Entry Thresholds and Competitive Behavior among Nonprofit Firms

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PRELIMINARY–COMMENTS WELCOME

Abstract

This paper attempts to describe the competitive behavior of charitable nonprofit firms when prices and output are difficult to observe. The paper exploits cross-sectional variation in market size to estimate the number of nonprofits that can be supported within a market. We find that our sample markets generally reach competitive levels once three or more firms are observed. The paper offers several possible interpretations of these findings and future directions for our research.
1 Introduction

A common observation from nonprofit executive directors, board-members, and staff is that the intensity of competition for donations, grants, and skilled labor has grown over time. Practitioners often complain that there are too many nonprofits or that existing nonprofits are inefficiently small. Excessive competition implies that scare resources are dedicated to fundraising and competitive expenditures, rather than generating charitable output. In contrast, critics of the sector argue that market discipline is overly muted. Because nonprofits receive various tax subsidies and are typically funded by third parties, they argue that the natural competitive forces which promote operational efficiency are blunted in nonprofit markets.

The intensity of competition amongst nonprofits and its relative influence on firm behavior is often difficult to discern. In for-profit industries, it is typically possible to infer competitive behavior from changes in market prices. In contrast, nonprofits may offer no discernible prices, since their goods or services trade in subsidized markets or given away for free. Similarly, without residual claimants, the incentive to engage in overtly competitive (or collusive) activities is diminished. Perhaps as a consequence, exit rates among nonprofit firms are astonishingly low (Harrison and Laincz, 2008). Furthermore, because nonprofits often create a mix of public and private goods, the welfare implications of nonprofit competition are often ambiguous (Thornton, 2006). It has been demonstrated that increased rivalry, through fundraising, can either increase or decrease overall charitable output (Rose-Ackerman, 1982).

Because prices and output are difficult to observe in the nonprofit sector, our analysis re-
lies on indirect measures of market competition originally developed by Bresnahan and Reiss (1990, 1991). In this approach, we estimate entry thresholds, which exploit the relationship between market population and firm entry. From this we draw inferences about relative market power across nonprofit industries. Our study reports on fifteen distinct nonprofit industries using 2005 data.

2 Background

Economists who examine the nonprofit sector often carve the economy into three broad parts; the government sector, the for-profit sector, and the nonprofit sector. While an oversimplification, it recognizes that each of these types of agents operate with distinct incentives. This paper will focus on competition amongst nonprofit firms, with a particular emphasis on the human service and arts sectors. It is these types of organizations - in contrast to healthcare or education nonprofits - which are typically considered ”charities.” The economics literature examining competition solely among charitable nonprofits remains underdeveloped.

There exists a substantive literature on the topic of competition between for-profit and nonprofit firms in mixed markets. The literature has explored mixed industries such as hospitals, nursing homes, and day cares where nonprofit and for-profit firm coexist. Mixed markets have attracted the interest of economists because they clearly trace the economic consequences of the nonprofit organizational form.

In their analysis of mixed markets, Besley and Ghatak (2005) as well as Lakdawalla and Philipson (2006) emphasize the profit deviating preferences of the nonprofit entrepreneur.
In these papers, nonprofit entrepreneurs are motivated by some combination of altruism and a desire for perquisite compensation. These preferences, combined with favorable tax incentives, convince entrepreneurs to enter a market as nonprofits. The nonprofit entrepreneur then endures a non-distribution constraint, whereby there can be no residual claimant. These entrepreneurs will tolerate lower rates of return than their for-profit counterparts, leading them to enter the market. A natural scarcity of entrepreneurs with profit-deviating preferences results in mixed markets, where the marginal firm is profit-maximizing.

An alternative approach is to view the nonprofit organizational form as a credible signal of quality when information asymmetries are acute (Glaeser and Shleifer, 2001). In this case, the nonprofit organizational form serves as a credible signal of quality, for which consumers are willing to pay a premium. Lower cost - lower quality versions of the product are filled by for-profit firms. For a robust review of various models of mixed markets, see Brown (2010).

The intersection between government and the nonprofit sector has also been deeply explored. In the most well developed theories, nonprofit - government relations has been described as a niche model. Nonprofits fill the gap between services provided by the government and for-profit sectors Rathgeb and Gronbjerg (2006). It is well known that private for-profit firms will not generally provide public goods because of free-riding behaviors (Samuelson, 1954). Furthermore, for-profit firms will have difficulty providing goods where quality is difficult to observe ex-ante (Hansmann, 1980). This type of market failure is typically offset by a government provision of public goods. However, government may have insufficient feedback mechanisms to provide the precise type, level, or quality of collective goods demanded by a particular population (Weisbrod, 1977). Furthermore, government may be legally prevented from providing particular types of public goods, such as religious services. Put simply, the
nonprofit sector fills this gap. Comprehensive reviews of this relationship can be found in Steinberg (2006) and Young (2006).

This analysis will focus on the competition amongst charitable nonprofits. The nonprofit universe, characterized as those organizations operating under section 501(c)(3) of the tax code, includes a broad array of organizations. Our interest is restricted to donative nonprofits which are financed primarily - thought not exclusively - through charitable donations. This particular class of firms is economically interesting because they primarily exist to provide public goods. These organizations play an important role in the US economy by engaging private donor markets to provide goods and services that are often substitutes for government provision. Competition amongst nonprofit firms is not well understood by economists, largely because of the variation in objective functions by nonprofit managers.

The most widely adopted model of competition among charitable nonprofits was developed in Rose-Ackerman (1982). In her model, nonprofit managers maximize net-revenues by choosing their fundraising expenditures. The paper explores the relationship between fundraising strategies and overall production of the public good, conditional upon varying perceptions by donors about the use of their charitable gift. Her theoretical models suggest that fundraising can become excessive due to competition. Excessive competition may reduce social welfare, even if donors care about how much of their donation will be allocated to fundraising.

Rose-Ackerman’s work is supported by later theoretical and empirical analysis. Bilodeau and Slivinski (1997) develop models of nonprofit competition suggesting competitive markets will result in potentially excessive nonprofit specialization. Excessive specialization is characterized by declining total output. The authors suggest cartel behavior - such as the
United Way - or donor restricted gifts may increase total welfare in the market.

Unlike for-profit markets, these papers suggest that the influence of competition on nonprofit market outcomes may not be strictly positive. Because of the public good nature of nonprofit output, it is possible to characterize circumstances where too much competition reduces total welfare in the market. Consequently, this paper seeks to develop an empirical framework for examining the ”toughness” of market competition amongst rival nonprofits.

3 Theory

We model a nonprofit whose primary source of revenue is from donations. It is possible to expand the model to consider other forms of revenue, but we abstract away from optimizing over multiple revenue streams !!!! We need to explain this above sentence more–discuss that the point is that they maximize the net revenues; example, grants would work the same way; program services would be very similar to a for-profit model so don’t focus on that one. We assume the NP is a net revenue maximizer. That is, maximizing revenue guarantees that they have ensured the most resources for the firm in order to fulfill their charitable mission. We also assume that there is some fixed cost to fulfilling the mission. We do not model the choice of output (i.e., the charitable mission). Given sufficient resources, a NP firm might provide an infinite amount of output. Therefore resource constraints are the dominant mechanism for competition. The main purpose of this portion of the paper is to show that standard oligopoly models can be applied to the nonprofit setting in order to infer how competitive conduct changes with entry.

Let \( q_j \) = # of people solicited by firm j. The number of people solicited is a function of
the market size $S$ and the chosen percentage of individuals solicited from the population $\alpha_j$. Each additional person solicited has increasing marginal costs such that $TC = F + AVC * q$ where $F$ is fixed costs of fundraising. These costs are incurred regardless of whether the person solicited actually contributes to the cause. Without loss of generality, we subsume the cost of providing the charitable service into the fixed costs of fundraising. !!!! say a few more sentences here; an additional person served doesn’t impact the marginal costs of fundraising. It might help to actually expand the model to include a fixed and marginal cost to providing the services and then collapse into the fixed costs since the NP doesn’t optimize over that component when choosing fundraising.

For revenues, the NP knows that there is a distribution of preferences in the population for their charitable services. The NP therefore ranks potential donors from the highest to lowest expected donation. Let $d(q_{ij}) = P_{ij} * d_{ij}$ denote this expected value where $P_{ij}$ is the probability that donor $i$ gives to charity $j$ and $d_{ij}$ is the total dollars given by donor $i$ to the charity. We assume that the NP only knows the distribution of preferences but does not have precise knowledge of each person’s $P$ and $d$. Thus, the NP maximizes net revenue based on the total expected or average donation $\sum_i d(q_{ij})$. The assumptions about the donor distribution imply that donations generated by the additional donor increase total revenue but at a decreasing rate.

In addition, the donations generated by firm $j$ are also affected by the intensity of solicitations from other nonprofits. As donors become aware of similar nonprofits, the donor may split their donation between the two nonprofits or choose to give to one and not the other. Thus, the more donors solicited by other NPs, the lower the anticipated total donations to NP $j$. We can then express expected donations as $d(q_j, q_{-j})$ where $d'(q_j) < 0$ but $d''(q_j) > 0$
and $d'(q_{-j}) < 0$.

Each NP chooses the proportion $\alpha_j$ of the population to solicit where $0 < \alpha_j < 1$. If every nonprofit solicited the entire market, then $\sum_j q_j = Q = \sum_j \alpha_j \times S = n \times S$ where $n$ is the number of nonprofits in the industry. We can then represent per-capita demand as $d(q_j, q_{-j}) = a - b \sum_j \frac{q_j}{S} = a - b \sum_j \alpha_j$, (!1) should we change this notation; I’m using d for donation but most people will see it as demand; this looks weird because we are expressing the inverse demand function

Then net revenue (NR) from the nonprofit =

$$NR_j = (a - b \sum_k \alpha_k) \times q_j - F - AVC \times q_j$$ \hspace{1cm} (1)

This net donation/profit function is similar to Rose-Ackerman (1982), but more importantly, analogous to the Bresnahan and Reiss model. To see this, rewrite the net donation function in terms of market size and the chosen proportion of the population solicited:

$$NR_j = (a - b \sum_k \alpha_k) \times \alpha_j \times S - F - AVC \times \alpha_j \times S$$ \hspace{1cm} (2)

Because $d(q)$ is downward sloping in the percentage of the population solicited, similar to a for-profit firm, the NP faces a trade off when choosing $\alpha$. Soliciting more potential donors generates additional revenue but each additional donor has a lower expected donation. The donor’s charitable ideology is not as closely aligned with nonprofit i’s mission and therefore the probability of giving conditional on solicitation is lower and the amount given is also lower.
In equilibrium, the NP then chooses $\alpha$ such that the expected marginal donation from the last individual solicited equals the marginal cost of that solicitation. A nonprofit will choose to enter the market if the equilibrium net donations received allows the nonprofit to provide its services. Solving for $\alpha_j$ from this FOC gives:

$$\alpha_j = \frac{a - mc}{b(n + 1)} \quad (3)$$

Thus, as the number of firms in the market increases, the optimal proportion of the population solicited declines. Calculating the equilibrium average donation given and subtracting from marginal cost gives what we denote as the donative margin:

$$d(q_j, q_{-j}) \times -mc = \frac{a - mc}{n + 1} \quad (4)$$

We then see that, similar to a standard class of oligopoly models, the price-cost margin falls to zero as we reach a competitive equilibrium. That is, in competitive markets, we should expect the average donation to be just equal to the marginal cost of soliciting the last donation. We could also interpret this as the last donor solicited values the nonprofit mission at the marginal cost of the solicitation.

We also need to consider the point at which it is attractive for a nonprofit to enter the market. Setting $NR=0$ we then see that:

$$NR = d(q_j, q_{-j}) \times \alpha \times S - F - AVC \times \alpha \times S = 0 \quad (5)$$

$$d(q_j, q_{-j}) \times \alpha \times S - AVC \times \alpha \times S = F \quad (6)$$

$$S = \frac{F}{\alpha \times (d(q) - AVC)} \quad (7)$$

Like BR, we see that this breakeven threshold can be derived from changes in the market size needed to support $N$ firms. Consider a market size $S_1$ that is just large enough to support
a monopolist in the market. The monopolist NP has a captive donor audience and can thus extract the highest expected value from each additional solicitation. In order to induce another NP to enter, the market size must increase to $S_2$. However, now with two firms, depending on the heterogeneity in the charitable service, the expected value of donations falls due to competition. In the extreme, with identical offerings of charitable services, the two NPs split the donative market. Holding costs constant, the marginal donation falls. This is analogous to the price-cost margin falling in a for-profit setting. The second firm would then require more than double of $S_1$ in order to enter. Similarly, additional entrants would also require a larger break-even market size due to declining margin in donations.

In this scenario, the ratio of the break-even thresholds provides an inference on how competitive conduct is changing as entry occurs. This rationale follows directly from Bresnahan and Reiss (1991) where we interpret the declining price-cost margins in terms of the additional net donations generated from soliciting an additional potential donor. Under our above specification, we produce a standard Cournot model in which the donation-cost margin (we need to come up with a specific name for this margin—maybe donative margin?) falls and threshold ratios $S_{n+1}/S_n$ converge to 1 as additional NPs enter the market.

### 4 Empirical Model

Based on the above theoretical framework of net revenue maximization, the nonprofit payoff function is therefore:

$$NR_{im} = X_m\beta + h(N)\alpha + \epsilon_{im} + \gamma q_{im}$$  \hspace{1cm} (8)

Consistent with previous entry model specifications, $X$ captures demand and supply
side characteristics influencing the decision to enter the market. We discuss the particular variables in the Data section. After controlling for these differences across markets, our main area of interest is how nonprofits consider other donation-driven competitors when deciding to enter the market. Thus, the number of existing nonprofits in the market enters the payoff function separately through \( h(N) \) in order to capture own competitive effects from entry.

In the results that follow, we assume that \( \epsilon_{im} = \epsilon_{jm} = \epsilon_m \). Thus, the model assumes homogeneity across all nonprofit firms. That is, the identity of the competitors is not a consideration when deciding whether to enter a market. While this is clearly an abstraction, this assumption simplifies estimation and allows us to focus on how the number of other nonprofits affects entry. We also note that any estimation with the number of nonprofits as a regressor also makes similar assumptions; the advantage of our framework is that the assumption is more explicit and we can therefore, in extensions, consider how the assumption impacts the results.

We now determine the conditions under which we assume a nonprofit would enter a market. Common to the IO literature, we assume that NPs enter up to the point where the expected value of entry is positive and will not enter under negative value. We note here that due to the nonprofit motive, this does not necessarily imply that economic profits must be positive. The NP does need to be economically viable but the weight on serving the community \( (q) \) implies that the nonprofit could enter when a for-profit would not. Holding the demand and cost characteristics of the market constant, we follow Bresnahan and Reiss (1990, 1991) where the Nash equilibrium is unique in the total number of firms in the market.
The conditions for a Nash are then:

\[ V(N) \geq 0 \]  
\[ V(N + 1) < 0 \]

Given our assumptions, we can estimate this model as an ordered probit with the total number of firms as the dependent variable. A likelihood function is therefore formed based on the probability of observing \( N \) number of NPs in a market.

An additional advantage of this framework, for our purposes, is that we can then estimate the threshold number of potential donors required to induce market entry. The model relies on a revealed preference assumption that, if in a particular market, we observe \( N \) nonprofits, \( N \) must be viable and \( N+1 \) is not. Although we likely expect fluctuations in any given market at a point in time, this assumption is reasonable given that we are finding these thresholds, averaged over all of our markets (and controlling for other market characteristics).

We can now re-write the objective function; taking into account the size of the market and subsuming \( \gamma \ast q \) into the \( X \) vector:

\[ V_{im} = X_m \ast S_m \beta + h(N)\alpha + \epsilon_{im} \]  

where \( S \) measures the population in market \( m \). \( X \) is the interpreted as per-capita demand for the firm’s good or service. Averaged over all markets, epsilon is zero and thus, the donor population threshold \( S \) required to just be indifferent between entering and not entering the market (i.e., \( V=0 \)) is:

\[ X_m \ast S_m \beta + h(N)\alpha = 0 \]  
\[ S_m(N) = -h(N)\alpha/X_m \ast \beta \]
For example, the break even donor population required to induce entry of a monopolist and duopolist respectively is:

\[ S_1 = -\frac{\alpha_1}{X_m} \beta \]  \hspace{1cm} (14)

and

\[ S_2 = -\frac{\alpha_1 + \alpha_2}{X_m} \beta \]  \hspace{1cm} (15)

where \( X_m \) is the average of the per-capita demand variables for markets with 1 and 2 firms respectively. \( S_n \) therefore provides the total donor population needed to support \( n \) firms. The per-firm donor population is given by

\[ s_n \equiv \frac{S_n}{n}. \]

Following Bresnahan and Reiss (1990, 1991), we also calculate the ratio of \( s_{n+1}/s_n \) to infer how the relative change in entry thresholds changes the competitive nature of the firms.

From the theoretical model described previously, donors are arrayed according to their average expected donation. Donors will continue to be solicited as long as the expected value of their donation exceeds the cost of solicitation. Suppose we observe that it takes 10,000 donors to support 1 firm in a market. If the existing market is already perfectly competitive - all else equal - each additional firm should require an additional 10,000 people to enter. If we, however, observe a significant increase in population required to support an additional firm, then we can infer that price-cost margins have fallen. In this case, the incumbent firm was somehow able to delay entry of the second firm. It is the magnitude of this increase in population required to support an additional firm that reveals the movement toward a competitive equilibrium. This process should continue until entry thresholds stabilize. \(^1\)

\(^1\) It is also possible to interpret constant entry thresholds as collusive behavior. If firms were able to form
Figure 1 provides a graphical illustration of the intuition behind the model. In panel (1), price is higher than marginal costs and the nonprofit is not at the minimum of the average cost curve. Note that the output necessary to support the firm is less that the other panels. Panel (2) depicts how increasing the size of the market will flatten the residual demand curve, implying the tangency for zero profit moves down and to the right on the AC curve. Importantly, this increases the amount of output necessary to support the representative firm. By panel (3), the market has sufficiently expanded such that the residual demand curve is perfectly elastic. Consequently, prices have converged to the competitive equilibrium and output per firm is at its minimum efficient scale. As the market expands further, we should not observe additional increases in per-firm output.

As the market converges to a competitive equilibrium, we would therefore anticipate that $s_{n+1}/s_n$ would also converge to one. This insight allows us to use the variation in number of firms and market size across markets to infer the number of firms needed to approach a competitive environment. We can then also analyze how this competitive N has changed across time.

It is also possible that the fixed costs of production will rise for the marginal firm. This may occur due to some external barrier to entry such as increased costs for land. In this case, even if variable profits are constant, a firm just earning $V=0$ would now earn $V<0$. We are currently exploring empirical options to mitigate this possibility. Currently, we cannot empirically distinguish between a decline in variable profits from an increase fixed costs. Under either scenario, the number of people required to support additional firms will increase a cartel, the entry threshold would also be stable. However, given an initial increase in the entry threshold, we find this interpretation implausible.
in order to break even. Thus, we could imagine that a population of 30,000 is required for 2 nonprofits, implying that $s_2/s_1 = 15,000/10,000 = 1.5$.

5 Data

A significant challenge for this study is to determine the relevant economic markets. Unlike typical market structure studies, we are primarily interested in the relevant market for donations (an input) rather than the market for output. The output of produced by most nonprofit firms is typically offered below the cost of production, consistent with their charitable mission. Consequently, we expect excess demand for nonprofit output. The binding constraint on the nonprofit production will be its inputs, particularly donations. Market definition will then be determined by the relevant geography over which donors are willing to consider competing charities.

We attempt to bracket the relevant donor markets by examining entry behavior using both large and small market definitions. We make an initial conjecture that the Metropolitan Statistical Area (MSA) represents a reasonable approximation for the donor’s choice set among competing nonprofits, given the selection of nonprofit industries described next. Appendix 1 then reports results using small and isolated markets at the county level.

The paper constructs a cross-section of nonprofit markets for fifteen distinct nonprofit industries. We infer the existence of a nonprofit from their Form 990 tax filing for a particular year. Tax file data is aggregated and maintained by the National center for Charitable Statistics (NCCS). We rely on NCCS Core Files for 2005. With some exceptions, all nonprofits
are required to file a Form 990 annually.\textsuperscript{2}

The particular nonprofit industries were constructed using the National Taxonomy of Exempt Entities (NTEE). The NTEE classifies all nonprofit organizations according to a detailed taxonomy, similar to NAICS codes. We use the National Taxonomy of Exempt Entities (NTEE) to identify nonprofit firms with similar types of output. Note that our study focuses on competition for donations, so we wish to identify particular NTEE sub sectors that compete for donors in relatively distinct economic markets. We do this by selecting nonprofit sub sectors (at the 2 digit level) using the following criteria:

1. The nonprofit firms are headquartered within an MSA.

2. Their inputs (donations and labor) are derived locally and outputs are consumed locally.

3. The nonprofit firms contained within the two-digit sub sector are reasonably homogeneous in their outputs. Consequently, donors would likely perceive them as substitutes.

4. The nonprofit firms contained within the subsector produce output that is not substitutable with for-profit output.

5. The nonprofit firms contained within the subsector receive a non-trivial fraction of their revenues as private donations.

From these criteria, fifteen representative nonprofit industries were selected. These industries contain nonprofit organizations that are likely to compete for donations with each other.

\textsuperscript{2}For the time range of the sample all nonprofit organizations organized under section 501(c)(3) of the US tax code were required to file a Form 990. Exceptions include those organizations earning less than 25,000 USD in revenue and religious organizations (including churches).
in geographically distinct areas. Markets are geographically identified using Metropolitan Statistical Areas (MSA). The Office of Management and Budget defines Metropolitan Statistical Areas as having at least one urbanized population of 50,000 or greater. Each of the 363 MSAs contain fifteen nonprofit industries, for a total of 5,445 potential markets. Using the Form 990 data it is possible to know how many nonprofits existed in each of those markets for a particular year.

Table 1 offers summary statistics for each nonprofit industry. Note that Museums are the largest nonprofit industry in the sample, with 2,469 total firms in 2005. This industry averaged 7.2 firms per MSA, while the median number of firms was only 3 per MSA. For every sector, there was a least one MSA with no firms in the market. The Hot Line and Crisis Prevention industry had the smallest average number of firms per market. Figure 1 shows a histogram of the frequencies of markets by the number of firms they contain. Note that nearly half of all markets contain either a monopoly or no firms. The histogram is top-coded at 10 firms.

Each of these markets were linked with basic demographic and economic data derived from the Bureau of Economic Analysis Regional Economic Accounts and the American Community Survey. Table 2 offers summary statistics for these covariates. The average population of an MSA within the sample is 684,202. The average per-capita income was

\[ \text{Some MSAs contain a very large number of firms for any particular nonprofit industry. This creates a long right tail in the distribution of the number of firms per market that could skew our results. To mitigate this problem we trim the largest 20 MSAs from the sample. Note also that this includes Washington DC, which - for obvious reasons - contains a disproportionate number of nonprofits relative to its population size. See Figure 1 for a description of the distribution of firms across markets.} \]

\[ \text{OMB actually lists 366 MSAs. However, only 363 could be matched to NCCS data. This is likely because of recent changes to the OMB coding which had not been applied to the NCCS data. The three MSAs not included were: Crestview-Fort Walton Beach-Destin, FL; Sarasota, FL; & Steubenville-Weirton, OH-WV. The number of MSAs was reduced to 343 when the twenty largest MSAs were trimmed from the sample. Note that we further reduce the number of MSAs to 343 by censoring the 20 largest MSAs in the sample. Data cleaning is discussed further in Section 5.} \]
31,948 USD. Personal transfer payments to individuals include: retirement and disability insurance benefits, medical payments (mainly Medicare and Medicaid), income maintenance benefits, unemployment insurance benefits, veterans benefits, and Federal grants and loans to students. MSAs, on average received 3,353,405 USD in personal transfer payments. MSAs averaged 20,200,000 USD in total earnings, which includes: personal income-wage and salary disbursements, supplements to wages and salaries, and proprietors’ income.\textsuperscript{5} Median house rents ranged from $329 to $1,142. The mean poverty rate for the sample was 14%.

Our findings are derived by regressing the number of NPs observed in a market against these proxies for firm demand, multiplied by MSA population. An ordered probit regression model allows us to generate estimates for $\alpha$ and $\beta$ in equation (4). From this, we generate predicted values for $S_m(N)$ in equation (6). The predicted values can be interpreted as the minimum population necessary to support entry of N firms. These results are discussed in the next section.

\section{Results}

Table 3 presents the ordered probit estimates of their covariates. We find that higher per-capita incomes increase the likelihood of entry into the market, holding the size of the market constant. The amount of public transfers to an area seems to only affect entry for food banks, a sector where we might expect more complementarity between nonprofit and public services. Total earnings, our measure of labor costs, suggests that higher labor costs decreases the number of nonprofits in a market. Even though we control for per-capita income, it is possible that total earnings identifies additional variation across markets that is

\textsuperscript{5}http://www.bea.gov/regional/definitions/
related to the overall need for social services. The wage variable may pick up the lower tail of the income distribution better than the income variable. Generally, increases in household rent, a proxy for fixed costs, results in lower entry rates. The odd exception is crisis centers, which have a positive association with rents. Increases in poverty result in a decline in entry rates for cultural institutions such as performing arts. However, poverty rates are positively associated with entry for social service organizations such as community health centers and shelters.

We then use these regression results to estimate the average market size required to induce N firms to enter the market. It is important to remember that these estimates are for the population necessary to support N firms at zero economic profit. The estimates are presented in Table 4. For example, a monopolist homeless shelter required a mere 25,657 people to enter the market and break even. A monopolist crisis prevention center would require 653,142. The negative $S_1$ for many sectors implies that for markets with an average level of income, transfers and total earnings, we always will observe at least 1 nonprofit in the market. This is does not contradict Table 1 which shows that some markets have no Museums or Food banks. For example, markets that have lower than average income levels might not be able to support a Museum, even with a larger population.

The large difference in entry thresholds across industries is large. One interpretation of these differences is that Homeless Shelters enjoy higher per-person demand in the average market relative to Crisis Prevention Centers, implying that a lower population is required to support each firm. Alternatively Crisis Prevention Centers may have higher fixed costs relative to Crime Prevention - Rehab, though this explanation seems less plausible. Consequently, relatively little inference can be gained from comparing entry thresholds across
industries. The more productive comparison is to examine variation across market size within
the same industry.

Entry of the second firm provides more information on the competitive structure of the
market. For example, the typical Homeless Shelter duopoly market will require an estimated
324,647 people to support two nonprofits, or a per-firm population requirement ($s_n$) of
162,323. The required per-firm population is much larger than the monopoly case. The
increase in per-firm population requirements ($s_n$) is most likely the result of a fall in price-
cost margins. Large increases in the per-firm entry threshold for the second firm indicates
that either the monopolist firm was successful at deterring entry, or that operating costs
decline with scale. Under either scenario, the finding suggest that the first Homeless Shelter
in a market maintains some market power. Given the current data and empirical approach,
it is not yet possible to distinguish between declines in price-cost margins and rising fixed
costs. ⁶

The threshold ratios provide a similar interpretation, but allow us to more easily compare
more easily across industries. These ratios show that the second Homeless Shelter requires
around six times the per-firm population in order to enter the market. For contrast, Commu-
nity Shelters require slightly more than twice as many people to support the duopoly
relative to the incumbent monopoly. The ratio $\frac{s_2}{s_1}$ is more difficult to interpret for industries
such as Museums and Food Pantries due to the negative population estimate for $S_1$. The
ratio $\frac{s_2}{s_2}$ however shows a similar pattern of larger per-firm thresholds needed (i.e., ratio>1)

⁶The price-cost interpretation requires that the fixed costs of entry remain constant as N increases.
Bresnahan and Reiss (1991) implicitly make this assumption for their particular industries of study. It is
less clear that this is a correct assumption for the nonprofit sector. It is possible that the fixed costs of entry
will rise with N, possibly due to higher entry requirements for fundraising. The consequence of relaxing this
assumption would be that increasing per-firm entry threshold ($s_n$) could be an indication of rising entry
costs (possibly due to anti-competitive behavior) rather than lower price-cost margins.
in order to induce entry of the third firm. The degree to which these ratios are declining as more nonprofits enter, as discussed in the Methodology section, is one of our primary interests in this paper.

The first striking feature to note about the trend in the threshold ratios is that, across all sectors and years, we converge to an entry threshold ratio of 1 in around 3 to 4 firms. This finding is very similar to results found in for-profit industries in Bresnahan and Reiss (1991). Stated clearly, these nonprofit sectors do not require a large number of firms to achieve a competitive equilibrium. By this measure, nonprofit organizations appear about as competitive as a comparable for-profit market. Given the nature of nonprofits, one might wonder whether the ratio of 1 suggests a collusive, instead of a competitive, equilibrium. The fact that we observe ratios significantly above 1 when the market has fewer firms, however, is more consistent with a story of increasing competition rather than increasing collaborative or cooperative behavior.

We do however observe differences between sectors in the number of firms needed to approach competitive levels. For example, entry threshold ratios for Community Shelters and Family Counseling centers stabilize after the second firm. Crisis Prevention, Food Pantries, and Employment Training require four. Performing Arts organizations require an average of seven firms to stabilize entry ratios, implying that this market is the least rival of those sampled.

7 Discussion and Next Steps

In this paper, we estimate a model that allows us to infer the competitive nature of nonprofit, donative organizations without observing changes in prices or quantities of people served by
the nonprofit. We are able to make this inference by systematically comparing the differences in the number of nonprofits within an industry across markets. These differences are then used to estimate break even thresholds, that is, the average population needed to just support a given number of firms. We find that for the subsectors examined, markets typically reach competitive levels once three or more nonprofits have entered the industry. This result is very similar to those found for for-profit industries (Bresnahan and Reiss, 1991). The results therefore suggest that a relatively small number of firms are needed to observe competition between nonprofits.

Second, the number of observed firms in all of these subsectors is rising at the same time that the breakeven threshold ratios are staying relatively constant over time. Therefore, one could interpret additional entry after reaching the competitive levels as excess entry and indeed increasing competition for donations over time. This argument is consistent with previous findings of excessive fundraising for nonprofits (Thornton, 2006, Rose-Ackerman, 1982). This is of particular concern for the nonprofit sector, where excessive competition may reduce the private provision of collective goods. Isolating the influence of competition over time is a crucial next stage to our analysis.

Finally, we need to consider to what extent increased reliance on program service revenues or other revenue streams would affect our results. For example, as donative markets become more competitive, nonprofits may move toward fee-for-service revenues to compensate. In doing so, the break even threshold levels (i.e., population required to breakeven) could change at a rate that would imply lower levels of competition. Future versions of the paper need to incorporate reliance on program service revenues to be able to speak more directly to this point.
References


