity indicates that two goods are substitutes, because consumers purchase more of good A when the price of good B goes up. A negative cross-price elasticity indicates that two goods are complements, because consumers purchase less of good A when the price of good B goes up (they also purchase less of good B).

<sup>4</sup> It is theoretically possible that some theatres may be complements to the enterprising theatre, and may see their audience increase. This situation might occur if the enterprising theatre's low ticket price attracts audience members who had never been interested in theatre, and those audience members later attend more expensive shows at other theatres. I abstract away from this possibility for the sake of simplicity.

donors give a large portion of their gifts to charities within their local community, other donors give to organizations nationally or internationally. Defining subsectors that partition the nonprofit sector is complicated by the fact that many nonprofit services do not fit neatly into one category. An example helps to illustrate why it is difficult to assign nonprofits to subsectors that reflect the diversity of donor interests. Consider a donor to an after-school program that provides arts apprenticeships to urban, low-income youth. Donors could have many reasons for giving to this nonprofit organization. Some donors may classify the organization as “arts and culture,” while others may think of it in the category of “children and youth” or “jobs and employment.”<sup>5</sup> Furthermore, while some donors give only to a closely related set of organizations, others give much more broadly, and the characteristics they prioritize may be difficult to observe. Other donors to the after-school program may be substituting among organizations in categories that may not match traditional subsector definitions, such as “community improvement organizations” or “high-status organizations” (if the organization is particularly well-networked).<sup>6</sup>

Neither cross-price elasticity models nor local subsector models reliably define market boundaries in the nonprofit sector. What is called for to advance research on nonprofit competition is an empirical method of defining nonprofit markets without using price or arbitrary

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<sup>5</sup> A related issue is that donors to an organization are arguably more heterogeneous than consumers of that organization’s goods and services. Goods and services arguably have more concrete attributes than the “product” that is purchased when one donates to an organization. By purchasing the nonprofit’s product, consumers agree that the product’s characteristics are worth the price charged. Since the consumers agree, they have something in common, and are arguably more similar than donors whose expenditures don’t have concrete attributes or a fixed price.

<sup>6</sup> Defining the market based on field of interest model incorrectly assumes that donors mostly agree on the nature of the public good provided by the organization. Furthermore, it assumes that concern for production of the public good is the only motivation for donating to the organization, but donors might also compete with other “high status” or “politically connected” organizations for reasons that are less related to the public good than personal benefits.

classification systems. The ideal market definition should reflect actual donor decisionmaking among organizations. For instance, if two organizations are defined as being in the same market, then marketing or fundraising actions that increase giving to one organization should decrease giving to the other organization in the market.<sup>7</sup>

In this paper, I introduce an empirical method of defining nonprofit markets based on revealed donor behavior. By observing donors who give to two or more organizations, I construct a network of organizations with links that indicate that the organizations share donors. According to this new definition, nonprofit organizations compete when they have overlapping donors.<sup>8</sup> The competition exists because when a donor chooses to give more to one of the nonprofits in her network, she may decide to give less to other organizations in her network, even if she does not have a fixed charitable giving budget.

One consequence of this market definition is that each organization has a unique market. To clarify, consider the markets of organizations A and B. Donors that give to organization A determine A's market, which will include organization B if the two organizations share donors. A's market will also include organizations C and D if they share donors with A. Now consider B's market. Organization B's market will also include organization A since the two share donors. However, Organization B's market may not include organizations C and D if those organizations do not share donors with organization B. Organization B's market may instead consist of A, E, and F. Organizations A and B have unique markets reflecting the fact that each organization faces unique competitive environments and pressures. Because A and B share some donors, their

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<sup>7</sup> If the giving to the second organization increases as well, then the two organizations would be considered complements.

<sup>8</sup> Section II discusses the degree of overlap that is necessary for two organizations to be considered substitutes and, therefore, competitors.

competitive environments (and therefore their markets) overlap, but A faces some competitors not shared by B, and vice versa. The competitive characteristics the two organizations face will not be identical, but they will be correlated.

The proposed method of empirically defining a nonprofit donor market has three consequences that are beneficial for research. First, because each organization has a unique market, I can calculate organization-specific, time-varying measures of market characteristics, such as market concentration. Organization-specific measures are intuitively appealing, since they reflect the fact that each organization faces a different competitive landscape. Second, organization-specific, time-varying market characteristics allow me to use organization fixed effects, which control for unobserved factors that do not vary over time. Finally, having data at the organization-year level rather than the MSA-year level increases the number of observations and therefore the power of the analysis.

To demonstrate the usefulness of this approach and to evaluate my market definition, I implement the procedure using individual-level giving data from the Combined Federal Campaign (CFC). This context allows me to observe the list of soliciting nonprofits as well as annual, individual-level pledges by federal employees who give. For each donor, I observe both the nonprofits she selects and the amount she gives to each organization.

These data allow me to compare the performance of my new donor-based market definition to the standard subsector market definition. For each nonprofit, I construct the relevant market of competing organizations under the proposed donor-based definition and the standard subsector definition. Then, I construct a data set of actual gift substitutions after an exogenous exit of a CFC nonprofit. For each definition, I count the number of substitute organizations that

are part of the exiting organization's competitive market. I find that the donor-based market definition predicts substitutions 58% more accurately than the standard definition. The test shows that the donor-based market definition predicts donor behavior and that the fundraising actions of one organization affect giving to other organizations in the market.

Using the CFC context, I am also able to examine an important nonprofit policy issue—the relationship between competition and nonprofit spending on overhead—and compare the results obtained from the subsector and donor-based market definitions. By comparing the two analyses, I demonstrate how market definition influences researchers' understanding of competition in the nonprofit sector. Understanding how nonprofits may change their operations in response to competition from other organizations is important for evaluating the effects of a variety of public policies. Nonprofits may respond by changing their spending on fundraising and related overhead expenses such as communications. Organization-level changes in overhead spending, when aggregated, can affect the amount of public goods, social services, and other programs provided by the sector, and are therefore an important consideration for policymakers.

The direction of the change in overhead spending is theoretically ambiguous. Increasing fundraising expenses allows an organization to reach more potential donors, but decreasing overhead expenses, and therefore increasing the proportion of funds going to program services, makes the organization more attractive to donors (Rose-Ackerman 1982, Okten and Weisbrod 2000). Existing research draws mixed conclusions about the relative size of these effects, with some empirical work finding that competition increases overhead spending and other work finding that nonprofits in more competitive environments spent less on fundraising individually, but more in the aggregate (Feigenbaum 1987, Thornton 2006).

Using the data from the CFC, I construct markets using both the traditional subsector market definition and the new donor-based market definition. I then measure competition intensity within these markets. Following previous literature, I measure competition intensity using the Herfindahl-Hirschman Index (HHI). The HHI is a measure of market concentration that specifies the extent to which a market's donations concentrated in a few firms or, conversely, spread among many firms. The HHI is often used to measure competitive intensity, which is difficult to observe.<sup>9</sup> Using the traditional subsector market definition, all nonprofits in the same subsector share a HHI. Using the new donor-based market definition, organizations have unique HHI measures that vary over time, because organizations each have unique markets. For each of the two analyses, I regress overhead rate on HHI, on total dollars given to each nonprofit, and on other relevant controls, including fixed effects.<sup>10</sup>

Using the traditional subsector market definition, I find that when a subsector's market concentration increases over time, there is no change in overhead rates. Using the donor-based market definition, I reach a different conclusion. I find that when an organization's market concentration increases over time, there is a (marginally) statistically significant increase in overhead rates.<sup>11</sup> More concentrated markets have less competition, so this result indicates that increases in competition are correlated with more efficient nonprofits. This result also suggests that competition may make nonprofits more efficiency-conscious and may play a role in decreasing rent seeking and "slack" among nonprofits. This application demonstrates that the

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<sup>9</sup> The logic of using concentration to measure competitive intensity arises from the observation that monopolies, in which resources are concentrated in one firm, are anti-competitive, while atomistic markets, in which resources are distributed among a large number of firms, are highly competitive.

<sup>10</sup> Notably, the organization-year-level HHI measure combined and the longitudinal CFC data allow me to include organization and year fixed effects when using the new market definition. I include subsector and year fixed effects when using the traditional market definition.

<sup>11</sup> Significant at the  $p < 0.1$  level only. Note this relationship is not causal, as a valid exogenous shock is not present in the data.

new donor-based market definition leads to a better understanding of how nonprofit organizations respond to competition.

This paper contributes to the methods available to nonprofit scholars by devising a new way to define nonprofit markets. With the right data, this new method can be applied to a wide variety of nonprofit contexts, allowing researchers to better understand how organizations in the nonprofit sector responds to competitive pressures. In particular, competitive pressures in the nonprofit sector can be influenced by a variety of policies, such as policies that promote social entrepreneurship, confer grant- and contract-based government funding, or alter the incentives for donating to nonprofits. This method of defining nonprofit markets can help to quantify nonprofits behavioral responses to competition. Second-order behavioral responses by nonprofits to policy changes are important, and policymakers should account for these responses in their calculations of the social costs and benefits of new policies affecting the nonprofit sector.

The paper proceeds as follows: Section II provides the theoretical framework for understanding competition in the nonprofit sector. Section III reviews existing empirical approaches to defining markets to provide a context for the approach taken here. Section IV describes my proposed market definition procedure in detail. Section V explains the CFC and how the procedure is operationalized in the data. Section VI compares the new donor-based market definition to the traditional subsector market definition. It describes the overlap in the two measures and validates the new measure. Section VII describes the method of analysis for the application. It then compares the results obtained using the new donor-based and traditional subsector market definitions. Finally, section VIII concludes.

## ***II. Overview of Nonprofit Competition***

This section begins by establishing two important facts about competition and donations in the nonprofit context. These facts then form the basis for a model of donations to nonprofits in a competitive environment. Finally, I discuss the implications of this model for using individual-level donation records to define nonprofit markets.

### *Stylized facts about competition and donations to competing nonprofits*

The first important fact is that nonprofits produce heterogeneous public goods and social services. Nonprofit organizations produce heterogeneous goods, and nonprofit leaders work to differentiate their organizations from others in similar subsectors along many dimensions. In the industrial organization literature, this is known as horizontal differentiation (one-dimensional differentiation is known as vertical, since the goods can be clearly ranked as better or worse in a single dimension). Although many organizations may seek to provide a similar public good, such as higher education, they differentiate themselves on the basis of methods of production, population served, or even intangible, brand-related aspects such as values espoused in marketing and communications (Brown and Slivinski 2006). Thus, two universities operating in the same state may develop programs and reputations for focused on technology or liberal arts, or two nonprofits aimed at encouraging more low-income and minority students to pursue higher education may do so by offering scholarships or by offering assistance filling out the necessary paperwork to apply to schools and scholarships. Donors and consumers are sensitive to these distinctions, and may give more to one organization over another because they agree with their approach, feel more empathetic toward the population they serve, or are more inspired by their marketing pieces.

The second important fact is that many donors give to several charitable organizations over the course of a year, and often these organizations are in multiple subsectors and locations. According to a recent survey of active donors by Cygnus Applied Research, respondents age 35 to 64 gave, on average, to 9 organizations in 2015, and donors over age 65 gave, on average, to 14 organizations (Burk 2016). Donors making larger gifts from accumulated assets also give to multiple organizations. According to a Fidelity Charitable (2016) report, 85% of individuals with Fidelity Charitable Donor Advised Funds gave to 6 or more charities in 2015. Donors making multiple gifts tend to give to more than one nonprofit subsector. According to the 2005 Center on Philanthropy Panel Study (COPPS), most donor households give to more than one type of nonprofit organization.<sup>12</sup> The number of organization types supported tends to increase as a donor household's income increases. Donor households with income over \$100,000 gave, on average, to 3.5 types of nonprofit organizations, while donor households with income less than \$50,000 gave, on average, to 2.3 types of nonprofit organizations. Finally, donors give to charities based outside of the donors' local area. According to the Fidelity Charitable study, only half of donors' grant dollars went to their home states (2016).

### *Modeling competition and donor decisionmaking*

Competition among heterogeneous, horizontally differentiated organizations has been modeled using "locational" representations. Locational representations were introduced by Hotelling, in the form of a one-dimensional "linear city" model (1929). Later extensions took on multiple dimensions.<sup>13</sup> In the multi-dimensional model, organizations differ on (finitely) many

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<sup>12</sup> COPPS asks households if they made gifts of \$25 dollars or more in the previous year. If so, the households are asked separately about giving to 11 different types of nonprofit organizations. These organization types do not align perfectly with the NTEE major group codes I use in this present study. Therefore, I use the "nonprofit organization type" terminology of COPPS to distinguish this classification scheme from the more common scheme I am using.

<sup>13</sup> For a review of these multi-dimensional models see Lancaster (1990).

characteristics, and these characteristics are represented in an n-dimensional unit space known as the “product space.” The organizations are then located within this space by quantifying each differentiated characteristic. Figure 1 shows how a group of theatres differentiated on two characteristics—type of stories produced and target audience—would be represented using a two-dimensional locational model. In the figure, one can see that Theatre A produces more new works than Theatre B. Theatre B produces more child-friendly productions than Theatre A. In addition to representing organizations, this model also represents customers on the product space by using their preferred sets of characteristics as their “ideal points” or locations.

<Figure 1 About Here>

Using a locational model, donor decisionmaking is straightforward as long as the donor chooses only one organization. In this case, the donor gives to her most preferred organization, which is also the closest organization to her on the diagram. In Figure 1, the donor shown is closest to Theatre A, and so would choose to give to Theatre A. The amount she gives depends on the marginal benefit she gets from giving compared to the marginal benefit from spending that money on all other (non-charitable) consumption.<sup>14</sup>

If a donor has an ideal point but also values variety, then he or she may give to multiple organizations. Preference for variety is often explained by diminishing returns from purchasing additional quantities of a most preferred good. After purchasing some initial amount of the most preferred good, a consumer will begin to purchase a second good. Donors may value variety because they experience diminishing marginal utility from additional dollars donated to a cause,

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<sup>14</sup> The donor equates marginal utility from both donations and other consumption. This formulation of donor decisionmaking abstracts away from strategic considerations regarding the giving of other donors and considerations of the motivation for giving, including utility derived from consuming a public good and utility derived from the act of giving, which the literature terms “warm glow.”

or for other reasons. For instance, donors may believe that multiple organizations working on a problem encourages innovation, or they may get some social benefit from being known as a donor to more than one organization. As donors' appreciation for variety increases, more donors will give to multiple organizations. In Figure 1, if a donor values variety, she would give first to Theatre A, and then to Theatre B, which is her next-most-preferred organization.

### *Implications of the model*

Using the models discussed here, a researcher can learn about the distribution of charities and donors in the product space based on the donors' giving. At the most basic level, when a donor gives to one nonprofit organization, this tells the researcher what her most preferred nonprofit organization is. The gift also reveals that the donor and nonprofit organization are located near each other within the product space.

When a donor makes multiple gifts, this tells the researcher even more about the distribution of nonprofit organizations within the product space. Donors making multiple gifts are trading off between organizations that are close substitutes. This tradeoff process is only possible if the organizations are both located near the donor in the product space, and it follows that those organizations are located near each other as well. Organizations near the same donors will then be competing for these donors' contributions.<sup>15</sup>

Before moving on, it is important to note that any particular individual may consider organizations that they do not choose to be substitutes with those they do choose. However, given a population of enough individuals with slightly varying preferences, the observed choices

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<sup>15</sup> Here, I take the form of competition employed by organization to be exogenous. Competition could involve advertising, providing a different mix of public goods and social services, cutting overhead rates, or some other actions.

will include some donors who give to both organizations. While observing one individual's choices may not provide a full understanding of the set of competitive organizations, observing a full population of individual donors' choices will uncover the full set of competitive organizations.

### ***III. Empirical Measures of Markets in the Literature***

In the nonprofit literature, the relevant market for nonprofit competition is usually defined as the set of nonprofit organizations operating in the same subsector in a particular geographic region. This literature is summarized in Table 1, which describes ten papers that were selected because they relate to nonprofit competition or entry and measure the competitive nonprofit market.

<Table 1 About Here>

As shown in the table, nine of the ten papers use MSA as the geographic scope of the nonprofit market. In addition, nine of the ten papers use the National Taxonomy of Exempt Entities (NTEE) codes or a related mission designation to define the product scope of the nonprofit market. For instance, Seaman et al. (2014) define the market as organizations in the same NTEE category in the same MSA. Intensity of competition or market power is typically operationalized using the HHI (Thornton 2006, Castaneda et al. 2007, Seaman et al. 2014, Twu 2007, Bose 2015) or the number of organizations per capita (Twombly 2003, Saxton and Benson 2005, Barman 2008, Twu 2007)<sup>16</sup>, with some papers using multiple measures.

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<sup>16</sup> Some papers use other related nonprofit count variables.

In search of a method of defining nonprofits' competitive which better reflects the observed behavior of donors, I review empirical measures of markets in other literatures.<sup>17</sup> The industrial organization literature has developed multiple ways of defining competitive markets. Some of these measures are applied primarily to for-profit competition, and other measures are applied primarily to mixed-industry hospital market competition. Each of the measures from the industrial organization literature faces substantial hurdles to application in the nonprofit context.

*Empirical industrial organization literature: For-profit industries*

In the industrial organization literature, a major focus has been on defining the market for the purpose of evaluating antitrust claims. In antitrust claims, it is important to evaluate if two firms are operating in the same market. Market definition in antitrust claims is typically done using tests of cross-price elasticity and tests of substitution as a result of price increases, known as the SSNIP test (U.S. Department of Justice and the Federal Trade Commission 2010). These tests evaluate whether a change in the price of one firm's goods shifts the demand curve for the other firm's goods to establish if these two firms are competitors.

Defining substitute products based on cross-price elasticity is problematic in the nonprofit context because there is nothing analogous to price. Many researchers create an analogy between the concept of price and the nonprofit's overhead rate (Meer 2014, Bowman 2006, Okten and Weisbrod 2000, Weisbrod and Dominguez 1986) . They note that, with a higher overhead rate, a donor must increase her gift if she wishes to purchase a specific amount of charitable goods and services. Even if the analogy between overhead rates and price is correct, it

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<sup>17</sup> Much of the theoretical and empirical work focuses not on competition for donations but instead on competition for the sales of goods and services. The focus on sales-related competition exists in the hospital context, but also can be observed in other industries where researchers have been interested in the mixture of nonprofit and for-profit organizational forms (see Schlesinger and Gray (2006) or Brown and Slivinski (2006) for a review of this literature).

is not clear that donors respond to changes in overhead rates the same way that consumers respond to changes in product prices for two reasons. First, it is unclear whether donors are well informed about charitable overhead rates. Second, one component of overhead rates is fundraising expenses. Fundraising expenses have been shown to encourage donations (Frumkin and Kim 2001). It is difficult to separately identify the effects of the price-like overhead rate and the spending on fundraising. Empirical research has shown these donors' responsiveness to changes in overhead rates is relatively small when compared to other factors, even in cases where the information is clearly available (Bowman 2006, Frumkin and Kim 2001).

*Empirical industrial organization literature: Hospitals*

Not all industries produce the data necessary to carry out cross-price elasticity tests effectively, however. One important industry where price data is rarely used to define competitive markets is the hospital industry.<sup>18</sup> In the hospital industry, alternative market definitions have been used. Elzinga and Hogarty (1973) define a market's geographic boundary by product flows in and out of the area. Specifically, the Elzinga-Hogarty test defines the market as the smallest geographic area where no more than 10% (or 20% or 25%) of the goods and products consumed within the area are produced externally and, conversely, no more than 10% of products produced in the area are exported. Inspired by the Elzinga-Hogarty test, hospital researchers have also begun to use patient flows to define a market's geographic boundary. In the hospital literature, market geography is typically defined as a set of zip codes that send a non-

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<sup>18</sup> Using prices in the hospital context is atypical because consumers often do not have information on prices before selecting hospital care. Prices charged to consumers are also distorted by insurance. The prices paid by insurance providers are not the prices charged to the users of the hospital care. Notably the hospital industry includes both for-profit and nonprofit hospitals.

trivial number of patients to the hospital and collectively account for a large percentage of hospital discharges.

In an influential paper on hospital competition, Kessler and McClellan (2000) expanded on the idea of using patient flows to empirically define a hospital market. They first estimate a patient-level hospital choice model and then empirically define the hospital's geographic market from the predicted patient flows. Unfortunately, applying a model of this type to the nonprofit sector by using donors rather than patients, is infeasible. Three problems arise that make a donor flow model impossible in most contexts (including this one).

First, the data required for a donor flow model are difficult to obtain. Individual giving data for the nonprofit of interest and all potential competitors would be needed. Individual giving data are available in the context of the CFC, but that is unusual.

Second, the number of nonprofit alternatives is typically much larger than in the hospital case. The large number of alternatives increases computational difficulty (or data required) for the donor choice model. One technique used in the industrial organization literature reduces the estimation difficulty by describing each choice by a set of attributes (Fader and Hardie 1996). To achieve this, nearly all attributes must be objective and observable. While objective attributes are easily available in industries such as the packaged grocery industry, where one would observe size, brand, and calories, nonprofits can be more difficult to describe in an objective manner and standard datasets may not contain the full range of objective attributes. Furthermore, because the number of options in the nonprofit data set is so large, even this technique will be computationally difficult. To overcome this, the researcher may also need to sample the alternatives available to each donor, rather than estimating the model using the full set of alternatives. This additional

step further increases the technical difficulty of estimation, and its application has been limited within the industrial organization literature (Keene and Wasi 2012).

Third, donors often give to several organizations in a short period of time. Assuming that these donation decisions are unrelated to one another may not reflect reality. In contrast, the hospital literature typically uses heart attack data or similar rare occurrences. In this data, one patient is typically admitted to one hospital for their heart attack. The typical assumption in the hospital setting is that each observed choice of hospital by a consumer is unrelated, which is reasonable in that context. Because nonprofit donors give to multiple organizations and the donors' decisions may be related, modeling the donations in a simple multinomial logit choice model would be incorrect.

More complex choice models are rarely used in the literature and are therefore underdeveloped. Most models from empirical industrial organization treat joint purchases as a challenge to be overcome, as it makes modeling the choice more difficult. However, it is possible that, if the choice set is known, simultaneous or joint purchases can be used to understand competition. Grover and Srinivasan (1987) use multiple purchases in a short period of time to estimate the joint probability of the same consumer choosing two different brands or items within a product category. These probabilities are then used to segment the consumers and define the market structure based on the level of predicted switching for the firm's market position.

#### *Network science literature*

Another literature which is concerned with defining competitive markets is the network science. The network science literature arises out of the sociology tradition, and early sociological work on competition goes back to Granovetter (1985). This literature attempts to

uncover the “structure of social relations” underlying competition using observation and self-reporting by organizations. Management reports of competitors typically define the competitive market in this literature. For instance, Braha et al. (2011) uses Hoover’s research database, which is largely based on firms’ own filings with the government, to form competitor lists. The resulting network shows a network of competition characterized by several factors, including geographic distance and firm size, rather than industry codes alone. In fact, only 46% of competitive network ties specified by firms were between organizations in the same industry (five-digit NAICS code).

Network science literature has been applied to the nonprofit sector, although literature specifically looking at funding-related networks (as opposed to service delivery networks) is sparse. Some of this literature has examined relationships among organizations based on shared board members (Moore et al. 2002, Faulk et al. 2016a). A recent paper by Faulk et al. examined shared board ties among nonprofits and foundations and found that more connected nonprofits were more successful in obtaining grants (2016a). Another recent paper by Faulk et al. examines networks formed by nonprofits which share foundation grants. This work concluded that organizations with more central positions in the network in early years received more grants in later years (2016b). To my knowledge, no researchers have published work examining networks of relationships among nonprofits based on shared individual donors.

### *This paper*

The empirical strategy used here combines aspects of the economics, networks, and nonprofit approaches. Like in the network literature, I interpret the competitive landscape using a network. However, I do not follow the network literature in employing self-reports to construct the network. Instead, I follow the economics literature in using observed consumer (in this case,

donor) choices to understand the competitive set. However, rather than estimating a multinomial logit choice model, I employ a simpler approach. I take advantage of the fact that donors jointly choose multiple nonprofits as a first step of constructing network ties between organizations.<sup>19</sup> Like the nonprofit literature, I use geographic location to constrain the donor choice set.

#### ***IV. Proposed Market Definition Procedure***

Empirically modeling competition, including nonprofit competition, involves two implicit steps: defining the competitive market revealed by donor overlap and calculating intensity of competition. This section will describe the first of these steps, the process for defining the competitive market.

I define two organizations,  $i$  and  $j$ , as competitors if at least some donors are likely to substitute donations to  $i$  for  $j$ . I use bundled donations, which are two or more donations that occur at the same time, as evidence that the organizations are near each other in the product space and close substitutes for the donor. The “competitive market for organization  $i$ ” is organization  $i$  itself plus all the  $j$  organizations that share at least one donor. These relationships can be represented in a network model, which provides a visual representation of the product space described in Section II.

Figure 2 provides a simple illustration of the market definition procedure. The first panel provides a simple example of individual-level giving by 8 donors. These 8 donors give to six organizations, labeled A-F. Some donors give to only one nonprofit organization, while others split their giving with pledges to multiple organizations. The second panel shows how these gifts

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<sup>19</sup> I do not currently approach this as a stochastic problem, but a probabilistic model may be useful in future extensions.

can be represented in a two-mode (or bipartite) network. Donors are represented by boxes, and organizations are represented by circles. From this two-mode network, one can already observe that Organization A is not connected to other organizations, and is in its own market. One can also observe that organizations B and C are connected and form a market. Finally, one can observe that organizations D, E, and F are connected in a more complex manner. The third panel shows the inferred nonprofit network. In this network, nonprofits are represented by circular nodes. Ties between the organizations indicate that the nonprofits share at least one donor. This structure visually represents the competitive market defined by donor behavior. In the third panel, one can see that organization A has no connections (no common donors), while organization B and C are connected because they share donors. Organization F is connected to both D and E. However, because organizations D and E do not share donors with each other (each shares only with F), they are not connected. The fourth panel specifies the donor-based markets for each organization. The market for each organization consists of the organization and the organizations with which it shares donors. These are the organizations it is linked to in the network diagram, which are known as network neighbors.

<Figure 2 about here>

It is important to note that the markets for organizations D, E, and F are distinct. Organization F shares donors with both organizations D and E, and so its market includes all three organizations. However, organization D does not share donors or a network tie with organization E. Therefore, its network includes only organizations D and F. Likewise, organization E shares donors only with F, and its market contains only these two organizations, not D. The three organizations have overlapping, but unique markets. As such, any market characteristics for these organizations will be different.

In a formal network model, organizations and relationships between competitive organizations can be represented by the set  $G = \{V, E\}$ . The organizations  $V = \{v_1, v_2, \dots, v_N\}$  are represented as nodes. The relationships between competitive organizations, defined by donors' pledges to multiple organizations, are represented by an edge or tie between the nodes,  $E = \{e_{ij}\}$ .<sup>20</sup> Organizations  $v_i$  and  $v_j$  sharing  $n$  donors have  $e_{ij} = n$ . If no donors are shared  $e_{ij} = 0$ . Therefore the market for organization  $i$  could be described as its network neighbors, or the set of all organizations such that  $e_{ij} > 0$ . Equation 1 expresses this formally.

$$\text{Market}_i = \{v_i, v_j: e_{ij} > 0\} \quad (1)$$

The definition in Equation 1 gives the market for organization  $i$  as its immediate neighbors in the network, or the organizations with which organization  $i$  shares donors. These are known as first-degree neighbors. The network model also allows for an expanded market definition which includes organizations that indirectly compete for donors. In network parlance, these organizations would be known as second-degree neighbors. Second-degree neighbors are organizations that share a first-degree neighbor—their donors are both interested in a common third organization. For some analyses, I test a second market definition based on second-degree neighbors.

## V. *Context of the Combined Federal Campaign*

I implement the proposed framework in the context of the Combined Federal Campaign (CFC), which is the workplace giving program of the federal government. This unusual data set

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<sup>20</sup> In network parlance, this is a one-mode representation of a two-mode, or bipartite network.

allows me to observe the list of soliciting nonprofits as well as individual-level pledges by federal donors (nonprofits selected and amount donated to each).

### *Overview of the Combined Federal Campaign*

The Combined Federal Campaign, or CFC, encourages and facilitates workplace giving by employees of the federal government. These employees are located in federal workplaces around the United States, and therefore the CFC is divided into local administrative zones. Employees within each administrative zone are provided with a list of eligible nonprofit organizations. Eligible organizations include local nonprofit organizations (those with services in fewer than 15 states), national nonprofit organizations (those with services in more than 15 states), and international nonprofits (those with services in at least one country other than the United States). To be deemed eligible, organizations must be a registered 501(c)3 nonprofit organization, must complete a simple application providing information about governance, program operations, and auditing practices, and provide a copy of the previous year's IRS Form 990.

Employees make pledges through the CFC at the end of each calendar year (generally between September and December).<sup>21</sup> Each employee receives a booklet of eligible organizations for his local administrative zone. In many campaigns (including all those in my data), the employee may also access this list online. The employee then chooses the organizations to which he wants to donate and makes either a one-time gift by cash or credit card

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<sup>21</sup> Gifts in this context are called pledges because employees generally do not give one large donation; instead, most commit to an amount taken from each paycheck over the course of the year. As it is a commitment, rather than an immediate gift, it is known as a pledge.

or a recurring gift deducted from his pay. He can submit his choices either with a paper pledge form or through an online system.<sup>22</sup>

### *Data*

I observe individual-level giving to the CFC between 2008 and 2013. For each year, I observe pledges made through one of the online giving and gift tracking systems serving the CFC. The system was in use by 62 local administrative zones by 2013. The pledges include information on which charities an individual selects and how much he or she gives to each nonprofit organization. I also observe the individual's zone. The data set includes approximately 18,650 public charities, 655,000 pledges, and 1.3 million gifts over the six-year period.

Table 2 shows how the coverage of the Nexus data grows over the course of the panel. The first three rows show that the number of local administrative zones, number of pledges, and number of gifts grows each year as the coverage of the Nexus system expands. Coverage expansion also leads to larger pledge totals in the sample each year, which are shown in row four, even though pledges to the CFC overall are falling over this time period. Rows five and six show that the average pledge and average gift decrease and then increase during this time period. Row seven shows that the average donor chose about two nonprofits during this time period. Row eight shows the number of organizations selected by at least one donor who appears in the individual data. The number of organizations included in this data grows substantially over time.

<Table 2 About Here>

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<sup>22</sup> A few systems are available; in my data, most individuals use the Nexus system.

## VI. *Nonprofit Market Analysis*

The present section begins by presenting two facts from the CFC data. Each of these facts supports the idea that the subsector definition of the competitive market is not the most useful definition to use in the nonprofit context. I then compare the new donor-based market definition to the traditional subsector market definition. Finally, I present evidence that the new donor-based market predicts a donor's behavior after an organization she has donated to in the past becomes unavailable for future gifts. Specifically, I show that the donor-based nonprofit market definition predicts the donor's new selection 58% better than the traditional subsector definition.

### *Stylized facts in the CFC data*

Individuals' donations to the CFC behave much like donations in other contexts. First, over half of CFC donors give to multiple organizations. Individuals making more than one donation split their gifts among subsectors 82% of the time. Among these donors, 33% give to 2 subsectors, 25% give to 3 subsectors, and 24% give to 4 or more subsectors. A more granular form of these statistics is shown in Table 3. The columns show the number of organizations made,  $X$ , and the rows show the number of subsectors selected to receive those donations,  $Y$ . The cells give the probability of an individual donor's pledge to  $X$  organizations being split among  $Y$  subsectors.

<Table 3 About Here>

Furthermore, when new nonprofits enter the market, donors switch their donations from existing organizations to these new organizations. However, many of these switches do not happen within subsectors. In Table 4, I find all cases where donors made a specific kind of unambiguous switch after the entry of a new organization. These are cases where a donor stopped giving to exactly one organization and started giving to a new organization. These

switches are relatively clear examples of direct substitution. Table 4 shows the number of times donors substituted between specific existing organizations (the rows) and new organizations (the columns), grouped by 12 NTEE<sup>23</sup> subsectors. It demonstrates that, in 58% of cases, the substitution was not occurring within subsector.

<Table 4 About Here>

### *Markets in the CFC data*

The donor-based market procedure was applied to the CFC data, and the market for each organization that received donations from the individual giving dataset between 2008 and 2013 was identified. Information about these markets is summarized in Table 5. On average, the donor-based markets include 11 organizations, the main organization and 10 competitors. This average is influenced by a few organizations with exceptionally large donor markets. The American Red Cross, which is consistently among the top 5 organizations in the campaign has the largest donor-based market at 1,969 organizations. Row two indicates that an average of two out of the 10 competitive organizations in these markets are the same subsector, defined using the 26 NTEE major groups, as the main organization. On average, the organizations in the CFC receive about 7 percent of the gifts in their markets. The markets receive an average of \$210,675 gifts per year, and this average is once again influenced by a few particularly large organizations that also have large markets. The final three rows of Table 5 show that the organizations in the

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<sup>23</sup> In the United States, the National Taxonomy of Exempt Entities (NTEE) divides nonprofits into 26 service types. These are collapsed into major groups of nonprofit activities: arts, culture, and humanities (A), education (B), environment and animals (C, D), health, (E, F, G, H), human services, (I, J, K, L, M, N, O, P), international, foreign affairs (Q), public, societal benefit (R, S, T, U, V, W), religion related (X), mutual/membership benefit (Y), and unknown (Z). Hospitals and institutions of higher education are analyzed separately from health and education institutions to form a total of 12 groups.

CFC receive, on average, 153 donations totaling \$1,293 in each zone and year. On average, 26 percent of an organization's donations are from donors who give to only one nonprofit.

<TABLE 5 ABOUT HERE>

As suggested by Table 5, there is some overlap between the donor-based market and traditional subsector markets. Table 6 shows how market size and market overlap vary by subsector. Row 1 describes the subsector markets. For organizations in the CFC, the subsector market would include an average of 212 organizations when subsector is defined using 12 NTEE groups. This is much larger than the 11.5 organizations, on average, in the donor-based markets, which are described in Row 2. Using the subsector market definition, health, human services, and international organizations have the largest markets, on average, because these types of organization have strong participation in the CFC. Using the donor-based market definition, hospitals have the largest markets, on average. This is influenced by the fact that the few hospitals participating in the CFC are quite popular. Examples include St. Jude Children's Research Hospital and Shriners Hospitals for Children. On average, there is relatively low overlap between the subsector market definition and the donor-based market definition. This is perhaps surprising, given the importance that the nonprofit research tends to place on the subsector definition of nonprofit competitive markets. On average, an organization can expect that 3.2 of its 10.5 competitors, or 30 percent, will share its 12-group subsector. The percent of overlap varies somewhat by subsector. Higher education organizations have particularly low overlap between the subsector and market definitions, which is intuitive if one believes that most individuals attended and give to only one college and therefore very few colleges would share donors. In contrast, the health subsector has very high overlap between the two definitions, with

approximately 38 percent of donor-based market organizations appearing in the subsector market as well.

<TABLE 6 ABOUT HERE>

Overlap between donor-based markets and traditional subsector markets can also be analyzed by looking at the network ties and a more granular nonprofit subsector definition. A tie between two organizations means that the organizations are in the same market. Ties between organizations in the same NTEE major group, which includes 27 categories, occur 14.7 percent of the time.<sup>24</sup> Table 5 shows the prevalence of same-subsector ties, by subsector. Same subsector ties are most prevalent among animal-related organizations (31.2 percent), followed by disease-related organizations (22.4 percent) and international-focused organizations (22.2 percent).

<TABLE 7 ABOUT HERE>

Given the evidence presented here that many of the donor-based market competitors are not in the same subsector, a natural question arises: just what kinds of organizations are the other-subsector competitors? In many cases, the competitors are intuitive. For instance, Special Olympics is categorized as a “Recreation and Sports” organization. However, its most important competitors are in the “Diseases, Disorders, and Medical Disciplines” subsector and the “Health Care” subsector. Donors that give to Special Olympics rarely give to other sports organizations, but they often give to organizations like the National Down Syndrome Society, St. Jude Children’s Research Hospital, the Children’s Miracle Network, the National Down Syndrome Congress, and the Ronald McDonald House Charities. As another example, the ACLU’s competitors tend to be other quintessentially liberal causes. Even though the ACLU is

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<sup>24</sup> Ties between organizations in a less granular 12-category grouping occur 28.3 percent of the time, and 38.9 percent of ties are between organizations in the same 5-category NTEE group.

categorized as a “Civil Rights, Social Action, and Advocacy” organization, its competitors are often organizations in the subsectors of “Environment” and “International, Foreign Affairs, and National Security.” Organizations like Amnesty International, Doctors Without Borders, the Nature Conservancy, and the Sierra Club Foundation are important competitors in these subsectors. In addition, National Public Radio, an “Arts” organization, and Planned Parenthood, a “Health Care” organization, are important competitors for the ACLU. These examples demonstrate that the donor-based market definition yields lists of competitors which are intuitively appealing.

#### *Validation of market definition*

For the donor-based market to be an improvement over the subsector market, donor-based markets not only must be intuitively appealing, but also must capture the true set of nonprofit organizations that are considered by a donor. If donor-based markets capture substitution patterns better than subsector markets, then this is a strong argument that the donor-based market is valid and preferable to the subsector market. To test this, I analyze donor substitution between nonprofits after an unexpected change to the CFC’s nonprofit list. It is important that the change be unexpected, or exogenous, to decrease the probability that a donor is changing their donations because the donor has changed his or her ideal point on the nonprofit product space. The CFC data includes cases when a nonprofit drops off the list of eligible organizations. In the year of the disappearance, many donors increase their giving to one of the remaining organizations in their giving set or begin giving to an entirely new organization. If the donor-defined market captures the true substitution set, then many of these new gifts should be in

the list of network neighbors in the previous year.<sup>25</sup> If the subsector market captures the true substitution set better, then more of the organizations should be in the subsector market.

To assess the extent to which each market definition predicts substitution, I created a list of organizations that disappear from the CFC. I include both organizations that permanently disappear and those that disappear temporarily. I exclude disappearances that happen in merger years and may therefore be endogenous (bad communication, etc.). I then find the donor records<sup>26</sup> associated with those gifts. I exclude donor records from my analysis when more than one organization the donor was giving to disappears, because I will not be able to tell which new organizations are substitutes for which older organizations. I also exclude donor records when the donor decreases or quits giving to an organization which does not disappear. Unprompted changes in giving behaviors indicates that an individual may have shifted his or her ideal position in the product space, so these donors should be excluded from the analysis. These criteria allow me to increase my confidence that the substitution is related to the disappearance of the specific disappearing organization, rather than other factors.

The first panel of Table 5 shows that 38% of substitutions are found on the previous year's donor-based market, which is the immediate (first-degree) network neighbors list. The second panel shows that the proportion of substitutions predicted increases to 73% when second-degree network neighbors are also included in the list.

<Table 5 About Here>

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<sup>25</sup> In such a case, it is also possible that the donor begins giving to the organizations outside of the CFC. However, this should not bias the analysis. The analysis focuses on donors who begin giving to a new CFC organization after one of their preferred organizations drops out of the CFC. If the donor simply begins giving outside of the CFC rather than giving to a different CFC organization, then they would not appear in the list of substituting donors.

<sup>26</sup> Excluding those "users" that appear to include gifts for multiple people.

The first panel of Table 6 shows that 24% of substitutions are within the same 27-group NTEE subsector. This 27-group categorization of nonprofits is relatively broad competitive definition. Some research on competition even defines the relevant market at a level below this (the NTEE-CC code), which includes hundreds of categories. Defining markets using NTEE-CC codes would capture an even lower percentage of donations than the 27-group NTEE subsectors. The second panel of Table 6 shows that the subsector markets must be aggregated up to the 12-group level to achieve a level of accuracy similar to the donor-based market definition. The relative success of the 12-group subsector market at capturing substitutions is unsurprising, since these markets include hundreds of organizations. When a market is so large, it can predict many substitutions by random chance.

<Table 6 About Here>

The donor-based does a better job than the subsector market at predicting actual donor substitutions under exogenous conditions. This is true even though the average subsector market includes many more competitors than the average donor-based market. The fact that the larger subsector markets are not capturing substitution patterns means that these markets contain many organizations which are not true competitors and miss organizations that are true competitors. Any measures of competition intensity derived using the subsector markets are likely to be flawed and may lead to erroneous conclusions about the relationship between competition and nonprofit behaviors. The next section explores this possibility in the context of the CFC.

## ***VII. Competition and Overhead Application***

In this section, I examine an important nonprofit policy issue—the relationship between competition and nonprofit spending on overhead—and compare the results obtained from the

subsector and donor-based market definitions. The CFC provides a good context for this application for several reasons. First, because the CFC includes individual data and information on nonprofits' subsectors, it can be used to define both donor-based markets and subsector markets. Second, the CFC data are longitudinal, allowing me to control for unobserved factors, provided they do not vary over time. Finally, the CFC makes overhead information readily available, making it a salient characteristic for both donors and nonprofit leaders.

This section proceeds in three parts. First, I describe the method of analysis for the application. I define how I will calculate the main variables of interest, overhead rate and competition intensity. I also describe the OLS model employed in the analysis. Second, I show an explanatory scatter plot exploring the relationship between competition intensity and overhead rate in the CFC data. Third, I present the results from the two regressions. Finally, by comparing results obtained with the two market definitions, I discuss how a new market definition can change researchers' understanding of competition among nonprofit organizations.

#### *Application method of analysis*

To use CFC data to understand the relationship between competition and overhead, and to compare the results of the analysis when using different market definitions, the data need to be converted from individual-level giving records to organization-level data with measures of competition intensity. For each organization, I begin by constructing its subsector market and its donor-based market. These markets are identical those analyzed in Section VI.<sup>27</sup> I use the 26-group subsector market here to increase the power of the analysis.

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<sup>27</sup> Most donors in the data are straightforward, and give only one online pledge (which may include several gifts) using a specific donor ID. Paper pledges, which also may include several gifts, do not have a donor ID. I assume each paper pledge is a separate donor (although in theory one person could turn in multiple paper pledges). In contrast, if an online donor has multiple pledge records in the same year under the same donor ID, I count those as one pledge.

Next, I calculate a measure of competitive intensity for both the subsector market and the donor-based market. To calculate the competitive intensity for organization  $i$ , I use the Herfindahl-Hirschman Index (HHI). As discussed in Section III, the HHI is an index of market concentration and is also the most commonly used method of measuring competition intensity in the nonprofit literature. In markets with low HHI values, donations are spread among many organizations, while in markets with high HHI values donations are concentrated among very few organizations. HHI values range from 0 to 10,000, with 10,000 indicating that an organization has a monopoly within the market.

HHI for organization  $i$  is calculated by taking the sum of the squared market shares ( $\sigma_j$ ) for each organization in  $i$ 's market, including  $i$ . Market shares are calculated for each organization in organization  $i$ 's market. An organization's market share is its own observed CFC donations divided by the total observed CFC donations for all organizations in  $i$ 's market. Only donations in that zone in that year are used. Shares are rounded to the nearest whole percent, so the final HHI values are integers from 0 to 10,000.<sup>28</sup> The formal representations of these definitions are given below, with subscripts for zone and year eliminated for readability.

$$HHI_i \equiv \sigma_i^2 + \sum_{j=1}^n \sigma_j^2, j \neq i \quad (2)$$

$$\sigma_i \equiv \frac{Donations_i}{Donations_i + \sum_{j=1}^n Donations_j}, j \neq i \quad (3)$$

Differences between the HHI calculations for the subsector markets and the donor-based markets occur more because of the differences between the market definitions than from the way

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<sup>28</sup>The Gini coefficient is also used as an index of nonprofit concentration (for instance in Seaman 2014), although it is uncommon. Seaman et al. make the case that observing the HHI and Gini coefficient together can better categorize market types. Analysis of the Gini coefficient is left for future work.

the HHI is calculated. Calculating the HHI for the subsector markets is straightforward.

Subsector markets will be identical for all organizations with the same NTEE code, the same zone, and the same year. Using the CFC donations within a particular zone and year, I calculate the share of donations directed to each organization in the subsector and calculate the HHI using the standard formula. Because the included organizations and shares are the same, all organizations in a subsector will have the same HHI value for a particular zone and a particular year.

The HHI for the donor-based market is also calculated using the standard formula. The difference with this market definition is that the CFC donation shares are calculated using the specific competitors in an organization's market. Every organization has a unique market, and so the shares that are input into the HHI equation will be different for each organization.

To calculate overhead, I use the administrative and fundraising expense rate (AFR) directly from the CFC data. My data only include this information for national organizations, so models with AFR include only the approximately 2,000 to 2,500 national organizations participating in each year. To calculate AFR, an organization is instructed to use information from its IRS Form 990.<sup>29</sup> The AFR is:

$$AFR_i \equiv \frac{\text{Management and General Expenses}_i + \text{Fundraising Expenses}_i}{\text{Total Revenue}_i} \quad (4)$$

Like other measures of overhead in the nonprofit literature, the AFR is not without its faults. Overhead measures relying on IRS 990 reporting have been shown to be subject to misreporting, especially underreporting by nonprofits who know donors prefer low overhead

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<sup>29</sup> The rule states, "Add the amount in Part IX (Statement of Functional Expenses), Line 25, Column C (Management and General Expenses) to the amount in Line 25, Column D (Fundraising Expenses), and divide the sum by Part VIII (Statement of Revenue), Line 12, Column A (Total Revenue)." For more information, see: [https://www.opm.gov/forms/pdf\\_fill/opm1647a.pdf](https://www.opm.gov/forms/pdf_fill/opm1647a.pdf)

rates (Wing et al. 2006). However, this is the best measure of overhead rate available for the nonprofit sector at this time.

### *Exploratory scatter plots*

The two scatter plots in Figure 3 show the relationship between HHI and overhead rate, by market definition. In each plot, the X-axis is the level of market concentration, represented by the HHI index. Organizations with a HHI of 0 face the strongest competition, and organizations with a HHI of 10,000 face the weakest competition. The Y-axis is the AFR overhead rate, with a lower number indicating a lower percent of revenue spent on administration and fundraising.

<Figure 3 About Here>

The first graph depicts the overhead rate and the HHI calculated using the donor-based markets. The upward slope of the line of best fit in the graph indicates that the average AFR overhead rate tends to rise as the HHI increases. Because higher HHI scores tend to indicate lower competition, this result suggests that more competition is related to lower overhead rates. The second graph depicts the overhead rate and the HHI calculated using the subsector markets. In this graph, the line of best fit does not show a clear relationship between overhead and HHI.

### *OLS regressions*

To understand the effect of competition on an organization's overhead rate, I use the panel nature of the data to run an OLS model with organization and time fixed effects. The model is shown in Equation 5.

$$\text{Overhead}_{it} = \alpha + \beta_1 \text{HHI}_{it-1} + \beta_2 \text{Controls}_{it} + \delta \text{Organization}_i + \gamma \text{Year}_t + \epsilon_{it}$$

(5)

The organization fixed effects account for any characteristics of the nonprofit that persist over time and lead to a consistently higher or lower overhead rate. These characteristics might include the sector, the year the nonprofit was founded, or the headquarters location. The year fixed effects account for events that take place in a specific year and might cause all nonprofits to experience a higher or lower overhead rate. These events might include financial shocks, like the state of the stock market or the Great Recession. This model results in an identification strategy that relies on changes in competition faced by each individual nonprofit over time.<sup>30</sup>

The measure of competition, HHI, is lagged to allow time for overhead to respond to competition. The included controls are parsimonious, and include only the total revenue of the organization at time  $t$ , total contributions from all sources at time  $t$ , and percent of revenues from contributions at time  $t$ .<sup>31</sup> Each of these measures comes from the IRS Form 990 data, as reported in the NCCS Core Files.

Table 10 presents the regression results when the HHI is calculated using the donor-based market definition. The results are presented using four models, with the final model being the preferred model presented in Equation 5. The first model is similar to the first scatter plot from Figure 3, and documents the correlational relationship between HHI and overhead. The

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<sup>30</sup> The changes in competition faced by each nonprofit are a function of changes in donor decisions. These decisions are driven by all the organizations' attributes, the donors' attributes, and the attributes of competing organizations. To the extent that these attributes are also driving total giving to the organization, they should be captured in the coefficient on the total organizational revenue. Including this variable intuitively limits the bias due to time-varying omitted variables that are correlated with the decisions.

<sup>31</sup> Previous research has identified several organization-level factors which are related to nonprofit overhead rates. Lecy and Searing found that overhead rates vary based on an organization's size and subsector (2015). The present study includes annual revenue, which is a measure of organization size, as a control variable. Organization subsector is not included, because subsector tends to be constant over time. Subsector is therefore captured by the organization fixed effects. Ecer et al. find that size, age, sources of revenue, and the share of earned income are related to overhead rates in the nonprofit sector (2016). Age, like subsector, does not vary within an organization and so is excluded from the present analysis. The dollars from contributions and the proportion of revenues from contributions are the closest measures available from the nonprofit financial database used in the present study, so these are the two variables included as controls here.

coefficient indicates that as HHI increases by one point, the overhead rate increases by 0.0001 percentage points. Since the median overhead rate in the data is 14 percent, this is a small increase. The positive sign on the coefficient indicates that the average overhead rate tends to rise as the HHI increases. Because higher HHI scores tend to indicate lower competition, this result suggests that less competition is correlated with higher overhead rates. The positive and significant coefficient on HHI persists, even after controlling time-varying financial variables in the second model, and common shocks to all organizations in a particular year in the third model. In the fourth model, which is the preferred model from Equation 5, I find that a one-point increase in the HHI leads to a 0.00002 percentage point increase in overhead rate. The magnitude of the result is easier to interpret for larger increases in HHI. An organization which experiences a 1000-point increase in HHI, which is roughly the difference between the 25<sup>th</sup> percentile and the 50<sup>th</sup> percentile of the distribution, is expected to increase overhead by 0.02 percentage points. It is important to note that, unlike the first three models, the coefficient on HHI in the fourth model is not significant at the  $p < 0.05$  level, although it is at the  $p < 0.1$  level ( $p = 0.07$ ).

<Table 10 About Here>

Table 11 shows that the organizations with low overhead tend to be less responsive to changes in competition than organizations with high overhead. The first four columns repeat the analyses from Table 10, but only for the organizations with lower-than average overhead. None of the results are significantly different from zero. Low overhead is defined as overhead below the median value of 12.4 percent. The second four columns repeat the analyses with high-overhead organizations. These organizations tend to be responsive to changes in overhead, although the coefficient on HHI for the preferred model is still not significantly different from zero at the  $p < 0.05$  level ( $p = 0.057$ ).

<Table 11 About Here>

Table 12 presents the regression results when the HHI is calculated using the subsector market definition rather than the donor-based market definition. While the first correlational column is non-significant, the second and third models presented both yield significant and negative results. If these results are to be believed, then a one unit increase in HHI decreases the overhead rate by 0.0002 percentage points. A 1000-unit increase in HHI would decrease the overhead rate by 2 percentage points. The negative coefficient on the results indicates that higher HHI values, which are associated with lower competition, lead to decreases in the overhead rate. This would mean that organizations in more competitive environment are spending more on management or fundraising expenses, perhaps because the organizations are advertising heavily to attract donors. The final model in Table 11, which is the preferred model, is positive but very close to zero. From this result, organizations are not predicted to change their overhead in response to changes in competition.

<Table 12 About Here>

A researcher would make different conclusions about the relationship between competition and overhead if she were to use the subsector markets rather than the donor-based markets to calculate competitive intensity. Using the subsector market definition appears to bias the results downwards in this case.

## ***VIII. Conclusions***

The present paper introduces and validates a new empirical market definition procedure for the nonprofit sector. The work contributes to the literature on nonprofit competition in several important ways. It is the first paper to use donor-level data to define the donor-based

market for nonprofit organizations, rather than relying on the organization's subsector and geographic location. It uses actual substitutions made when organizations quit the CFC to validate this measure, showing the donor-based market definition predicts substitutions better than the sector-based market definition does. It also shows that conclusions about important policy issues, such as how nonprofits change their overhead spending in response to increases in competition, can be influenced by the market definition selected.

This result must be carefully interpreted due to some of the limitations of this study. The current market definition and measure of competitive intensity could miss competitors in smaller zones. In zones where fewer donors are observed, the present method could miss some competitors. The problem also would exist if donors were too similar and were not covering the full nonprofit product space. Without a sufficiently large and diverse donor sample, the donor-based market definition may miss competitors. This problem could be solved with additional data or with a more advanced network model. A more nuanced understanding of competition could be developed using a network model that acknowledges that the observed donations are a sample and that the resulting network is subject to sampling variability. However, this is beyond the scope of the current paper, and is left for future work.

Future work could also identify the causal connection between competition and overhead in a stronger way. Hypothetically, the current results could be affected by unobserved, time-varying factors which are correlated with both competition and overhead. Research that incorporates an exogenous shock to competition would mitigate these concerns.<sup>32</sup> In the

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<sup>32</sup> The exogenous shock used in the market validation procedure is not suitable for this analysis. The market validation procedure uses individual-level data, while the regression analysis uses organization-level data. The number of organizations which disappear from the CFC is limited, and so this exogenous shock does not provide the necessary power for the regression analyses.

absence of such a shock, the addition of additional time-varying covariates could better identify the effect of interest.

Finally, future work could implement or develop different measures of competitive intensity to be used with the donor-based market definition and individual giving data. While the HHI is an important and often-used measure of competitive intensity, it can generally be implemented with only organization-level data and does not use the individual-level data available. Using the individual donation data could allow for new measures of competitive intensity. For example, with the individual-level data, one can observe what proportion of an organization's donors give only to that organization and what proportion of the donors split their giving among two or more organizations. When more of an organization's donors split their giving, the organization is arguably more exposed to the competitive market. This observation could be used to develop a new measure of market exposure which could contribute to our understanding of competition in the nonprofit sector.

The findings in this paper regarding the scope of nonprofit competition and the character of nonprofit competitors have important implications for research. Understanding competition in the nonprofit sector is important to a wide variety of research questions. Each of these questions relies on an accurate definition of the market and of the level of competitive intensity. Going forward, researchers should prioritize the development of new and more accurate ways to measure nonprofit competition.

Finally, the findings in this paper also have implications for the way nonprofit leaders understand their competitive markets. The nonprofit leader described in this paper's introduction was associated with a dog rescue organization and was trying to determine which other organizations are competitors. The research presented here suggests that the leader should not

automatically consider only organizations with produce similar services to be competitors. Instead, the leader should survey the dog rescue organizations donors to determine what other organizations the donors are contributing to. Then, she can focus the dog rescue's competitive strategy on this donor-defined competitive market.

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Table 1: Market Definitions in Nonprofit Literature

Paper	Product Boundary	Geographic Boundary	Intensity Measure	Dependent Variable	Findings related to competition
Feigenbaum 1987	“Medical Research Funding” organizations	7 metropolitan markets	4-firm Concentration Ratio	Spending ratios (admin, fundraising, research)	Concentration inversely related to research spending and fundraising; positively related to administrative spending
Twombly 2003	Human service organizations	53 MSAs	Number of organizations/population in poverty; 5-org concentration ratio using gross income	Probability of exit; rate of entry	Low nonprofit density has a positive relationship with entry; nonprofit density is unrelated to exit
Saxton and Benson 2005	501(c)(3) organizations	284 counties	Number of organizations	Number of new organizations	Organizational foundings are positively related to prior organizational density
Thornton 2006	16 “Local” NTEE Subsectors	MSAs	HHI based on total revenues, also tested number of orgs	Spending on fundraising (org-level and market-level)	When donor markets become more competitive, nonprofits significantly decrease their fundraising expenditures and returns to fundraising decrease. Total fundraising expenditures increase when competition increases due to new firm entry.
Castaneda et al. 2007	16 “Local” NTEE subsectors	MSAs	HHI, CR4, FSI (population to support a new firm)	Expenditure shares	Competition reduces admin spending, increases fundraising spending
Barman 2008	Workplace charity/federated fundraiser organizations	123 MSAs	Number of nonprofits per capita	Presence of United Way rivals (“Alternative Funds”)	United Way rivals are more likely when a city has a greater number of nonprofit organizations per capita

Harrison and Thornton 2014	15 “Local” NTEE Subsectors	CBSAs–MSAs	n/a	Number of organizations	Based on a normalized unit of demand for nonprofits, there is lower nonprofit density per demand unit in 2005 than in 1995
Seaman et al. 2014	NTEE major groups (25 categories)	20 largest MSAs	HHI and Gini coefficients	n/a	Subsectors and metropolitan areas vary in their levels of concentration and nonprofit expenditure inequality
Twu 2007 (unpublished)	Symphony Orchestras	MSAs	Various (organizations per capita, HHI included)	Fundraising efficiency (4 measures)	Concentration associated with lower net contributions but higher fundraising expenses ratios
Bose 2015 (unpublished)	16 “Local” NTEE Subsectors	MSAs	HHI	Public support donations	Increasing competition decreases average donations, has a positive effect on aggregate market donations

Notes: A literature search was conducted to identify empirical academic articles on the topic of nonprofit competition in the United States. The search process was conducted in the winter of 2016. The search spanned academic databases and the references of found articles. Only papers that included an empirical definition of the nonprofit market are shown here. Papers examining nonprofit entry (founding) and exit while controlling for level of competition between existing organizations are included here. Additional papers investigate the determinants of nonprofit density without controlling for competition explicitly, and so are not part of this table. These papers include: Corbin (1999), Grønbjerg and Paarlberg (2001), Matsunaga and Yamauchi (2004), Kim (2013), and Lecy and VanSlyke (2013). Within these papers, nonprofit density measurements typically use MSA or county as the geographic scope. Density is measured using number of organizations or number of organizations per capita.

Figure 1. Simple Representation of Horizontal Differentiation in the Nonprofit Sector

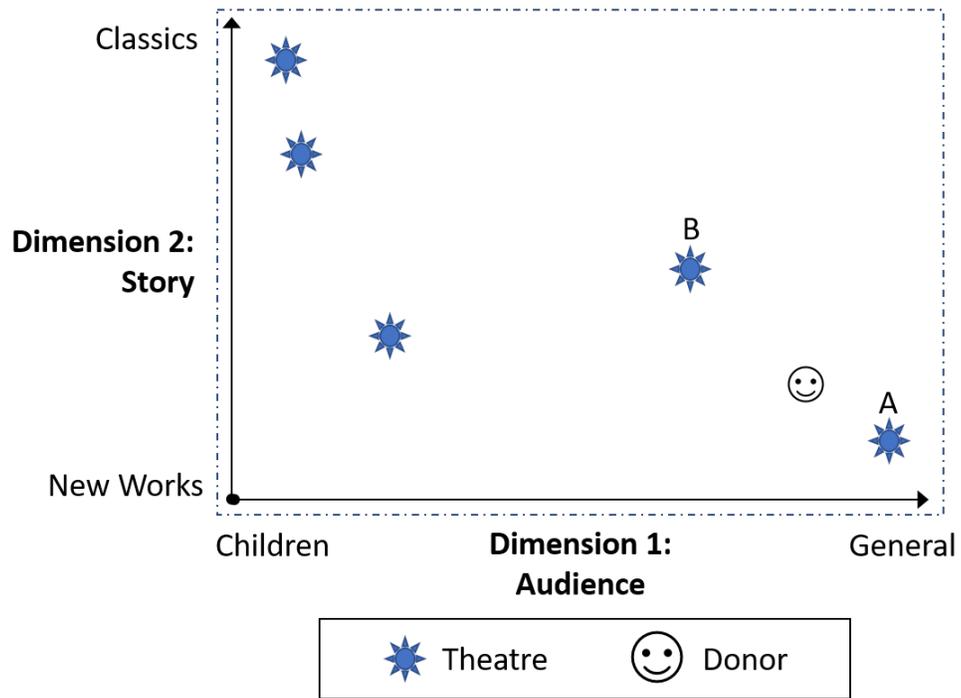


Table 2. Summary Statistics for Individual Gifts and Pledges to the Combined Federal Campaign

	2008	2009	2010	2011	2012	2013
Number of Campaign Zones	17	25	37	47	59	62
Number of Pledges	11,197	50,955	97,643	117,756	154,292	222,897
Number of Gifts	23,418	96,244	176,133	220,601	291,020	476,752
Total Pledges (2011 dollars)	4,255,303	17,453,175	29,815,274	39,450,405	51,389,802	98,208,369
Mean Pledge (2011 dollars)	380.04	342.50	305.35	335.02	333.07	440.60
Mean Gift (2011 dollars)	181.71	181.34	169.28	178.83	176.59	205.99
Mean Gifts per Pledge	2.1	1.9	1.8	1.9	1.9	2.1
Number of Selected Nonprofits	3,618	6,302	8,542	10,514	13,832	16,362

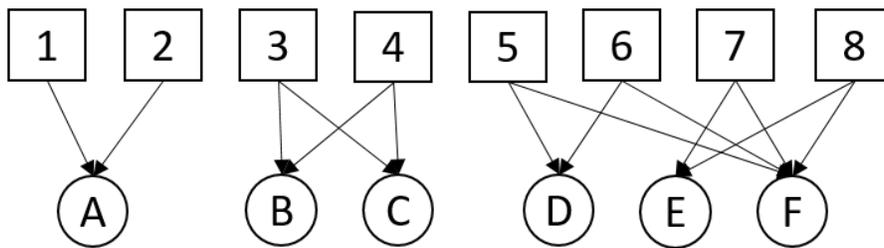
*Note:* A pledge is one individual's donations across all selected organizations. A gift is one individual's donation to a single nonprofit organization. A pledge can include several gifts. This table includes only those individuals, pledges, and campaigns in the estimation sample.

Figure 2. Network Modeling of the Competitive Marketplace

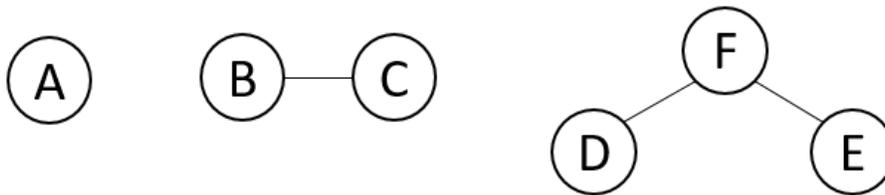
Panel A: Sample Gift Records

Donor	Org. A	Org. B	Org. C	Org. D	Org. E	Org. F
1	\$40					
2	\$40					
3		\$20	\$20			
4		\$20	\$20			
5				\$20		\$20
6				\$20		\$20
7					\$20	\$20
8					\$20	\$20
Total	\$80	\$40	\$40	\$40	\$40	\$80

Panel B: Two-mode (Bipartite) Network



Panel C: Inferred Nonprofit Network



Panel D: Markets

	Org. A	Org. B	Org. C	Org. D	Org. E	Org. F
Orgs. In Market	A	B, C	B, C	D, F	E, F	D, E, F

Table 3. Donors Bundle Gifts from Multiple Nonprofit Subsectors

Number of Sectors	Number of Gifts in Year										Total
	1	2	3	4	5	6	7	8	9	10+	
1	47.261	8.467	1.968	0.732	0.348	0.077	0.030	0.013	0.004	0.013	58.911
2	-	12.281	5.972	2.896	1.655	0.464	0.145	0.056	0.027	0.053	23.550
3	-	-	3.405	3.208	2.755	0.941	0.398	0.202	0.089	0.198	11.197
4	-	-	-	0.927	1.495	0.791	0.406	0.251	0.119	0.409	4.397
5	-	-	-	-	0.244	0.264	0.176	0.144	0.100	0.428	1.355
6	-	-	-	-	-	0.028	0.031	0.041	0.040	0.277	0.417
7	-	-	-	-	-	-	0.001	0.005	0.003	0.110	0.119
8	-	-	-	-	-	-	-	0.001	0.000	0.043	0.044
9	-	-	-	-	-	-	-	-	0.000	0.009	0.009
Total	47.261	20.748	11.345	7.762	6.497	2.565	1.187	0.712	0.382	1.540	100.000

*Note:* Cells represent the proportion of donors who give X gifts to organizations from Y subsectors, where X is the column value and Y is the row value. The maximum number of subsectors a donor making 2 gifts can select is two, which means rows 3 to 9 in column 2 will always equal zero. Number of gifts for year was topcoded at 10. Subsectors are the 12 major NTEE groups (10 standard major groups plus Hospitals and Higher Education).

Table 4. Substitution Patterns Between Existing and New Organizations - Subsector of Substitution

Sector Losing Org	Sector of New Organization										Total
	AR	ED	EH	EN	HE	HU	IN	PU	RE	U	
AR - Arts, Culture, and Humanities	1	0	0	1	1	3	2	4	0	1	13
BH - Higher Education	0	0	0	0	0	1	0	0	1	0	2
ED - Education	1	7	0	0	3	6	1	6	1	4	29
EH - Hospitals	0	0	3	2	4	8	0	3	0	2	22
EN - Environment and Animals	2	2	1	86	16	14	1	7	0	19	148
HE - Health	2	3	6	24	74	59	5	26	6	12	217
HU - Human Services	3	5	4	25	33	142	10	36	11	22	291
IN - International, Foreign Affairs	1	2	0	3	7	16	6	14	1	3	53
PU - Public, Societal Benefit	7	5	0	11	13	35	2	29	4	8	114
RE - Religion Related	0	0	0	0	1	9	1	1	5	2	19
U - Subsector Unknown	0	0	1	9	11	23	2	6	6	6	64
<b>Total</b>	<b>17</b>	<b>24</b>	<b>15</b>	<b>161</b>	<b>163</b>	<b>316</b>	<b>30</b>	<b>132</b>	<b>35</b>	<b>79</b>	<b>972</b>

*Note:* Cells are counts of donors who substitute a gift in subsector Y for a gift to a new organization in subsector X, where Y are rows and X are columns. Sample includes only simple substitutions (one new org chosen, no other new gifts made). Subsectors are the 12 major NTEE groups (10 standard major groups plus Hospitals and Higher Education). No new organizations of type BH appear in this sample.

Table 5. Summary Statistics on Organizations and Their Markets

	Mean	SD	Min	Median	Max
<b><i>Market Characteristics</i></b>					
Number in donor-based mkt	11.5	(28.7)	1.0	5.0	1,969.0
Number of donor-based mkt in same subsector	1.7	(4.2)	0.0	1.0	276.0
Organization's share of its market	0.07	(0.13)	0.00	0.02	1.00
Total pledges to organization's market (2011 \$)	210,675	(1,360,550)	3	15,220	39,835,868
<b><i>Organization Characteristics</i></b>					
CFC pledges to organization (in 2011 \$)	1,293	(7,787)	0	315	1,247,797
Number of gifts to organization	153	(502)	1	42	10,827
Proportion of gifts non-contested	0.26	(0.16)	0.00	0.26	0.97

*Note:* N=171,842. Organization and market data is at the organization-zone-year level. Standard deviations in parentheses. Zeros in minimum column are due to rounding in rows 3 and 5.

Table 6. Market Overlap

	All	AR	BH	ED	EH	EN	HE	HU	IN	MU	PU	RE	UN
Avg Number in Subsector Mkt	212.1 (162.3)	44.5 (44.2)	8.3 (14.1)	70.9 (70.2)	8.8 (4.1)	127.0 (61.9)	286.0 (130.0)	308.0 (207.6)	185.3 (107.4)	6.0 (13.6)	146.9 (79.1)	50.6 (33.6)	33.7 (61.2)
Avg Number in Donor-based Mkt	11.5 (28.9)	10.8 (34.1)	15.3 (95.5)	8.9 (21.0)	26.9 (67.0)	13.1 (29.4)	11.1 (25.5)	12.8 (32.8)	9.3 (25.7)	9.0 (10.4)	11.0 (26.0)	8.5 (15.1)	21.1 (47.0)
Avg Overlap of Market Definitions	3.2 (7.5)	0.9 (2.4)	0.1 (0.4)	0.6 (1.8)	0.4 (0.9)	4.3 (8.0)	4.3 (8.5)	4.1 (10.0)	2.1 (4.9)	0.1 (0.3)	2.0 (4.0)	1.3 (2.3)	0.0 (0.0)

*Note:* Standard deviations in parentheses. Data at the organization-zone-year level. Columns are 10 major groups of nonprofit activities: Arts, culture, and humanities (AR), higher education (BH), education (ED), hospitals (EH), environment and animals (EN), health (HE), human services (HU), international, foreign affairs (IN), public, societal benefit (PU), religion related (RE), mutual/membership benefit (MU), and unknown (Z). Row 1: Average number of organizations in the traditional subsector markets. Row 2: Average number of organizations in the donor-based market. Row 3: Average number of organizations in the donor-based market which would have been in the traditional subsector market as well. Subsectors used for the traditional markets are the 25 major NTEE groups plus Hospitals and Higher Education.

Table 7. Percent of Market (Network Ties) In Same Subsector

Subsector	Percent Market in Same Subsector
A - Arts, Culture, & Humanities	0.082
B - Education	0.063
BH - Higher Education	0.003
C - Environment	0.139
D - Animal Related	0.312
E - Health Care	0.083
EH - Hospitals	0.014
F - Mental Health and Crisis Intervention	0.058
G - Diseases, Disorders, & Medical Disciplines	0.224
H - Medical Research	0.153
I - Crime & Legal-related	0.040
J - Employment	0.007
K - Food, Agriculture, & Nutrition	0.041
L - Housing & Shelter	0.042
M - Public Safety, Disaster Preparedness, & Relief	0.012
N - Recreation & Sports	0.062
O - Youth Development	0.056
P - Human Services	0.166
Q - International, Foreign Affairs, & National Security	0.222
R - Civil Rights, Social Action, & Advocacy	0.103
S - Community Improvement & Capacity Building	0.015
T - Philanthropy, Voluntarism, & Grantmaking Foundations	0.052
U - Science and Technology	0.024
V - Social Science	0.022
W - Public & Societal Benefit	0.099
X - Religion-related	0.150
Y - Mutual & Membership Benefit	0.007
Total	0.147

*Note:* Table reports the overall percentage of market organizations (network ties) which are in the same subsector. Subsectors are the 25 major NTEE groups plus Hospitals and Higher Education.

Table 8. Validation: Neighbor Competition Sets and Substitution from Disappearing Organizations

Panel A: First Degree Neighbor Markets					
	2009	2010	2011	2012	Total
In Donor-based Market	34.3	35.1	41.5	35.7	37.7
Not in Donor-based Market	65.7	64.9	58.5	64.3	62.3
Total	100.0 (35)	100.0 (94)	100.0 (205)	100.0 (207)	100.0 (541)

Panel B: Second Degree Neighbor Markets					
	2009	2010	2011	2012	Total
In Donor-based Market	68.6	62.8	72.2	77.8	72.5
Not in Donor-based Market	31.4	37.2	27.8	22.2	27.5
Total	100.0 (35)	100.0 (94)	100.0 (205)	100.0 (207)	100.0 (541)

*Note:* After an organization quits the CFC, donors who were giving to that organization choose a new nonprofit to contribute to. Tables report if this new nonprofit was in the competitive market defined using the donor-based method. The first row reports the percent of donor substitutions which were predicted by the donor-based markets from the previous year. First panel defines competitive markets using immediate network neighbors. Second panel differs by including organizations in the competitive market which are second-degree network neighbors (organizations which share a common neighbor). Parentheses are column total observations.

Table 9. Validation: Sector Competition Sets and Substitution from Disappearing Organizations

Panel A: Twenty-six Sector Markets					
	2009	2010	2011	2012	Total
In Subsector Market	8.8	25.8	20.3	28.7	23.8
Not in Subsector Market	91.2	74.2	79.7	71.3	76.2
Total	100.0 (34)	100.0 (89)	100.0 (187)	100.0 (202)	100.0 (512)

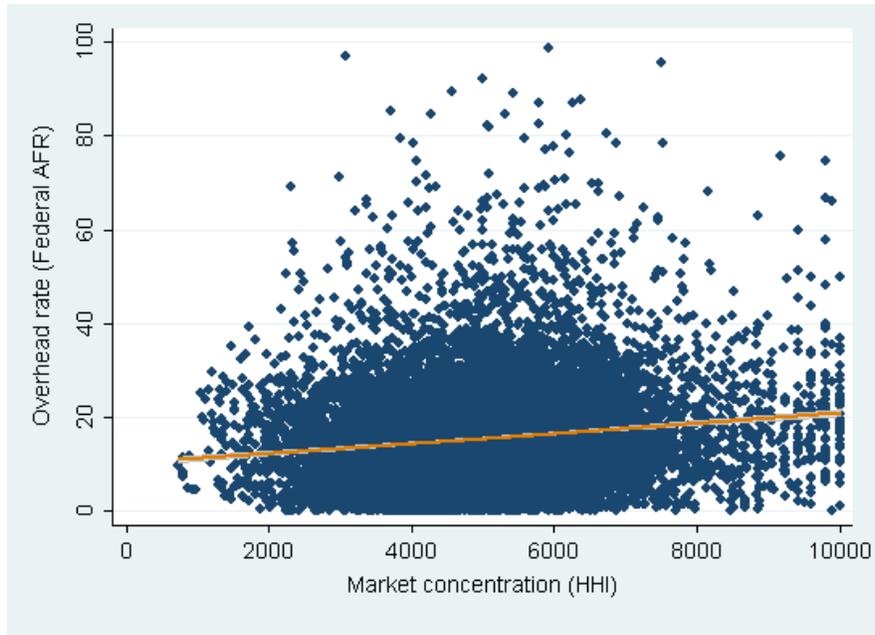
  

Panel B: Twelve Sector Markets					
	2009	2010	2011	2012	Total
In Subsector Market	26.5	41.6	39.6	43.6	40.6
Not in Subsector Market	73.5	58.4	60.4	56.4	59.4
Total	100.0 (34)	100.0 (89)	100.0 (187)	100.0 (202)	100.0 (512)

*Note:* After an organization quits the CFC, donors who were giving to that organization choose a new nonprofit to contribute to. Tables report if this new nonprofit was in the competitive market defined using the subsector method. The first row reports the percent of donor substitutions which were predicted by the subsector markets from the previous year. First panel defines subsector markets using 26 NTEE subsectors (major groups). The second panel aggregates these groups into 12 larger NTEE categories. Parentheses are column total observations. Missing values arise when sector is not found.

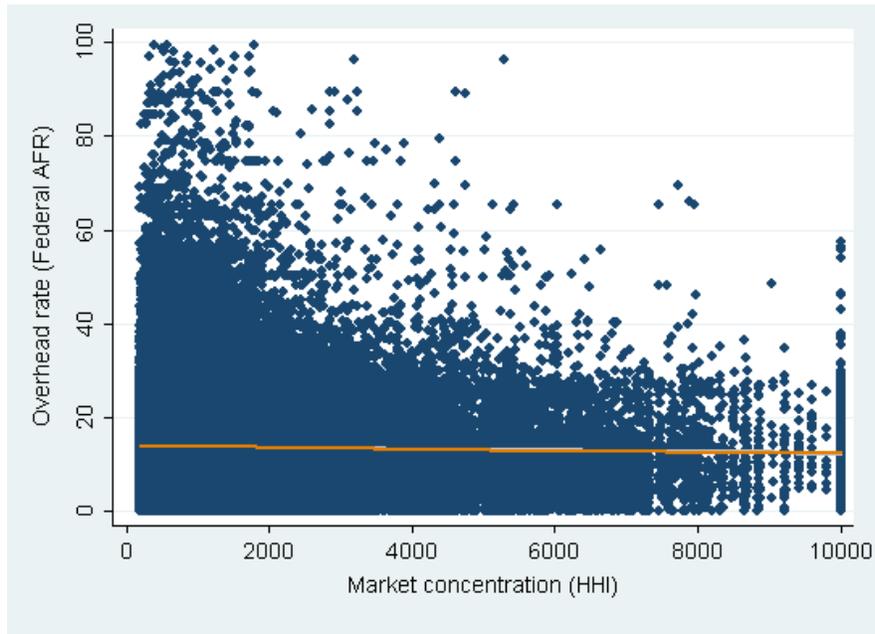
Figure 3. Correlation Between Market Concentration (HHI) and Overhead, by Market Definition Procedure

Panel A: Donor-based Market Definition



*Note:* Years 2008 through 2013 are included. Organizations without gifts are excluded from the graph. Only organizations in the individual data are included.

Panel B: Subsector Market Definition



*Note:* Years 2008 through 2013 are included. Subsector is defined using 26 NTEE subsectors. Only organizations in the individual data are included.

Table 10. Regressions of Overhead on Market Concentration, Donor-based Market

	(1) Basic	(2) With controls	(3) YR FE	(4) Org+YR FE
L2.HHI of organization's market	0.000145* (0.0000708)	0.000201* (0.0000896)	0.000205* (0.0000901)	0.0000219 (0.0000119)
Annual revenues (in \$)		4.68e-09 (3.66e-09)	4.68e-09 (3.66e-09)	9.01e-09 (6.77e-09)
Annual contributions (in \$)		-9.59e-09 (5.86e-09)	-9.51e-09 (5.83e-09)	-1.65e-08* (7.43e-09)
Percent of revenue from contributions		11.32 (7.276)	11.30 (7.256)	27.44*** (6.106)
Observations	37598	32515	32515	32515
Adjusted $R^2$	0.000	0.062	0.065	0.858

*Note:* \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ . Robust standard errors, clustered at the organization level. The unit of observation is organization-market-year. Only national organizations included. Organization revenues are the CPI-adjusted mean revenues on the Form 990 for all submitted forms for periods between July 2006 and October 2012. The measure of concentration (HHI) is coded such that an increase in the measure represents a decrease in competition. The measure is lagged by one year.

Table 11. Regressions of Overhead on Market Concentration, by Level of Overhead, Donor-based Market

	Low Overhead				High Overhead			
	(1) Basic	(2) With controls	(3) YR FE	(4) Org+YR FE	(5) Basic	(6) With controls	(7) YR FE	(8) Org+YR FE
L2.HHI of organization's market	0.0000322 (0.0000306)	0.0000449 (0.0000335)	0.0000457 (0.0000337)	0.00000691 (0.00000827)	0.000140 (0.0000727)	0.000192* (0.0000806)	0.000198* (0.0000813)	0.0000290 (0.0000152)
Annual revenues (in \$)		1.57e-09* (7.21e-10)	1.56e-09* (7.18e-10)	9.85e-09** (3.39e-09)		2.25e-08* (1.02e-08)	2.24e-08* (1.02e-08)	4.03e-08 (2.61e-08)
Annual contributions (in \$)		-2.43e-09 (1.70e-09)	-2.39e-09 (1.71e-09)	-1.29e-08** (3.94e-09)		-3.24e-08* (1.26e-08)	-3.20e-08* (1.25e-08)	-6.33e-08 (3.51e-08)
Percent of revenue from contributions		-0.152 (1.558)	-0.152 (1.556)	12.88* (5.033)		19.74* (7.677)	19.70* (7.664)	32.09*** (4.425)
Observations	18698	16021	16021	16021	18900	16494	16494	16494
Adjusted $R^2$	0.000	0.005	0.006	0.819	0.000	0.217	0.219	0.858

Note: \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ . Robust standard errors, clustered at the organization level. High overhead is defined as  $AFR_i = 12.4$  percent. The unit of observation is organization-market-year. Only national organizations included. Organization revenues are the CPI-adjusted mean revenues on the Form 990 for all submitted forms for periods between July 2006 and October 2012. The measure of concentration (HHI) is coded such that an increase in the measure represents a decrease in competition. The measure is lagged by one year.

Table 12. Regressions of Overhead on Market Concentration, Subsector Market

	(1) Basic	(2) With controls	(3) YR FE	(4) Org+YR FE
L2.HHI of subsector market	0.000143 (0.000130)	-0.000181** (0.0000617)	-0.000183** (0.0000611)	0.00000818 (0.0000306)
Annual revenues (in \$)		5.74e-10 (5.44e-10)	5.66e-10 (5.39e-10)	-8.18e-09*** (2.29e-09)
Annual contributions (in \$)		-2.46e-09* (1.03e-09)	-2.43e-09* (1.02e-09)	3.81e-09 (2.61e-09)
Percent of revenue from contributions		1.482 (1.201)	1.485 (1.196)	2.992 (2.183)
Observations	36632	32086	32086	32086
Adjusted $R^2$	0.000	0.008	0.010	0.712

*Note:* \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ . Robust standard errors, clustered at the subsector-zone-year level. The unit of observation is organization-market-year. Only national organizations included. Organization revenues are the CPI-adjusted mean revenues on the Form 990 for all submitted forms for periods between July 2006 and October 2012. The measure of concentration (HHI) is coded such that an increase in the measure represents a decrease in competition. The measure is lagged by one year.