Nonprofit tax exemptions, for-profit competition, and spillovers to community services*

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Abstract

We investigate the role of nonprofit tax exemptions in affecting the structure of local fitness markets and in driving the nonprofit's decision to complement fitness offerings with youth programming. Nonprofits compete against a large number of for-profit fitness centers, calling into question the necessity of tax exemptions to encourage the provision of such services. We estimate an equilibrium model of market structure for fitness centers to assess the degree of competition between nonprofit and for-profit firms. Our results suggest that the two ownership types serve different customer bases, with nonprofit entry being prevalent in markets with large single populations and populations without college education. Relying on local property tax data as a proxy for the firm's tax burden, we find that while nonprofit entry would fall by 26% when facing the typical for-profit tax liability, for-profit entry would not respond to replace this loss in providers. In an extension of our entry model, we consider the potential spillovers to youth services provided by the nonprofit. We estimate that in the absence of a property tax exemption, the entry of nonprofit fitness facilities that jointly operate a youth program would decline by approximately 20%, a significant share of the overall impact on nonprofit entry. Tax exemptions thus aid in both the provision of the primary and auxiliary services.

Keywords: entry, nonprofit firms, tax exemptions, cross-subsidization, multi-product firms

JEL Classification: L10, L3, H25

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1 Introduction

Nonprofit firms typically provide some form of collective or public good and frequently offer products and services that the market would not profitably provide on its own. As a result, nonprofits require either alternative sources of revenue, such as donations or government grants, or subsidies that decrease their cost. In this paper, we investigate how the latter impacts market structure, focusing on a typical setting with mixed ownership – the provision of fitness services – and the nonprofit's choice of which services to offer beyond the core product, some of whom may be targeting otherwise under-served markets – here youth services and programming.

Nonprofits are commonly exempt from federal, state, and local income taxes, as well as sales and property taxes, in order to encourage provision of collective and public goods. These exemptions can be substantial; European and US effective average corporate income tax rates for medium-sized businesses, a common size for many nonprofits, amount to between 20 and 35%.[1] They apply in industries ranging from education, financial services and healthcare, to retail, where for-profit and nonprofit firms increasingly compete directly. The co-existence of non- and for-profit competitors has resulted in a longstanding debate of the need for differential tax treatment of the two firm types and the implications of granting nonprofits cost advantages in such settings (see, e.g., Rose-Ackerman, 1986). Recent years have also seen a range of legal and political action. For example, the German Federal Fiscal Court clarified limits on nonprofit hospitals' tax exemptions in a 2011 decision, and the US Congress similarly questioned the Internal Revenue Service (IRS) about its oversight of nonprofit hospitals in 2011. The US States of Connecticut and Illinois have recently debated the property tax exemption for some of their nonprofits, in light of large budget deficits. In Wales, a recent influx of charity retail stores has resulted in a proposal to decrease their sales tax exemption from 80% to 50%.[2]

The argument that tax exemptions grant unfair cost advantages to nonprofits is predicated on two main assumptions: 1) the tax exemption increases entry by nonprofits, and 2) nonprofit and for-profit services are substitutes, leading to the exclusion of for-profit competitors. In this

[1] See http://ec.europa.eu/taxation_customs/taxation/gen_info/economic_analysis/tax_structures/index_en.htm for 2014 effective average corporate tax rates in the European Union and http://www.irs.gov/uac/SOI-Tax-Stats-Corporation-Data-by-Size for 2012-13 corporate tax receipts in the US.

[2] For information on these legislative proposals, see German Federal Fiscal Court decision IR 59/10 June 22 2011; http://www.nytimes.com/2011/11/01/business/congress-asks-irs-about-oversight-of-nonprofit-hospitals.html?_r=0, Connecticut House Bill 5583 (2014) and http://www.nytimes.com/2003/04/20/nyregion/20CONN.html, Illinois Senate Bill 2194 (2012), and http://www.bbc.com/news/uk-wales-22960857, all accessed 5/2015.

paper we develop and estimate discrete games of entry and product choice to assess the validity of these assumptions. We allow our models to capture the inherent endogeneity in the joint entry decisions of the firms and the direct incorporation into profit of the costs imposed on for-profits by state and local taxes. As a result, we can predict in counterfactual analyses how market structure would change under a revocation of the nonprofit's tax exemption, eradicating the nonprofit's cost advantage over the for-profit. While previous studies have shown a positive relationship between nonprofit market share and taxes (Gulley and Santerre, 1993; Hansmann, 1987; Harrison, 2008), the reduced form nature of these analyses obscures the role that taxes play in the nonprofit entry decision: increased taxes in an area do not explicitly raise a nonprofit's costs; increased entry would arise only from displacement of for-profits due to the higher tax burden and an inherent substitutability between the two ownership types' services.

Prior studies highlight that crowd-out between nonprofit and for-profit facilities is not a universal feature of mixed-ownership industries. Ballou (2008) finds asymmetric competitive effects between ownership types such that the absence of a nonprofit nursing home increases the for-profit's entry probability, but not vice versa, while Cohen et al. (2013) find evidence that crowd-out effects between government substance abuse clinics and their for-profit and nonprofit counterparts are stronger than between the for-profit and the nonprofit. For-profit and nonprofit daycare centers do not appear to respond to the presence of each other in the market (Owens and Rennhoff, 2014).

The substitutability between the services offered by non- and for-profits is but one determinant of market structure in mixed-ownership markets. Taxes and other regulations that increase firm costs are similarly important considerations. Hotz and Xiao (2011) find, for example, that regulations in the child care industry decrease the number of daycare centers in the market, and, perhaps more importantly, have heterogeneous effects with lower income markets being more impacted. Our study, by assessing the extent of crowd-out attributable to nonprofit tax exemptions, complements the earlier work. Indeed, we find that revocation of the tax exemption is responsible for almost all of the decline in nonprofit and overall entry for the setting we study.

Nonprofits are frequently multi-product firms, offering a portfolio of complementary services that differ in profitability and relationship to the nonprofit's core mission goals. Examples of services that serve to support a nonprofit's mission, rather than being central to the mission itself, include gift shops at hospitals and book stores at universities (Oster, 2011). In our setting, the mission of the nonprofit – most commonly the YMCA – centers around facilitating a healthy family-

oriented lifestyle, and it offers a number of mission-relevant services. For example, in 95% of the markets we study, the YMCA offers fitness services, daycare services in only 54% of markets and after-school programming in 84% of markets. The relative predominance of fitness services, together with the frequently reported underfunding of child care services (see, e.g., The Afterschool Alliance, 2012) and in particular after-school programs, points to possible cross-subsidization between service offerings.

Multi-product offerings in which more profitable subsidize less profitable services are not unique to the nonprofit organizational form. Research examining potential cross subsidization has studied hospitals, nursing homes, and regulated industries such as transportation and telecommunications (David et al., 2014; Dranove, 1988; Troyer, 2002; Nicholas, 1991).[3] The benefits of such strategies often result from economies of scope related to shared inputs. In our setting, the possibility of economies of scope arises primarily from the shared facility space across the multiple services offered, thereby representing fixed, more so than variable, cost sharing.

To assess the importance of property tax exemptions to the nonprofit's choice to provide auxiliary services, we extend our empirical discrete game to allow the nonprofit to enter either as a stand-alone fitness center or as a combined fitness and youth services facility. We therefore investigate the importance of joint production of services and its relationship to market structure, and the role of policy design in impacting the nonprofit's product offering decision. Gruber (1994),Duggan (2002), and David et al. (2014) demonstrate that policies targeting firms' costs structures can impact the intensive margin of the provision of the auxiliary service. We focus instead on the extensive margin, highlighting the possibility of a loss in services due to policies that increase the nonprofit's cost.

Our results suggest limited competitive interaction between for-profit and nonprofit firms in the markets we study. In the provision of fitness services, we find that for-profit and nonprofit entry decisions are not significantly affected by the other type's presence. We thus find evidence of minimal crowd-out of for-profits by nonprofits, driven in part by a focus on different consumer segments: nonprofit entry responds more strongly to income and low levels of educational attainment, whereas health status is a more important driver of for-profit profitability and ultimately entry.

Controlling for the local competitive environment, we find that property taxes depress prof-

[3]The prevalence of cross-subsidized investments across more/less profitable corporate divisions has also led to a literature focused on identifying and explaining the potential for a "diversification discount." (Chevalier, 2004; Campa and Kedia, 2002; V. and Phillips, 2002).

itability and use estimates from our model to predict how nonprofit entry, and indirectly for-profit market structure, would respond if the nonprofit tax exemption were revoked. Our results suggest that nonprofit entry would fall by 26% if the nonprofit's value were reduced by the full estimated tax impact. This decline, combined with the limited cross-competitive effects we observe, would result in an overall reduction in the provision of fitness services were nonprofits required to pay property taxes. This suggests that tax exemptions are effective at promoting a nonprofit presence in local markets, but that concerns that they put for-profits at a competitive disadvantage are largely unfounded.

Our estimates when allowing for the nonprofit's decision to offer fitness and youth services jointly imply an approximate 20% reduction in the nonprofit's propensity of offering mission-related youth services due to a tax-exempt revocation. Tax revenues generated from the revocation would only subsidize a fraction of the cost of these youth services. Our paper therefore provides some insight into the second-order impacts on community services of equating the tax burden between nonprofit and for-profit firms.

Our paper proceeds as follows. Section 2 presents relevant background information about the recreational and fitness industry and the role of nonprofit competitors in the sector. We then present in Section 3 an empirical equilibrium model of entry by ownership type, allowing for type-specific differences in the value of entering a local market and incorporating directly the taxes that reduce a for-profit entrant's profitability. Section 4 outlines the data that we use to estimate the parameters of the model. We then turn to the results of our estimation in Section 5. We conclude in Section 6 with a discussion of our results and the potential implications for other multi-product settings.

2 Fitness Markets and the Nonprofit's Multi-Product Offerings

We study fitness services for several reasons. First, nonprofit firms, typically affiliated with the Young Men's Christian Association (YMCA), are a sizeable portion of the market. At the same time, the public sector involvement in the market is minimal resulting in a simpler setting than other mixed ownership markets such as health care; government-run fitness centers comprise an extremely small portion of the market. Second, local YMCAs have been subject to recent scrutiny of their nonprofit tax advantaged status, and conversely, there has been consideration of an in-

troduction of a for-profit tax exemption.[4] The nonprofits' tax exempt status reflects the public interest benefits it generates through the multiple services it provides, which include, beyond fitness offerings, summer camps, daycare centers, and after-school programs. Fitness services thus make up a unique setting to study the role that nonprofit tax advantages play not only in altering competition in the primary, mixed ownership market, but also in the provision of secondary community services. In this section, we summarize the structure of fitness markets, nonprofit competition, and the propensity of nonprofit fitness service providers to offer additional community services.

Health and fitness centers comprise a growing segment of service providers given public emphasis on health and research demonstrating the benefits of exercise. Between 2003 and 2013, the number of US recreation centers grew by 9% (US Census County Business Patterns) and club membership by an estimated 33% (International Health, Racquet & Sportsclub Association, 2014). For the purposes of our study, we focus exclusively on centers providing comprehensive fitness facilities, setting aside facilities strictly devoted to one particular sport (e.g., yoga studios). Health clubs are fragmented; in 2009, the largest for-profit chain by revenue (24 Hour Fitness) accounted for only 1,352 outlets out of a total of approximately 30,000 US outlets, or 4.4%. In the following analyses, we therefore treat each potential entrant into a local market as a stand-alone competitor.

Nonprofit facilities comprise a nontrivial portion of the market. Their membership share as of 2007 is approximately 20% (American Sports Data, 2009). Facilities associated with the YMCA are the dominant firm type with Jewish Community Centers (JCCs) and Young Women's Christian Associations (YWCAs) following as fringe competitors. Using our selected markets (see detailed discussion of market selection in Section 4) as an example, 42.3% of markets contain a YMCA, but only 1.6% a JCC and 0.5% a YWCA.[5] In the entry model below, we consider YMCA-affiliated facilities as the sole nonprofit competitor to limit the number of strategic players.

Local YMCAs function as stand-alone units and make independent operational and initial entry decisions, provided there is no other YMCA already operating in the market. This together with the limited presence of multi-outlet for-profit chains motivates our modeling assumption below that both for- and nonprofit competitors make independent, single-outlet entry decisions. IRS filings of

[4]See Atkins' 2003 article in Club Industry on "Profit vs. nonprofit: Unfair Competition" and Selfspot Inc. v Butler County YMCA (2008) for a recent lawsuit against a Pennsylvania YMCA. In 2013, the Kansas legislature debated and ultimately rejected a bill to grant tax-exempt status to for-profit fitness centers. See https://nonprofitquarterly.org/policysocial-context/24131-kansas-rejects-tax-exempt-status-for-for-profit-fitness-clubs.html accessed 10/2014.

[5]We exclude facilities at nonprofit organizations such as universities and hospitals where membership is not open to the general public.

tax exempt returns (forms 990) suggest that for the average YMCA facility, about 27% of revenues come from donations and grants and 60% from program related services. These program revenues can further be broken down into membership dues (25% of revenues) and other program fees – primarily fees for sports lessons – (34%). The data thus suggest that a significant portion, but not all, of the nonprofit revenue base stems from their fitness services. Appendix A.1 contains a detailed overview of the YMCA organizational structure and typical objectives.

Nonprofit competitors, distinctive from other fitness facilities, often provide youth-related services. YMCA-affiliated organizations are the largest non-school-run operator of after-school programs (23% market share), frequently serving students from economically disadvantaged households. Such programs commonly suffer from insufficient funding to meet local student needs and rely in part on donations and fundraisers as a source of local funding.[6] This suggests the potential for cross-subsidization of youth programs by the nonprofit's fitness provision in the form of economies of scope in the fixed costs of sharing a common facility. It also highlights another dimension of tax effects on YMCA entry in the fitness center markets: to what extent do tax exemptions increase nonprofit entry not only in fitness markets, but also in youth programming, a service with arguably larger public interest benefits?

The multi-product nature of YMCAs is centered around fitness services. In the markets we use in our analysis below, we observe fitness centers in 95%, or 266, of the 280 markets with a YMCA affiliated firm.[7] In the markets where the nonprofit does not provide fitness services, it offers after-school programs in all 14 markets and daycare services in three of the 14 markets. This reflects the nonprofit's focus on after-school programming more broadly. In 235 markets, it offers after-school programs. Daycare services are available in only 152 markets, and in 141 of these instances, the nonprofit also offers after-school services.

These statistics suggest that the nonprofit's predominant strategic choice consists of either entering into fitness services alone or operating fitness and youth services programming jointly. Reduced form estimates provided in Appendix A.3 provide additional evidence beyond these cross tabulations that youth services are unlikely to be provided in the absence of the YMCA also oper-

[6] The Afterschool Alliance (2012) reports, for example, that 68% of youth participating in after-school programs qualify for free or reduced price lunch. 57% of surveyed after-school programs report inadequate program budgets to meet student needs. 43% of programs rely on private donations, donation containers, and fundraisers.

[7] The YMCA has a presence in an additional 20 markets in our sample where it does not offer either fitness or youth services programming. Instead, offerings in these markets consist of dedicated summer camp or swimming programs, which we disregard here.

ating a fitness facility. Controlling for other market characteristics, we find that the likelihood of the nonprofit offering youth programming is between 12 and 20.2 times higher in markets where it also operates a fitness facility. Bivariate probit estimates similarly suggest that the unobservable determinants of the youth service and fitness center offering decisions are highly correlated (correlations of around .9 for both daycare centers and after-school programs). In the below model of the nonprofit's product choice, we therefore disregard the nonprofit's option of providing youth services programming independently of also offering fitness services.

3 Empirical Model

We use an equilibrium model of market structure that allows us to answer two questions: (i) Focusing on fitness services, do consumers view the offerings by non- and for-profit firms as substitutes, or does each ownership type serve distinct segments of the population? and (ii) How much do tax benefits granted to nonprofits affect entry decisions and competitive interaction in fitness markets, and the nonprofit's decision to offer youth programming jointly with fitness services? One possibility of investigating the degree of substitutability between the two ownership types would be to estimate a demand system for each type's fitness services, to identify the cross-price elasticity of for-profit fitness center membership with respect to the nonprofit's price. While it is possible to estimate the size of each nonprofit's membership from tax return information, such detailed data is not available for the for-profit sector, which is often comprised of single-outlet, privately held facilities. Instead, we rely on more aggregate information on the market structure of local markets and estimate a model of entry by for-profit and nonprofit firms.

We envision a market m with a total of N potential firm participants, segmented into N_{FP} for-profit firms (FP) and – in line with our empirical setting – a single nonprofit firm (NP). Each potential entrant i must decide whether to enter the market. Similar to Bresnahan and Reiss (1991), we model the per-firm profit function for for-profit competitors as:

$$\Pi_{FP} = V_{FP} \times q_{FP} - F_{FP} \tag{1}$$

where

$$\begin{aligned} V_{FP} &= \text{per-capita variable profit} \\ q_{FP} &= \frac{D_{FP}}{N_{FP}} \times S \\ D_{FP} &= \text{per-capita demand} \\ N_{FP} &= \text{number of for-competitors} \\ S &= \text{market size} \\ F_{FP} &= \text{fixed cost} \end{aligned}$$

Since we do not observe price and quantity information, we cannot estimate the determinants of V and D separately and thus specify a reduced-form payoff function. As we discuss below, for-profit facilities offer a relatively homogeneous product, and we assume that they each earn an identical profit of

$$\pi_{FP,m} = X_m\beta_{FP} + g(N_{FP,m}, \theta_{FP}) + \gamma_{FP}I_{NP} - F_{FP,m} \tag{2}$$

Here, X captures demand and cost characteristics that influence the profitability of the market. Functions of the number of for-profit and nonprofit competitors in the market (N_{FP} and an indicator for the presence of the nonprofit, I_{NP}) enter the payoff function separately, via $g(\cdot)$ and γ_{FP}, in order to capture own and cross-type competitive effects from firm presence. Fixed costs are comprised of observed and unobserved components such that:

$$F_{FP,m} = Z_m\delta_{FP} + \eta T_m + \epsilon_{FP,m} \tag{3}$$

Common measures of Z_m include the average land value in the market. Our focus is on the property taxes for this land (T_m), which may be capitalized into rents in the case where the for-profit leases its facility. For-profits also pay income taxes on their profits; we subsume both federal and state income tax rates into τ_m in a manner similar to Gowrisankaran and Town (1997). The after-tax

payoff function is therefore:

$$\begin{aligned}\Pi_{FP,m} &= \pi_{FP,m}(1-\tau_m) \\ &= \Big(X_m\beta_{FP} + g(N_{FP,m},\theta_{FP}) + \gamma_{FP}I_{NP,m} \\ &\quad - (Z_m\delta_{FP} + \eta T_m + \epsilon_{FP,m})\Big)(1-\tau_m)\end{aligned} \tag{4}$$

Similar to the for-profit, we use a reduced form for the nonprofit value function.[8] Initially, we focus on the nonprofit's decision to enter into the provision of fitness services. We extend our model in subsequent analyses to the nonprofit's product choice between entering as a stand-alone fitness center or offering both fitness and youth services.

Nonprofits, as discussed earlier, are generally not subject to income or property taxes. We therefore set $\tau_m = T_m = 0$.[9] At the same time, other not-for-profit motivations may enter their objective function. Lakdawalla and Philipson (2006) and Gaynor and Vogt (2003), for example, propose that nonprofits put weight on the quantity of consumers served. Then, the nonprofit value function takes the form:

$$\begin{aligned}\Pi_{NP,m} &= \pi_{NP,m} + \nu \times q_{NP,m} \\ &= V_{NP,m} \times q_{NP,m} + \nu \times q_{NP,m} - F_{NP,m},\end{aligned} \tag{5}$$

where, in contrast to the for-profit's fixed cost, the nonprofit fixed cost is given by:

$$F_{NP,m} \quad = \quad Z_m\delta_{NP} + \epsilon_{NP,m} \tag{6}$$

For the same level of quantity, the payoff functions in Equations (4) and (5) illustrate three reasons why nonprofits may have different propensities of entering a market from their for-profit

[8] In alternative specifications, we used quantity information derived from nonprofit financial statements to estimate a membership equation as a function of market structure, in addition to the overall value of entry, given the nonprofits' independent value placed on quantity provision highlighted in e.g., Lakdawalla and Philipson (2006). The determinants of the nonprofit's entry decision in this alternative model were very similar to those presented above. We therefore chose not to model membership to focus on the extended analysis of the nonprofit's choice of entering as a multi-product firm, offering both youth services and fitness services. We do not separately observe fitness versus youth services usage by members.

[9] A concern may be that nonprofits implicitly bear the burden of the tax if they lease their property. However, YMCAs predominantly own their property and building as opposed to leasing or other arrangements. A 2010 Facility Survey, conducted by the National YMCA chapter, found that over 85% (out of a sample of 2,900 facilities completing the survey) of all YMCAs own their property.

counterparts. First, the lack of both income and property taxes increases firm profitability and specifically, setting $T_m = 0$ decreases the firm's fixed costs. Second, placing independent weight on the size of the market served (q) increases the nonprofit's entry into a market. For example, the nonprofit may put weight on serving more members because it values better health and well-being for its customers (common in YMCA mission statements). Lastly, we allow for type-specific parameters on the demand and cost shifters to reflect that different ownership types face different demands and costs and thus entry incentives.

Without a more fully specified variable profit function, requiring information on nonprofit's price and membership (which we observe) and its competitors' prices (which we do not observe), we cannot separately identify the weight the nonprofit places on membership served, ν, from the intercept in its variable profit. We thus submerge it into variable profit, $V_{NP,m}$, which we specify as $X_m\beta_V + h_1(N_{FP,m}, \gamma_V)$. Our ownership-specific parameters on market characteristics, β_V, thus capture the nonprofit motive of quantity maximization, but we are unable to directly quantify the portion attributable to a nonprofit motive, separately from preference differences between the services offered by nonprofit and for-profit firms. In what follows, we denote the nonprofit's value to entering as simply its payoff.

Grouping terms, we therefore have the following nonprofit value function:

$$\Pi_{NP,m} = X_m\beta_{NP} + h_1(N_{FP,m}, \gamma_{FP}) - (Z_m\delta_{NP} + \epsilon_{NP,m}) \tag{7}$$

We consider several specifications for the effect of additional for-profit competition on the nonprofit's value. First, we allow the number of firms to shift payoffs linearly, resulting in $h_1(N_{FP}, \gamma_{NP}) = \gamma_{NP} \times N_{FP}$. We also consider more flexible functional forms to capture that the impact of additional competition is likely larger in more concentrated markets, and introduce separate indicator variables for each observed market structure.

Our second set of model specifications focuses on the nonprofit's product choice of offering youth services in conjunction with fitness services. Here, we follow the literature on firms' optimal product assortment decisions (see, e.g., Draganska et al., 2009; Eizenberg, 2014; Fan and Yang, 2016) and specify an individual value to the nonprofit of offering each of its different service combinations. Our problem differs from the settings considered in the literature for a number of reasons. First, as discussed above, the nonprofit typically offers youth service programming as an add-on to its

fitness services, rather than on a stand-alone basis, limiting the number of service combinations that make up the nonprofit's choice set. Second, fitness and youth services do not compete with each other directly; we thus do not need to consider the product market competition among the services that the nonprofit considers. This results in the nonprofit selecting the optimal of three choices – not to enter, entering as a fitness center, or entering as a combined fitness center and youth services provider. We specify the value of the nonprofit's two entry modes akin to its overall value from providing fitness services in Equation (7), allowing the effect of demographics and cost shifters to vary by entry mode, to capture, for example, that the fixed costs of offering fitness and youth services in conjunction differ from those of offering fitness services on their own.

3.1 Equilibrium Concepts

Given the payoff functions above, we assume that firms make an entry decision by comparing the payoff to entering with the value of remaining out of the market, which we normalize to zero. For the base specification of the nonprofit's overall provision of fitness services, an equilibrium of this discrete game is a for-profit/nonprofit entry configuration, (N_{FP},I_{NP}), such that given the entry decision into fitness services of the nonprofit, all N_{FP} for-profit firms make positive profit, while an additional firm would earn negative profit. Similarly, an entering nonprofit needs to earn positive value given the for-profit competition it faces. Formally, the equilibrium conditions describing an optimal firm-configuration are:

$$\begin{aligned} \Pi_{FP,m}(N_{FP}, I_{NP}) &\geq 0 \\ \Pi_{FP,m}(N_{FP}+1, I_{NP}) &< 0 \\ \Pi_{NP,m}(N_{FP}) &\geq 0 \end{aligned} \tag{8}$$

While our focus on differentiated competition by ownership type resembles studies such as Mazzeo (2002) and Schaumans and Verboven (2008), our set-up differs in that we do not allow firms an initial choice of ownership type – nonprofit versus for-profit – which appears natural in our context. When we extend the nonprofit choice set to incorporating the nonprofit's choice of entry mode, we similarly assume that the service combination we observe in the data is the one that maximizes the nonprofit's value across the entry modes of {No entry, Fitness Center only, Fitness and Youth Services}.

3.2 Estimation

We estimate the parameters of the base discrete entry game and extended nonprofit product choice model by comparing the models' predictions to the configuration that we observe in the data. It is important to account for the possibility of multiple equilibria. These arise in the base model, for example, when particular realizations of the market-level unobserved profit shifters, ϵ_{FP} and ϵ_{NP}, are consistent with both $(N_{FP}, 1)$ and $(N_{FP}+1, 0)$ being predicted equilibrium outcomes based on conditions (8). We address this possibility by applying an equilibrium selection rule, similar to Berry (1992) and Jia (2008). We consider four equilibrium selection mechanisms: the for-profit moves first; the nonprofit moves first; the equilibrium with the highest industry value is chosen; or the individually highest value firm moves first. The equilibrium selection rule thus results in unique predictions allowing us to rely on maximum likelihood techniques to estimate the parameters. Since different equilibrium selection mechanisms assign the same set of payoff function realizations to different outcomes for some values of ϵ, their resulting likelihood functions for given parameter values differ, providing a base of comparison for the different equilibrium selection mechanisms. Beyond the simplicity of estimation, we prefer the use of an equilibrium selection mechanism to alternatives, such as moment-inequality estimators akin to Ciliberto and Tamer (2009) or Pakes et al. (2015), since the availability of point-identified parameter estimates simplifies the prediction of market structures in the alternative tax environments that we consider in the counterfactual analyses. In our setting, we find that the estimated parameters are stable under alternative equilibrium selection mechanisms as the empirical incidence of multiple equilibria is low.

In estimation, we truncate the number of for-profit entrants at six. For every realization of the error terms ϵ and values for the payoff function parameters, the model, combined with the considered equilibrium selection rule, assigns a particular ownership-type configuration or ownership and service offering configuration based on the market's data. With the two ownership types, the model's prediction of the firm configuration can take on one of 14 possible values; once we extend the model to allow for nonprofit provision of youth and fitness services in addition to fitness services alone, there are 21 possible firm configuration outcomes.

We follow earlier work (Mazzeo (2002), Schaumans and Verboven (2008), Toivanen and Waterson (2005)) in assuming that the market-level unobservables, $(\epsilon_{FP}, \epsilon_{NP})$, are distributed according to a multi-variate normal distribution with mean and correlation coefficient of zero and standard

deviations of one. We make the same assumption for the distribution of the unobservables in the product choice models, (ϵ_{FP}, ϵ_{NP1}, ϵ_{NP2}), where for the non-profit we include unobserved value components from entering as a gym alone (entry mode 1) and as a combined youth services and fitness facility (entry mode 2). This error structure is econometrically sensible (see, e.g., Berry and Tamer (2006) for a discussion of parameter identification under these parametric assumptions) and useful in our counterfactuals since the error terms and thus payoffs for each ownership type and each entry mode are identically scaled. Aiding in identifying the strategic interactions between ownership types are profit shifters that distinctly affect the for-profit but not the non-profit entry payoff (e.g. property taxes) and vice versa (e.g., benefits to being connected to a larger non-profit network).[10] In addition, we investigate the robustness of our estimated competitive effects to misspecification of the payoff functions by estimating a number of alternative specifications; see e.g., Footnote 26 in Section 3.2 and Appendix A.4.

For the base model, the estimated payoff function parameters maximize the likelihood of the observed market configuration across all markets:

$$L = \prod_{m=1}^{M} \left(\Pr\{(N_{FP}, 0)^o\} + \Pr\{(N_{FP}, 1)^o\} \right) \tag{9}$$

where $\Pr\{(N_{FP}, I_{NP})^o\}$ refers to the probability of the observed firm configuration of N_{FP} for-profit and I_{NP} nonprofit firms as predicted by the model. To derive $\Pr\{(N_{FP}, I_{NP})^o\}$, we integrate the joint probability distribution $f(\epsilon_{FP,m}, \epsilon_{NP,m})$ numerically over the region of the $(\epsilon_{FP,m}, \epsilon_{NP,m})$ space that corresponds to the observed outcome using a frequency simulator based on R Halton draws from the joint normal distribution. This facilitates the easy implementation of alternative selection mechanisms, including ones that result in non-rectangular areas of integration such as one where the highest value firm moves first. The probability of the observed configuration in Equation (9) is therefore:

$$\Pr\{(N_{FP}, I_{NP})^o\} = \frac{1}{R} \left(\sum_{r=1}^{R} I\left\{ (N_{FP}, I_{NP})^p_{r,m} = (N_{FP}, I_{NP})^o_m \right\} \right) \tag{10}$$

[10] While it is possible to allow for correlated errors in the derivation of the likelihood, we – in line with the discussion in Berry and Tamer (2006) on the identification of error correlations in discrete entry games with heterogeneity – found the correlation not to be empirically identified in the base model given the variation in our data and restrict it to zero for both the base and product choice models.

To avoid discontinuities in the likelihood function, we employ smoothed simulated maximum likelihood, as in Mazzeo (2002). In calculating the probability of an observed configuration for a given set of simulated error draws, we thus use normal transformations of the indicator functions that identify whether the payoffs at a given parameter vector satisfy the conditions in Equation (8).[11] We use an active-set optimization algorithm to maximize the empirical likelihood, Equation (9), and verify that the parameter estimates are robust to alternative starting values. We use an analogous estimation approach to generate the parameter estimates for the extended product choice model.[12]

4 Data

In order to estimate the models above, we obtained information on the presence and product offerings of nonprofit and for-profit firms in selected markets and demand and cost characteristics of the market, including information on property and income taxes. We define a market as a Census place or set of Census places[13] that satisfy two criteria: (1) the total market population, calculated as the population of all of the Census places in the market, falls between 10,000 and 200,000 and (2) no other adjacent market within 10 miles is larger than 20,000 inhabitants.[14] This results in 629 medium-sized, self-contained markets that allow us to clearly identify the competing firms in the market, as well as the population that they serve. Figure 1 depicts a map of the dispersed markets.

Based on this market criterion, we used ReferenceUSA to acquire information on full-service fitness centers within these markets. We limit ourselves to eight sub-sectors within the 6-digit NAICS code 713940, defined as Fitness and Recreational Sports Centers. This classification rules out facilities that are not full-service fitness centers (i.e., swimming pools, kid's gymnasiums, squash/tennis courts).[15] We further eliminated, based on the facility name, any other facilities that were not

[11] As as an example, we approximate the indicator that the nonprofit entry condition $I(\Pi_{NP,m}(N_{FP}) \geq 0)$ is met by $\Phi\left(\Pi_{NP,m}(N_{FP})/h\right)$, where Φ represents the cumulative normal distribution function. For the estimates in section 5.1, we set $h = 0.1$ and $R = 1000$.

[12] For the model where we allow for joint fitness and youth service provision by the nonprofit, we replace $\Pr\{(N_{FP}, I_{NP})^o\}$ by $\Pr\{(N_{FP}, I^1_{NP})^o\}$ and $\Pr\{(N_{FP}, I^2_{NP})^o\}$, where the first term represents the probability of observing a stand-alone nonprofit gym and the latter the probability of observing the nonprofit offering both fitness services and a daycare or after-school program.

[13] We identified Census places that fall into the same market area as follows. We overlaid the universe of Census places with zip codes and Census tracts using the online geographic correspondence engine MABLE/Geocorr. We grouped Census places together that shared either zip codes or Census tracts.

[14] We also used a more restrictive market criteria. The results were robust.

[15] The 8-digit NAICS codes are: 71394001, 71394009, 71394011, 71394013, 71394015, 71394016, 71394028, 71394030.

full-service fitness facilities.[16] In addition, we removed any duplicates in which seemingly different facilities were located at the same address.

The resulting sample contains 2,117 for-profit fitness facilities. In our analyses below, we treat the firms as homogeneous competitors, focusing on the number – rather than the identity – of for-profit firms per market. The ReferenceUSA data contain some basic firm descriptors that allow us to assess the validity of this assumption. Firms in the sample are typically small; 80% of them have less than 10 employees and 83% have sales below $500,000. Their facilities, in contrast, are relatively large, with 77% indicating a size above 10,000 square foot. Along these dimensions, the firms are thus relatively similar. They differ in organizational form, however, with 38% of firms indicating being affiliated with a fitness chain. Chain affiliates and independent gyms do not differ systematically along the reported outlet characteristics, however, and chains do not operate more than one outlet in a typical market. Since the focus of our study lies on understanding nonprofit and for-profit interactions, we therefore do not differentiate between chain and non-chain outlets going forward.

We obtained data on nonprofit facilities largely following the methodology above. Since nonprofits frequently provide multiple services, they may not list the "Fitness and Recreational Sports Centers" NAICS code as their primary line of business, even though they offer such services. We therefore also obtained information for firms containing "YMCA" or "Young Men" in their name from ReferenceUSA, regardless of the firm's primary line of business. For all of these facilities, we verified whether a fitness center, full-time daycare center, or after-school program was on-site either through the facility's website or through phone calls.

YMCA operated fitness centers are present in 266, or 42%, of markets.[17] Relative to the sample of for-profit fitness centers, YMCAs are typically larger when measured using employee counts; only 5.64% of YMCAs have less than 10 employees and the modal size category, at 35% of observations, is 50–99 employees.[18] Further, YMCAs are typically older with the median firm having been listed continuously since 1984 or earlier, compared to 2003 for the median for-profit firm.[19] Beyond the

[16] This includes for example firms with only "Yoga Studio" or "Kickboxing" in the title.

[17] Recall that in estimation, we disregard the 14 instances where nonprofits offer youth services, but not fitness facilities. We treat these markets as not having a nonprofit presence.

[18] Note that ReferenceUSA does not allow us to distinguish between part-time and fulltime employees; as a result, we cannot rule out that nonprofits use a different mix of workers than for-profits.

[19] Many nonprofits do not operate full-scale fitness facilities immediately upon their initial entry as a 501(c)3 organization; over 50% of the nonprofits in the sample did not self-identify as a fitness facility until at least five years after their initial listing in ReferenceUSA. Nevertheless, we experimented with including 1990 demographic variables for population, income, age, race, single person household, and education to capture possible frictions in the nonprofit

difference in organizational form, non- and for-profit firms thus differ significantly along a number of dimensions, justifying an investigation of the nonprofit entry decision separately from the for-profit side.

We use the firm information to generate a count of for-profit and nonprofit fitness facilities at the market level. Table 1 summarizes the firm-count distribution in our selected markets. For-profit facilities exist in 579 out of 629 markets. We observe 38 markets without either for- or nonprofit fitness facilities. For-profits are therefore more strongly represented in each market. The propensity of nonprofit entry increases in the number of for-profit competitors: Markets with four or fewer firms are less likely on average to have a YMCA present, with 36% of markets having a YMCA. This contrasts with an entry rate of 67% for markets with five or more for-profit firms. We observe a long right tail on the distribution of for-profit facilities, motivating the above discussed truncation of the for-profit firm count in estimation to ensure a sufficiently large number of market observations for each realized firm count.

We merge the firm count information with demand and cost shifters for each firm type's value from entering. We measure market size by population. We include demographic information on per-capita income, median age, educational attainment (percent of population with at least a bachelor's degree), and prevalence of single person households in order to capture the per-capita demand for fitness services. In addition, we experimented with other demographic characteristics such as ethnicity and the poverty rate of the population and found them to be insignificant in explaining entry. We gathered these Census data at the zip-code level and aggregate them to the market level by summing population across zip-codes and calculating population-weighted averages of all demographics.

Other factors, such as the overall health consciousness of the population and weather trends in the area, likely influence a person's propensity to join a fitness center. We control for regional variation in attitudes toward exercise by including each market's distance in miles to the nearest coast. A host of self-reported and objective variables is available to capture the health status and climate in a given area. However, there is a tension between providing richness to the specification and maintaining a computationally tractable number of regressors. Since we are primarily interested in identifying the contribution of the overall attribute on firm behavior, rather than the direct effect of one specific variable, we combine the variables into a general health and a weather index. As in

entry decision. We did not find the 1990 demographic variables to be correlated with current market structure and their inclusion did not impact the magnitude or significance of our variables of interest.

Scott Morton and Podolny (2002), we employ principal components analysis in order to create these indices. We apply varimax rotation to each factor and employ the first factor as our index. Each index is standardized to mean zero and standard deviation one. The weather index incorporates information on the occurrence of extreme or inclement weather and on environmental conditions that would make it more difficult to exercise outside. We base the health index on variables measuring diet, smoking, excessive drinking, self-reported overall health status, and ability to receive preventive medical care. A description of each individual variable, source of data, and summary statistics are provided in Appendix A.2.

Confirming our rationale for constructing the indices, many of the individual variables are highly correlated. For health, all but two of the 12 independent variables load at least 35% of their variance on the first factor, capturing a total of 34% of the total variation in the variables. Each of the remaining factors provides less than 10% of additional variation. A higher value for the health index indicates a less healthy lifestyle in that market. Similarly, six of the eleven weather variables load at least 67% of their variation on the first factor. In total, the index captures 43% of the variables' total variation, with larger values indicating a more severe climate, which implies conditions less amenable for outdoor exercise.

Individuals also have other outlets for exercise besides general membership fitness centers. They may choose to use a fitness center at an institution with which they have an affiliation. One common example is a college fitness facility. We therefore control for the presence of a major four-year college in the selected market, as identified in the National Center for Education Statistics' IPEDS data base.

Similarly, on the youth services side, we include in supplementary specifications information on the total number of facilities offering daycare or after-school programs in each market. We compiled these data from individual state's child care web directories typically maintained by the equivalent of the state's Department of Human Services, but were able to do so for only 457 of the full set of 629 markets.

On the cost side, we employ a firm cost index that measures the general fixed costs of operating in a market. It includes information on the median price of housing, our proxy and best measure for land values, and a cost of living measure. More than 85% of the variance loads on the first factor, explaining over 93% of the variance of each of the individual cost variables. Larger values for the cost index imply higher costs of doing business in that market. We also include the average

retail wage rate in the area to proxy for variable costs.

Finally, there are a number of profit shifters that affect one of the two firm types only. On the for-profit side, these are primarily tax measures, which by definition do not affect nonprofit entry directly. They include federal income and state and local business taxes. Since we do not observe variation in the corporate federal income tax rate, we focus on state and local business taxes to investigate the role of the tax burden in affecting for-profit entry relative to their nonprofit counterparts. Ernst & Young (2010)[20] estimate that state corporate and individual business income taxes contribute 18% to the average business tax burden. We collect information on the latter by compiling marginal state income tax rates from the National Tax Foundation. In line with the findings by Ernst & Young, state income tax rates average to only 6.6%, with a limited standard deviation of 1.5%, for the subsample of 381 markets with non-zero tax rates.

Ernst & Young (2010) cite property taxes as the largest individual contributor to local and state business taxes, amounting to an estimated 37% of total business taxes in 2009. Systematic information on local business property tax rates and taxes paid is difficult to obtain. For a subset of 284 of the 2,117 for-profit facilities and for 74 of the 179 nonprofit facilities, we were able to obtain property-specific 2008 tax values and assessments from two web-based databases, HomeInfoMax.com and realquest.com. Since nonprofits might pay taxes on non-exempt property, this information allows us to verify that the nonprofits use their facilities primarily for mission-related, tax-exempt activities and that any non-exempt activities occupy a small share of the total property utilized by the nonprofits in our sample. We confirmed that property taxes for all nonprofits in our sample are indeed negligible. The tax information available for the for-profit facilities allows us to investigate the for-profits' own-versus-rent decision. The data indicate that 42% of the properties are owner-occupied, while 56% are not, the occupation information being unavailable for the remaining two percent. Since commercial leases are frequently structured to include payments for the tenant's share of real estate taxes and expenses, however, property taxes impose direct costs on both occupation types. As discussed earlier, YMCAs primarily own their facilities. See footnote 9.

Since the available facility-level property tax information covers only 13.4% of the firms in our sample, we instead rely on a number of other data sources to calculate an estimate of the average property tax paid by a firm in our sample in each market. We collected data from Ernst & Young (2010, see footnote 20) on each state's total property tax payments by businesses and translated

[20] See Ernst & Young and COST (2010), "Total state and local business taxes: State-by-state estimates for fiscal year 2009," available at www.cost.org/WorkArea/DownloadAsset.aspx?id=76116, accessed 03/26/2011.

these into per-capita terms by dividing by the total number of business tax returns per state filed with the IRS in 2009.[21] By this measure, a firm in the average state pays total business taxes of $19,164 and property taxes of $6,573 in 2008.

Since we focus on small to medium sized markets, the average state-level property tax burden might not approximate property taxes paid by firms in our sample markets well. Property tax payments at more disaggregate levels of geography are, to our knowledge, not available in a centralized database. However, we are able to obtain real property tax rates τ_m for each of the markets m in the sample from the corresponding County Tax Assessor websites. We include in τ_m county, municipal, school, and other local jurisdictions' tax levies on real property. These are typically published as the millage rate in thousands at which a given property's taxable value is taxed in each county. Relying on a statewide average millage rate τ_s, we are able to back out the average taxable value of property in each state s from the Ernst & Young per-firm property tax liability in each state.[22] Our estimate of the average property tax paid in each market m in state s is then $\text{PropTax}_m = {}^{\tau_m}/_{\tau_s} \times \text{PropTax}_s$, where PropTax_s denotes the observed per-firm property tax burden in state s. Across our sample markets, the average estimated property tax paid amounts to $6,590, with an interquartile range of $4,201 to $8,061. We include this property tax measure as a shifter in the for-profit value of entering. It is comparable to the tax burdens we observe in the small subsample of individual facility level tax information; for properties with valid tax information, the mean property tax liability amounts to $6,563.

There are also a number of factors that we believe to increase the likelihood of entry for YMCAs, yet are unlikely to impact a for-profit's entry decision (except indirectly through competitive interaction). The core mission of promoting Christian values suggests that the overall religious affiliation of the population may play a role, which we capture with the county's share of Christian adherents. We include the percentage of children aged 9 and under in the nonprofit value function to capture demand for youth services. Finally, we use the full YMCA corporate tree to calculate, for a given market m, the number of YMCAs that are not in market m, but are within 25 miles

[21] See IRS (2010), "IRS data book Table 3, FY 2009". http://www.irs.gov/taxstats/article/0,,id=206490,00.html, accessed 05/11/2011.

[22] We use data from the Census' American Community Survey on property tax payments and assessed property values at the state level to calculate τ_s, the state-wide average millage rate. Note that the American Community Survey reports residential property tax payments and assessments. For a large share of the counties in our sample, the same millage rate applies to commercial and to residential property, however. As a robustness check, we also compute property taxes using the average millage rate of the counties in our sample as a proxy for state-level millage rates. The correlation of the resulting property tax measure and the one we employ is 0.8485.

of this market. Since each local chapter is affiliated with the national YMCA organization, a pronounced presence of YMCAs in surrounding markets may play a role in the likelihood of entry due to spillovers from networking, local programming, and general knowledge about YMCA franchising, advertising, and the overall structure of the organization.

Table 2 presents descriptive statistics for our demographic and tax variables. Column (1) summarizes the information for all of our markets. Columns (2) and (3) segment the markets based on the presence of for-profit and nonprofit firms. When we truncate the number of for-profit firms at six, there are on average 3.2 fitness facilities in our 629 markets in total, with 2.8 of these being for-profits.

Markets with at least one for-profit are very similar to all selected markets. Of course, much of this is a function of the fact that for-profits are present in almost all of the selected markets. From column (3), we see that nonprofits are more likely to enter larger markets, with an average population size of 60,277, compared to 45,967 for all markets. Larger markets similarly attract a disproportionately larger number of for-profit firms. The remaining demographics are similar between columns (2) and (3). Consistent with our prior discussions, we again see that approximately 56% of markets with a nonprofit fitness facility also contain a nonprofit daycare center while 83% have a nonprofit operated after-school program.

We also find that nonprofits tend to locate in areas where for-profits face higher property taxes, with average property taxes in markets with a nonprofit presence amounting to $7,300 relative to $6,743 for the full sample. Of course, disentangling whether these trends are a function of correlations with market size or arise from strategic decisions on the part of the firms is the purpose of the structural analysis to follow.

5 Analysis

5.1 Estimation Results

Before turning to the estimates of the full models outlined in section 3, we begin by estimating single-equation versions of the base entry model, considering each ownership type's decision to provide fitness services separately. To ensure robustness of all of our empirical results, we standardize the continuous payoff shifters; the estimated coefficients thus represent the effect of a one-standard-deviation increase in each variable on the value of entering. Table 3 presents estimates for an ordered

probit model of the number of for-profit competitors and for a probit model of the nonprofit's decision to enter into fitness services. The specifications control for the entry decision of the other type, treating their decision as exogenous and not imposing the joint equilibrium conditions in Equation (8).

In terms of sign and significance, most of the demand shifters have the expected effects. Size of the market and higher incomes increase the profitability for fitness centers in that market. In addition, markets with a generally healthier population as well as markets closer to the coast, are more likely to observe increased entry. We also find no effect from the presence of a major college, our control for institutional gyms. As anticipated, higher property taxes, as a proxy for tax liabilities if entering a particular market, have a statistically significant, negative effect on the likelihood of for-profit entry. At the same time, the state income tax, which we entered linearly here rather than multiplicatively as in the for-profit payoff function in Equation (4), is insignificant in driving entry, likely due to limited variation across states and lack of any within-state variation. This pattern continues to hold across the empirical models we estimate.[23] Conditional on demographics, the ordered Probit payoff thresholds (i.e., $FP = 2 - FP = 6$), as expected, indicate negative competitive effects of additional competitors on entry, with profit declining most strongly in moving from a monopoly to a duopoly market, and tapering off as more entry occurs.

We find evidence pointing to economically small effects of the presence of differentiated competitors on the entry decision. While the nonprofit competitive effect for the for-profit is statistically significant, the marginal effect of the nonprofit's presence on different for-profit counts is small. For example, the presence of a nonprofit increases the probability of observing markets with zero or one for-profit firm by approximately five percentage points each. As expected, it also decreases the probability of observing six or more for-profit competitors, again by approximately five percentage points. The marginal effect of the nonprofit's presence on observing intermediate market structures with between two and five firms is negligible. These represent the majority of markets in the data. Overall, the model predicts an average decline of 0.31 for-profit gyms when moving from having no nonprofit to one nonprofit in the market, relative to a baseline of 2.75 for-profit competitors.

Similarly, we find weak evidence of for-profit cross-competitive effects on the nonprofit's entry

[23] In unreported results, we also included an index measuring a market's overall affinity for public good provision based on government expenditures on a variety of social services and the community's propensity to give to charity organizations (i.e., amount and overall probability of donating to a charity). That index was never significant and did not alter the coefficient estimates for the two tax variables.

decision. The nonlinear competitive effects (given in column (5)) are often insignificant while the linear competitive effect in column (4) is negative and significant, but the for-profit count has a small marginal effect, decreasing nonprofit entry by six percentage points. Moreover, the magnitude of the marginal effect in column (4) for the for-profit linear competitive effect is smaller in absolute value than all other significant regressors except the health index.

The coefficient estimates in Table 3 are biased if, for example, the error terms in the two ownership types' payoffs are correlated because the two ownership types respond similarly to unobserved market conditions (in which case the true competitive interactions would be stronger than estimated) or, to the contrary, if the nonprofit's mission-related objectives result in it responding differently to unobserved market conditions from the for-profit (in which case the true competitive effects would be smaller in magnitude than estimated). The observed payoff shifters provide some support for this notion, suggesting that the nonprofit enters different markets based on e.g., educational attainment, household size, or age profile. Lastly, of course, the single equation models do not recognize that the observed entry patterns by ownership type are outcomes that are jointly determined in equilibrium.

We address such issues in Table 4, where we consider the simultaneous entry decisions of both nonprofits and for-profits. This specification assumes that when multiple equilibria exist, the highest payoff/value firm moves first. Empirically, as we discuss below, the four equilibrium selection mechanisms we consider result in statistically indistinguishable log-likelihood values; we similarly rely on this particular equilibrium selection mechanism in the extended nonprofit product choice model below.

Comparing these results to Table 3, we find that the demand and cost shifters are similar. The fixed cost index and property taxes continue to be significant and negative in their impact on entry. Relative to the single equation results in Table 3, the cross-competitive effects are statistically insignificant.[24] They are also of a smaller magnitude. In the case of the nonprofit effect on for-profit entry, however, the change is economically small as we find a similar marginal effect of the presence of a nonprofit on the expected number of for-profit entrants. The point estimates imply an average decline of 0.2 for-profit gyms across markets when comparing the case where the nonprofit

[24]This is consistent with unreported two-step instrumental variables estimates of the single equation Probit model of nonprofit entry in Table 3, where competitive interactions lose their significance once we instrument for the endogeneity of the presence of the for-profit using the property tax variable. This model does not, however, address the second shortcoming of the single-equation models – the joint equilibrium determination of market structure – and treats the endogenous number of for-profit competitors as a continuous payoff shifter.

does not enter in equilibrium to the case where it always enters.[25]

In results not shown here, we also establish for our data that recognizing the joint equilibrium determination of market structure and imposing an equilibrium selection mechanism that eliminates the possibility of a given pair of error realizations yielding multiple outcome predictions results in a reduction in the magnitude of the estimated competitive effects. Overall, thus, non- and for-profits do not appear to have a significant impact on each other's entry decisions, countering the notion that nonprofits are crowding-out for-profits in the marketplace. We quantify the precise extent of this limited substitution below.

The results also suggest that the two firm types show a preference for different types of markets, explaining the lack of strong competitive interaction. The size of the market, while a positive influence on entry, plays a smaller role in nonprofit value than it does on the for-profit side. Both non- and for-profit value increases in income, in particular in the case of the nonprofit; the nonprofit thus does not seek to enter primarily low-income markets. At the same time, nonprofits are also more likely to enter markets with larger single and less educated populations, two factors that are not statistically significant or of the opposite sign in for-profit entry, pointing toward the nonprofit choosing under-served markets along non-income dimensions. In contrast, for-profits appear to respond more to climate than nonprofits.

Figure 2 illustrates these differences further by considering how equilibrium market structure changes in response to variation in the share of college graduates, income, and the health index. The two graphs show, for the data's full range of education and income levels, and health status and income levels, respectively, the predicted equilibrium market structure holding all remaining profit shifters fixed at their mean levels. The top panel illustrates that the educational attainment of the population, while statistically insignificant in affecting for-profit entry, also has an economically small effect on it, with the predicted number of for-profit firms being largely independent of the share of college graduates. In contrast, the nonprofit, despite its propensity to enter high income markets, trades off education and income in its entry and is present in markets with low levels of educational attainment, even if they have below average income levels. The bottom panel makes a similar comparison for health status and income; it illustrates that both firm types have higher entry propensities in markets with low levels of the health index, but that the for-profit response is stronger.

[25] We calculate this marginal effect by simulating equilibrium outcomes when the nonprofit market unobservable is sufficiently small that the nonprofit never enters in equilibrium and sufficiently large that it always enters.

To investigate the robustness of the estimates, Table 5 presents estimates for our main regressors of interest only, using additional equilibrium selection mechanisms. The first column replicates the previous results from Table 4. The second and third columns assume that for-profits and the nonprofit enter first, respectively. Finally, we assume that the equilibrium configuration is the one that maximizes total industry profits in the market. Our estimates are stable across all four selection assumptions. The likelihood ratio test proposed by Gayle and Luo (2015) supports the similarity of the selection mechanisms as we fail to reject any statistical difference between the models. This arises because the incidence of multiple equilibria is rare given the small competitive effects. For example, for both the parameter estimates in Tables 3 and 4, multiple equilibria occur for only 3% of error term realizations in the median market, based on 10,000 draws from the normal distribution of $(\epsilon_{NP}, \epsilon_{FP})$.

These results include the state income tax rate as an additive profit shifter, as in Table 3; we suppress it in the tables as it is statistically insignificant throughout. Table A-5 in Appendix A.4 further contains estimation results that include the state income tax as a multiplicative scale factor, akin to the profit function in Equation (4); the main coefficients of interest are unaffected. A second robustness check we summarize in Table A-5 allows for-profit competition to affect the nonprofit's value from entering nonlinearly. We again find that the vast majority of the cross-competitive effects are insignificant.[26]

So far, we have established that in aggregate, the competitive interaction between the non- and for-profit offerings is limited. We now consider whether this is due to the fact that a significant share of the nonprofits in our sample offer a portfolio of services, not all of whom overlap with the for-profit offerings. We therefore in Table 7 present estimates of the extended product choice model where the non-profit chooses its mode of entry, either as a joint fitness and youth services facility or as a stand-alone gym that potentially competes more directly with the for-profit. Our data allows a number of ways of representing the non-profit decision to offer youth services. We consider two alternatives: first, we define youth services as operating a daycare center. As we establish in Section 2, in the vast majority of markets where the non-profit operates a daycare center, it also

[26] We conducted a number of other analyses, including specifications with a richer set of demographics for the market's racial makeup, proxies for public good provision, and religiosity; specifications with alternative property tax measures; specifications directly including subsets of the variables underlying the fixed costs, health and weather indices, rather than the using the indices themselves. Our estimates of own and cross-type effects are again robust to including these alternatives, and model fit is not significantly improved. Results available from the authors upon request.

offers after-school services. This first definition of youth services provision is thus equivalent to offering the full range of youth services. Our alternative definition of youth services focuses on the provision of after-school programming, which the nonprofit does in a significantly larger number of markets, but which is more limited in scope than our first definition.

To reduce the large number of coefficients to be estimated in the expanded product choice model, we constrain the coefficients on several of the demographic shifters of the nonprofit's value to be equal across its two entry modes. These results are the most analogous to our main model, allowing for consistent comparisons. Results in Appendix Tables A-6 and A-7 provide estimates for the full set of coefficients. There, we also display specifications that control for the (potentially endogenous) number of other youth services facilities in the market, to capture competitive effects and other unobserved demand or cost shifters that affect the provision of youth services in a particular market. Recall that due to data availability, the latter estimates only use 457 markets; adding the number of youth services competitors does not significantly change the parameter estimates of interest from those under the base model estimated on the limited sample of markets. We establish in Appendix A.5, however, that the decreased sample size drives some key differences in our results and thus adopt results for the full sample presented here as our preferred specification.

For both definitions of youth services, we find that the estimated coefficients for the demographics, competitive effects, and our tax variables are similar to the base model in Table 4 for the for-profit payoff function and the nonprofit's value of entering as a stand-alone gym. We continue to find that the competitive effect of the for-profit is insignificant in affecting non-profit entry through either mode, suggesting that even stand-alone nonprofit gyms do not directly compete with for-profit firms, despite their more similar product offering. The non-profit is more likely to enter as a combined youth services and fitness facility in markets with a larger and higher income population. Consistent with the nonprofit providing youth services in areas that may be under-served, we find nonprofits to enter through the joint entry mode in markets with a higher percentage of single households, and in the case of daycare centers, in markets with a less educated population. The impact of fixed costs on nonprofit value is statistically significant and negative for both entry modes, but similar in magnitude. This is reduced form evidence of possible economies of scope in the nonprofit's provision of multiple services in that it suggests that the fixed costs of operating in a market – capturing land and property values – do not have an economically larger effect on a multi-service provider than a stand-alone fitness facility. Without additional information on how

the nonprofit allocates space and thus fixed costs across the two services, we are unable to further evaluate the degree of cost-sharing between the two services.

5.2 Direct and Indirect Effects of Property Taxes on Market Structure

We use the estimates from Tables 4, 6, and 7 to conduct several policy experiments. For the base model where we do not consider the nonprofit choice of providing youth services, we present our counterfactuals in Table 8. First we measure formally the extent of crowd-out. We do so relying on the estimated model to predict the for-profit market structure under the assumption that the nonprofit's unobserved shocks to payoffs, ϵ_{NP}, are sufficiently negative that in equilibrium, it does not choose to enter. We report in column (2) the expected number of for-profit and nonprofit entrants across markets in this scenario. As nonprofit entry declines from 0.42 firms in the average market to zero, we observe that the number of for-profits increases from 2.77 to 2.85, an increase of only 3.1%.

The next two analyses focus on the importance of the for-profit tax burden on entry. Motivated by proposed changes in property tax status for for-profit health clubs, topic of the Kansas legislative efforts discussed in Section 2, we first illustrate the response in market structure to decreases in property taxes. We calculate the optimal for-profit and nonprofit configuration for each market under the estimated payoff functions assuming a for-profit faced a property tax that is one standard deviation, or \$3,400, lower than what it currently pays in the market. In response to the lower tax liability, estimated for-profit entry increases by 7.8%, or one tenth of a standard deviation. We predict virtually no change in nonprofit entry to this higher propensity of for-profit entry, in line with the results that for-profits do not have an economically meaningful effect on the nonprofit value underlying their entry decision. Nonprofit entry decreases by only 1.4%. These results are amplified under a full property tax exemption for the for-profit, as illustrated in column (4). For-profit entry increases by 16.2% while nonprofit entry declines by only 2.6%.

The last policy experiment is the one of primary interest. Here, we consider how nonprofit entry would respond were the nonprofit's property tax exemption revoked. Columns (5) and (6) in Table 8 implement this analysis by reducing the nonprofit value from entering by mean property taxes in each market, scaled by the estimated for-profit tax coefficient. We therefore assume in this case that the nonprofit tax burden and the underlying assessed value of its property is the same as the for-profit's. Detailed property tax records for a small subset of the nonprofit and for-profit competitors

in our sample (see discussion in Section 4) suggest that the assessed value of nonprofit properties exceeds that of their for-profit counterparts, in line with the additional community services provided by the nonprofit requiring larger facilities. Conversely, the nonprofit's property choice may adjust were it to be exposed to the additional property tax cost. We therefore conservatively assume that the tax policy change would equalize the two ownership types' tax burden.

We consider the direct effect on nonprofit entry of the tax burden and the indirect effect caused by the for-profit response separately. Column (5) summarizes the behavioral response holding for-profit entry fixed at base levels, while column (6) allows for-profit entry to adjust. Columns (7) and (8) are analogous but present a "Limited Tax Impact". We scale the estimated for-profit tax coefficient in calculating the nonprofit tax impact such that it accounts for the same proportion of the firm's mean pre-tax value as the estimated tax impact does on the for-profit side. Figure 3 considers for- and nonprofit entry under alternative property tax exemption rates, both for the full and the limited tax impact.

Due to the limited competitive interaction between the types, the vast majority of the total effect can be attributed directly to the tax response: in the full tax impact case, nonprofit entry falls by 25.6% in the base competitive environment, and responds by only an additional 1.1% once for-profit entry responds to the lower profitability of the nonprofit sector. The total number of competitors similarly falls from 3.19 in the baseline to 3.10 when holding for-profit entry fixed, rising marginally to 3.12 when for-profits respond. In the limited tax impact scenario, nonprofit entry responses are smaller but still non trivial, with a drop of 10% in the nonprofit entry probability. Our findings that total fitness provision falls roughly by the magnitude of the decrease in nonprofit provision remains, unsurprisingly, unchanged. Both within the nonprofit sector and in the industry in total, the number of consumer choices thus declines.

5.3 Spillover Effects to other Nonprofit Service Offerings

Based on the product choice estimates in Tables 6 and 7, Table 9 produces counterfactual results analogous to those in Table 8. We focus on the scenarios where the for-profits no longer pay taxes (column (2)) and where the nonprofit faces a full property tax-exempt revocation (column (3)), equivalent to the analyses in column (6) of Table 8. We first note that, like our single nonprofit choice model, our base predicted probabilities fit the observed data well. We predict that approximately 23% of markets see the entry of a nonprofit offering full-scale youth services through

daycare centers and, based on the estimates in Table 7, 35% of markets see the entry of a nonprofit offering after-school programs. Note also that the joint entry probability for the nonprofit across its two entry modes of 42% for both youth service definitions matches the prediction of the base entry model.

Our overall conclusions regarding the potential crowd-out effects are similar to those from the base model; a tax decrease (increase) for an ownership type increases (decreases) the entry probabilities for that type, but changes the competing type's entry propensities little. In column (2), for-profit firms increase their entry probabilities by about 16% in response to a removal of their tax liability but there is a much smaller, disproportionate response in nonprofit entry through either entry mode. Similarly imposing the tax on the nonprofit decreases their average entry by between 20 and 24% across entry modes and youth service definitions, but the predicted number of for-profit competitors across models only increases by approximately .5%.

Does the revocation of the tax exemption differentially affect the nonprofits choice of organizational form in providing youth services in addition to fitness services, rather than fitness services on their own? Considering first the provision of youth services when defined as daycare centers, we find nominally similar, but still statistically significantly different declines in the predicted entry probability for the joint youth services and fitness center entry mode and for the stand-alone fitness center entry mode: the probability of observing a joint day care and fitness nonprofit entrant declines by 3.6 percentage points, compared to a marginally smaller 3.4 percentage point decline for the stand-alone fitness mode. The differential response in the entry of a multi-service nonprofit is larger when youth services are defined as after-school programs, however: entry falls by a predicted 1.7 percentage points for entry as a stand-alone fitness facility, but declines by 5.1 percentage points for the multi-service entry mode. Translating these entry probabilities into discrete numbers of facilities would imply, across our markets, the loss of approximately 43 nonprofit facilities overall, and 23 daycare centers and 32 after-school programs operated by YMCAs following a tax-exempt revocation. The effects of a tax-exempt revocation in secondary markets where the nonprofit provides less profitable social services are thus sizable, even though our analysis cannot anticipate whether the loss of youth services programming might in part be absorbed by providers outside of the for-profit fitness providers in our sample.

We investigate whether the response in entry probabilities correlates with market characteristics in Table 10. Columns (1) and (2) and columns (4) and (5) use as the dependent vari-

able the absolute value of the difference in entry probabilities (i.e., *Change*) presented in Table 9, separately for each entry mode. For example, the dependent variable in column (1) is $|\Delta \Pr Entry_1^{Daycare}| = \Pr[Entry_1^{Daycare}(\text{Base})] - \Pr[Entry_1^{Daycare}(\text{No NP tax exemption})]$, where the subscript "1" denotes the stand-alone fitness services entry mode. The first two columns use the daycare center based definition of youth services provision, while columns (4) and (5) rely on the after-school programming definition. Columns (3) and (6) then use the difference between the response in the probability of entering as a combined youth and fitness facility and as a stand-alone fitness facility. For example, a positive (negative) coefficient in column (3) indicates that the coefficient in column (2) is greater (less) than column (1), implying a greater (smaller) response to the tax revocation for the joint entry mode. The estimated effects reflect the correlation between taxes and market demographics, allowing us to investigate whether the effect of a tax-exempt revocation on the nonprofit's presence is more or less pronounced in demographically more vulnerable markets.

For both definitions of youth services, nonprofit entry declines are larger for both entry modes in higher income markets with a younger, less educated, and more frequently single population. Columns (3) and (6) show, however, that the declines are more pronounced for entry via the multi-service mode for income and the percent single households, but less pronounced for age (after-school programs only), and educational attainment (daycare centers only).

Focusing on the effect of the tax-exempt revocation on entry via youth and fitness services (columns (2) and (5)), the entry mode with arguably larger public interest benefits, we find that entry declines across both definitions of youth services provision are more pronounced in markets that share at least some of the likely characteristics of under-served communities: markets with younger, less educated, and more single populations. We do not, however, observe a correlation between the response in entry via joint youth and fitness services and the percent youth in the market, the key target group of such programs.

Given the additional revenue generated by the tax-exempt revocation, the government could choose to subsidize these community services directly, to offset the possible reduction or loss of youth service offerings by nonprofits. Here, we compare a typical after-school program's cost of $2,640 per school year and student enrollee[27] to the incremental property tax revenue generated in the average

[27]For the cost per child, we rely on outside estimates that indicate a cost per school year and student enrollee of $2,640. See Baldwin Grossman et al, "The Cost of Quality Out-of-School-Time Programs," 2009, Wallace Foundation, available at http://www.wallacefoundation.org/knowledge-center/after-school/key-research/Pages/The-Cost-of-Quality-of-Out-of-School-Time-Programs.aspx,accessedonAugust12,2014. Finally, we scale up capacity by the annual cost per student to arrive at each program's total estimated cost. For example, a program

market, to estimate the extent of a locally-funded subsidy. We focus our attention on the provision of after-school services, given the general sparseness of these services in the marketplace.[28] Table 11 summarizes subsidy rates as the percent of the program's full-capacity costs that the tax revenue would cover under alternative program capacity scenarios and the assumption that the nonprofit property tax burden equals the mean property tax level in each market. Using California's detailed data base of licensed community care providers[29], we first use an average 67.5 slots per after-school facility. At that capacity, the property tax revenue generated by taxing nonprofits that continue to operate in the market under the additional tax burden amounts to only 4.1% of the average cost of operating an after-school facility. Adjusting for population and other market-level demographics that correlate with after-school capacity[30], the average subsidy rises to 4.7% of the after-school program's cost.

Across both capacity scenarios, the estimates therefore suggest modest subsidy rates. We note, however, that after-school centers rarely cover the full cost of operations through fees and donations: 73% and 56% of programs rely on some form of federal and state funding, respectively (Afterschool Alliance (2007); see footnote 6). In total, such public funds cover an estimated 32% of after-school program costs; a further 39% is made up of private funds, including foundation grants, corporate or individual donations, etc. (Baldwin Grossman et al (2009); see footnote 27). As a result, the cost that is actually borne by the center and that should be the base in our subsidy rate is likely significantly smaller than what we use in Table 11. Similarly, as discussed above, the nonprofit may choose to operate a larger facility with a more significant property tax burden than the market's average.[31] Our estimates may therefore be considered a lower bound on the subsidy rate, but nonetheless highlight the need to consider the full costs associated with a tax exemption.

with a capacity of 60 slots has an estimated total cost of $158,400.

[28] In California, for example, the number and capacity of full-scale licensed after-school programs amounts to 23.7 and 23% of the number and capacity of full-scale child care facilities in 2013. See Footnote 29 for source.

[29] Available at https://secure.dss.cahwnet.gov/ccld/securenet/ccld_search/ccld_search.aspx, accessed on July 3, 2013.

[30] We calculate an estimated capacity that adjusts for the market's demographics as follows. Using the full sample of California after-school programs, we regress capacity on area demographics of population, income, share black, and age of the population and use the estimated relationship to predict the out-of-sample capacity for our sample markets.

[31] Using our limited data on nonprofit assessed values, we estimated subsidies rates in the range of 16 to 24%. Given the sparseness of this data, we chose not to present those results.

6 Discussion and Conclusion

In this paper, we estimate a structural model of entry to assess the extent of competitive interaction between different ownership types in markets where both for- and nonprofits have significant presences. Our results show limited strategic interactions between the two firm types in the recreation and fitness center setting we study. We find that the two firm types target markets with different characteristics, such as the population's educational attainment. Our results indicate further that for-profit profitability and hence entry decline in the level of taxation, which we approximate with local property taxes paid. We find that tax exemptions are effective at promoting nonprofit entry and thus, nonprofit entry would decline by roughly a quarter in total were this market segment to be exposed to the for-profit property tax liability. Since we find limited scope for for-profit crowd-out by the nonprofit sector, there would be only a small response in for-profit entry.

The apparent lack of competitive interaction that our results suggest adds to the literature indicating that crowd-out effects between different ownership types appear to be industry specific. In general, findings of for-profit and nonprofit crowd-out have been primarily demonstrated in the health care sector. A possible explanation for the varied industry findings is that nonprofits like the YMCA use their entry to realize multi-faceted missions, possibly more so than nonprofits in the health care sector. Since YMCAs promote both youth development and healthy living, but for-profits focus on the latter, this may lead to a more distinct segmentation of the customer base than in other settings such as health care.

Such an explanation is consistent with the model proposed by Chen and Rey (2016) that demonstrates that with sufficient heterogeneity in consumer preferences, a multi-product firm's pricing can result in profitable cross-subsidization of a weaker product – here the nonprofit's youth services offering – by a stronger product. The entry model we study highlights fixed cost savings due to economies of scope across services offered, allowing the nonprofit to offer less profitable youth programs such as after-school programming and activities. In line with this hypothesis, we find that in 95% of nonprofit entry instances in our markets, the organization offers fitness services, but only 50.7% of the nonprofits in our data operate a child care facility; 78.3% offer after-school care.

In contrast, in hospital markets, a commonly studied mixed sector, a nonprofit firm may aim to provide some amount of charity care – similar to the reduced membership rates nonprofits such

as the YMCA charge qualifying low-income members – but generally continues to serve all patient groups. This may explain why evidence of cross-subsidization across hospital patient types (i.e., private paying and Medicaid) is mixed (see Dranove, 1988; Dranove and White, 1998; Wagner, 2016, for examples), while David et al. (2014) find evidence of cross-subsidization across types of medical services.

Our results provide evidence that revocation of nonprofit property tax exemptions would decrease overall fitness provision in the market, given that the less frequent nonprofit presence does not spur increased for-profit entry. While we may independently be concerned about this decrease, the multi-product nature of the nonprofit brings out another common concern: does the increased tax burden limit economies of scope in multi-service provision at higher fixed cost levels, resulting in a decline in other community benefits that tax exemptions support? Our results suggest a decline of approximately 20% in nonprofit fitness and youth services facilities; the impact on the provision of core mission-related services could thus be significant.

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Figures and Tables

Figure 1: Sample Markets (n=629)

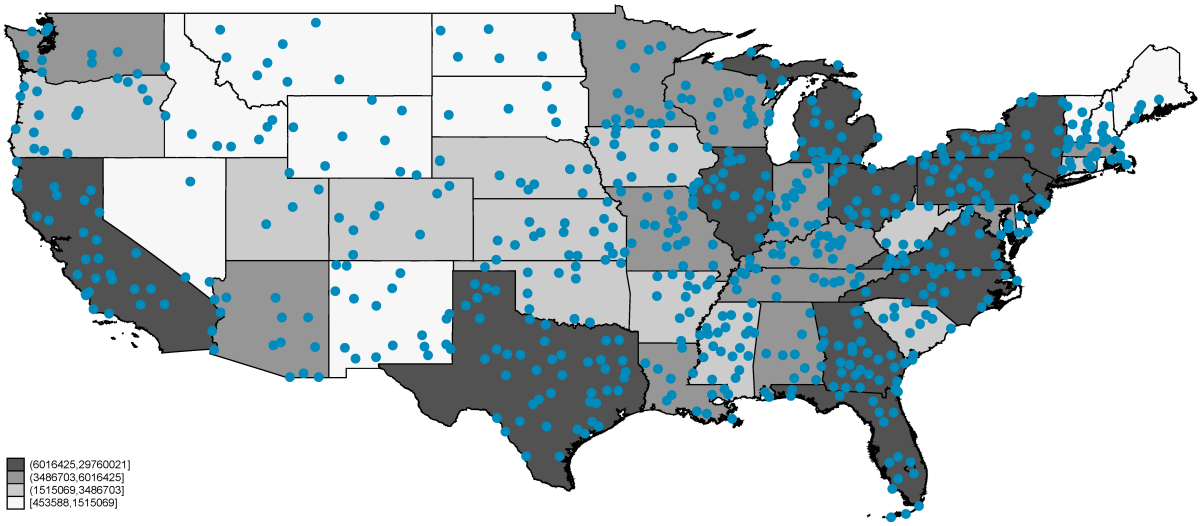


Figure 2: Impact of Market Attributes on Market Structure

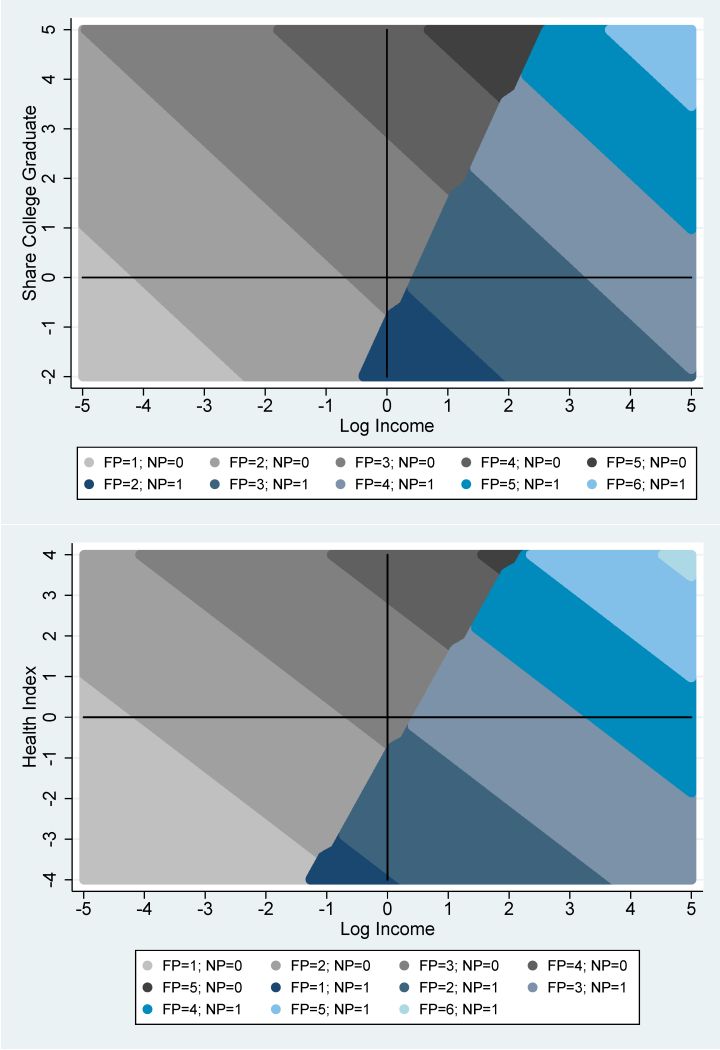
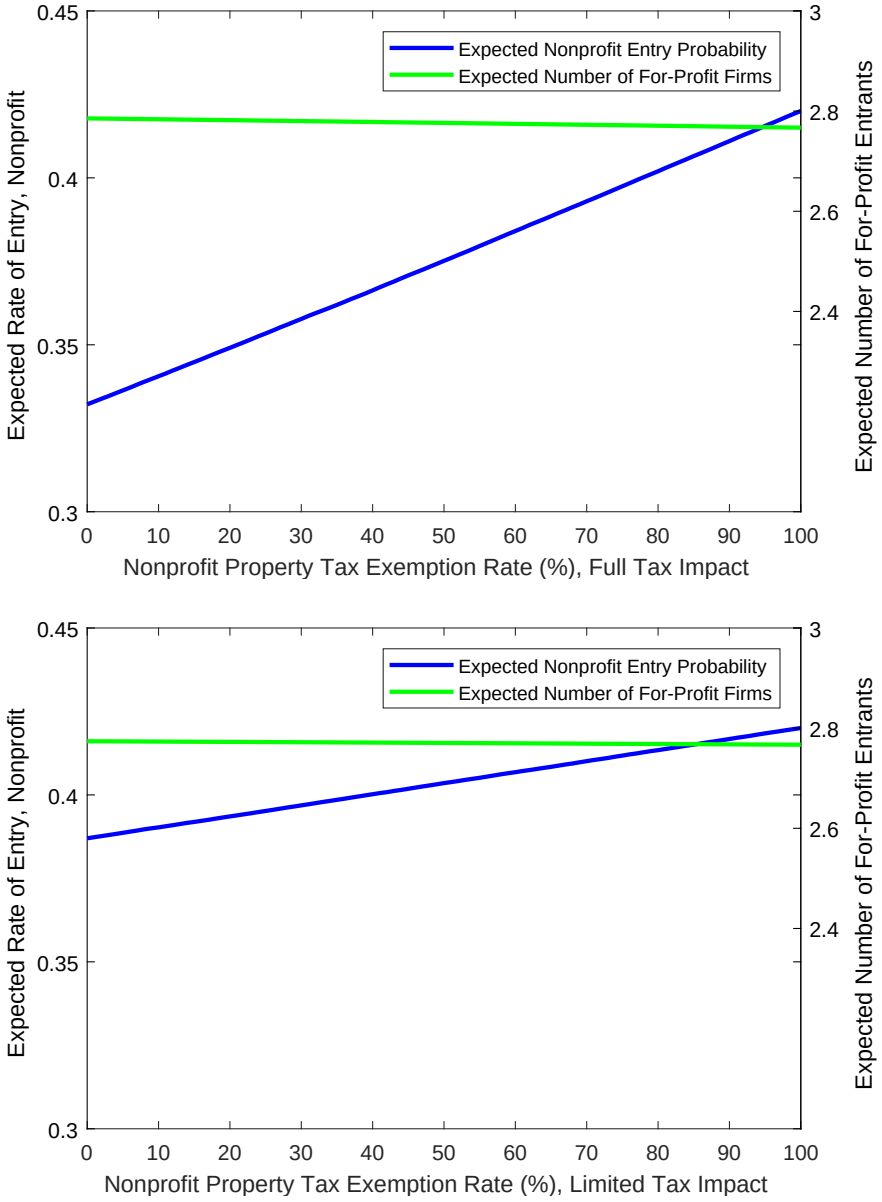


Figure 3: Nonprofit and For-Profit Entry under alternative Nonprofit Property Tax Exemption Rates



Note: Panel (1) displays the effect of nonprofit property tax exemption rates on nonprofit and for-profit entry assuming the tax impact on nonprofit value is identical to the for-profit impact. Panel (2) instead assumes that the nonprofit impact accounts for the same proportion of mean nonprofit tax-exclusive value as for the for-profit.

Table 1: Cross-Tabulation of Fitness Facility Counts for Selected Markets

	Nonprofit Count		
For-Profit Count	0	1	Total
0	38	12	50
1	93	53	146
2	73	60	133
3	72	34	106
4	43	19	62
5	15	25	40
6	10	8	18
7	2	9	11
8	1	3	4
9	0	2	2
11	5	22	27
16	0	1	1
17	1	2	3
18	3	1	4
19	4	5	9
20	2	6	8
21	1	4	5
Total	363	266	629

Table 2: Descriptive Statistics, Profit Shifters

	All Markets		Markets w/ FPs		Markets w/ NP	
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
Market population (000) (Pop)	45.97	39.18	47.40	40.25	60.28	48.02
Per capita income ($000) (Income)	17.79	3.49	17.95	3.46	18.60	2.97
Percent with at least bachelor's degree (Perc BA+)	18.68	8.17	19.03	8.23	19.80	7.95
% 1-person households (Perc Single)	26.30	4.05	26.49	3.94	27.22	3.52
Median Age	36.02	4.44	36.12	4.41	36.44	3.81
Distance to closest coastline (miles) (Dist Coast)	3.48	3.11	3.39	2.85	3.56	3.05
Weather index	−0.00	1.00	0.03	0.99	0.20	0.91
Health index	0.01	0.99	−0.01	0.98	−0.03	0.85
Retail Wage	0.43	0.05	0.43	0.05	0.43	0.04
Fixed cost index	0.00	1.00	−0.02	0.96	−0.01	0.91
Average County Property Tax (Prop Tax)	0.67	0.33	0.67	0.34	0.73	0.38
State corporate income tax rate (Inc Tax)	5.96	2.68	5.97	2.72	6.30	2.75
% of population <=9 yrs old (Perc Youth)	13.47	1.91	13.37	1.88	13.30	1.58
# of YMCA locations within 25m (YMCA 25m)	3.03	7.12	2.98	6.89	4.59	9.24
=1 if >=1 Univ present in market (Pres of Univ)	0.30	0.46	0.31	0.46	0.38	0.49
# of FPs; truncated at 6 (# FPs)	2.75	1.86	2.99	1.75	3.21	1.99
Market with >=1 YMCA gym (Pres of NP)	0.42	0.49	0.44	0.50	1.00	0.00
Market with YMCA gym & daycare (NP Gym Youth 1)	0.24	0.43	0.25	0.43	0.56	0.50
Market with YMCA gym & after-school program (NP Gym Youth 2)	0.35	0.48	0.36	0.48	0.83	0.38
N	629		579		266	

Note: Sources of the data are as follows: Pop, Income, Median Age, Perc BA+, Perc Single, Perc Youth–Census 2000; Dist Coast–Global Land 1km Base Elevation Project, National Oceanic and Atmospheric Administration; Prop Tax–Ernst & Young / COST FY 2009 50-State Business Tax Study, County State Assessor offices, and Census Bureau's American Community Survey (2004-2009); Inc Tax–Tax Foundation; Y 25m, Pres of NP, NP Gym Youth 1, NP Gym Youth 2, and # FPs–Reference USA. The Weather, Health, and Fixed Cost indices are the first factors from factor analysis using variables described in Appendix A.2.

Table 3: Single-Equation Ordered Probit Models of For-Profit and Nonprofit Firm Counts

	Number of For-Profit Firms		Presence of Nonprofit Firm		
	(1)	(2)	(3)	(4)	(5)
Log of Pop	1.085***	1.170***	0.614***	0.841***	0.843***
	(0.061)	(0.066)	(0.068)	(0.097)	(0.103)
Log of Income	0.205**	0.265***	0.568***	0.629***	0.611***
	(0.080)	(0.082)	(0.123)	(0.125)	(0.128)
Perc BA+	0.220***	0.191**	−0.227**	−0.203**	−0.205**
	(0.075)	(0.075)	(0.099)	(0.101)	(0.104)
Perc Single	−0.007	0.017	0.374***	0.367***	0.340***
	(0.061)	(0.061)	(0.088)	(0.089)	(0.091)
Median Age	0.141**	0.133*	−0.040	−0.001	0.010
	(0.070)	(0.070)	(0.098)	(0.100)	(0.103)
Dist Coast	−0.173***	−0.182***	−0.061	−0.093	−0.083
	(0.051)	(0.051)	(0.078)	(0.076)	(0.079)
Weather index	0.223***	0.236***	0.089	0.121	0.144*
	(0.059)	(0.059)	(0.074)	(0.075)	(0.077)
Health index	−0.202***	−0.215***	−0.127*	−0.164**	−0.150**
	(0.050)	(0.051)	(0.066)	(0.067)	(0.067)
Retail Wage	0.057	0.037	−0.225***	−0.226***	−0.222**
	(0.062)	(0.062)	(0.084)	(0.086)	(0.087)
Fixed cost index	−0.205***	−0.225***	−0.310***	−0.324***	−0.306***
	(0.072)	(0.073)	(0.110)	(0.108)	(0.112)
Prop Tax	−0.156***	−0.144***			
	(0.050)	(0.050)			
Inc Tax	0.032	0.040			
	(0.048)	(0.049)			
Perc Youth			0.158*	0.168*	0.154*
			(0.085)	(0.086)	(0.087)
Y 25m			0.292***	0.240***	0.236***
			(0.085)	(0.085)	(0.085)
Pres of Univ	0.005	0.010		0.049	0.049
	(0.049)	(0.049)		(0.063)	(0.064)
Pres of NP		−0.378***			
		(0.099)			
# FPs				−0.172***	
				(0.048)	
# FPs =1					0.209
					(0.263)
# FPs =2	−1.191***	−1.201***			0.162
	(0.086)	(0.087)			(0.264)
# FPs =3	−0.810***	−0.827***			−0.481*
	(0.062)	(0.064)			(0.280)
# FPs =4	−0.734***	−0.752***			−0.748**
	(0.064)	(0.066)			(0.315)
# FPs =5	−0.577***	−0.582***			−0.403
	(0.067)	(0.068)			(0.352)
# FPs =6	−0.510***	−0.510***			−0.629*
	(0.074)	(0.074)			(0.345)

Note: *, **, *** p-value $\leq$ 10%, 5%, and 1%, respectively.

Table 4: Endogenous Ownership-Type Model Estimates: Highest Value Type Moves First

	Number of For-Profit Firms	Presence of Nonprofit Firm
Log of Pop	1.130***	0.723***
	(0.081)	(0.155)
Log of Income	0.237***	0.600***
	(0.088)	(0.138)
Perc BA+	0.207***	−0.222**
	(0.075)	(0.104)
Perc Single	0.009	0.354***
	(0.068)	(0.086)
Dist Coast	−0.190***	−0.104
	(0.047)	(0.092)
Weather index	0.230***	0.107
	(0.061)	(0.085)
Health index	−0.213***	−0.155**
	(0.055)	(0.075)
Retail Wage	0.045	−0.256***
	(0.066)	(0.087)
Fixed cost index	−0.222***	−0.327***
	(0.075)	(0.115)
Prop Tax	−0.151***	
	(0.052)	
Y 25m		0.271***
		(0.090)
Pres of Univ	0.013	0.030
	(0.054)	(0.063)
Pres of NP	−0.189	
	(0.215)	
# FPs		−0.084
		(0.096)
FP = 2	−1.199***	
	(0.086)	
FP = 3	−0.825***	
	(0.066)	
FP = 4	−0.746***	
	(0.069)	
FP = 5	−0.585***	
	(0.072)	
FP = 6	−0.515***	
	(0.078)	
Log-likelihood	-1233.301	

Note: *, **, *** p-value $\leq$ 10%, 5%, and 1%, respectively. Specification also includes Median Age, State Income Tax rate (for-profit), and Percent Youth (nonprofit).

Table 5: Comparison of Model Estimates under Alternative Equilibrium Selection Assumptions

	Most Profitable Firm Moves First	For-Profit Firm Moves First	Nonprofit Firm Moves First	Most Profitable Industry Equilibrium
Select ForProfit Profit Shifters				
Fixed cost index	−0.222***	−0.224***	−0.223***	−0.222***
	(0.075)	(0.075)	(0.075)	(0.075)
Prop Tax	−0.151***	−0.151***	−0.149***	−0.149***
	(0.052)	(0.052)	(0.052)	(0.052)
Pres of Univ	0.013	0.013	0.012	0.013
	(0.054)	(0.054)	(0.054)	(0.054)
Pres of NP	−0.189	−0.191	−0.200	−0.191
	(0.215)	(0.216)	(0.211)	(0.215)
FP = 2	−1.199***	−1.201***	−1.197***	−1.195***
	(0.086)	(0.086)	(0.086)	(0.086)
FP = 3	−0.825***	−0.827***	−0.824***	−0.824***
	(0.066)	(0.066)	(0.066)	(0.066)
FP = 4	−0.746***	−0.745***	−0.748***	−0.747***
	(0.069)	(0.068)	(0.068)	(0.068)
FP = 5	−0.585***	−0.583***	−0.587***	−0.586***
	(0.072)	(0.072)	(0.072)	(0.072)
FP = 6	−0.515***	−0.515***	−0.514***	−0.514***
	(0.078)	(0.078)	(0.078)	(0.078)
Select Nonprofit Value Shifters				
Fixed cost index	−0.327***	−0.324***	−0.319***	−0.320***
	(0.115)	(0.114)	(0.113)	(0.113)
Y 25m	0.271***	0.270***	0.271***	0.270***
	(0.090)	(0.090)	(0.090)	(0.090)
Pres of Univ	0.030	0.032	0.032	0.031
	(0.063)	(0.063)	(0.063)	(0.063)
# FPs	−0.084	−0.081	−0.084	−0.085
	(0.096)	(0.096)	(0.094)	(0.094)
Log-likelihood	−1233.301	−1233.364	−1233.125	−1233.313
LR Test		0.375	−0.733	0.058

Note: *, **, *** p-value $\leq$ 10%, 5%, and 1%, respectively. See Section 5.1 for a detailed description of the non-nested test of order-of-entry assumptions resulting in the LR test statistic.

Table 6: Endogenous Ownership-Type Model Estimates
Choice of Organizational Form by NP: Offering Daycare Services

	Number of For-Profit Firms	Presence of Nonprofit Gym	Presence of Nonprofit Gym & Daycare Services
Log of Pop	1.126***	0.912***	1.114***
	(0.077)	(0.220)	(0.220)
Log of Income	0.225***	0.713***	0.944***
	(0.087)	(0.190)	(0.214)
Perc BA+	0.221***	−0.127	−0.401**
	(0.076)	(0.147)	(0.162)
Perc Single	0.011	0.254*	0.643***
	(0.070)	(0.137)	(0.128)
Perc Youth		0.226	0.153
		(0.139)	(0.139)
Median Age†	0.146*	−0.009	−0.009
	(0.077)	(0.148)	(0.148)
Dist Coast†	−0.200***	−0.131	−0.131
	(0.048)	(0.125)	(0.125)
Weather index†	0.211***	0.167	0.167
	(0.061)	(0.110)	(0.110)
Health index†	−0.222***	−0.182*	−0.182*
	(0.056)	(0.102)	(0.102)
Retail Wage	0.053	−0.444***	−0.233
	(0.065)	(0.145)	(0.144)
Fixed cost index	−0.242***	−0.451***	−0.423**
	(0.077)	(0.173)	(0.210)
Prop Tax	−0.156***		
	(0.052)		
Y 25m†		0.317***	0.317***
		(0.123)	(0.123)
Pres of Univ	0.023	0.045	0.045
	(0.055)	(0.083)	(0.083)
Pres of NP	−0.143		
	(0.198)		
# FPs		−0.179	−0.155
		(0.137)	(0.134)
FP = 2	−1.207***		
	(0.090)		
FP = 3	−0.821***		
	(0.066)		
FP = 4	−0.745***		
	(0.068)		
FP = 5	−0.590***		
	(0.073)		
FP = 6	−0.521***		
	(0.080)		
Log-likelihood		-1403.144	

Note: *, **, *** p-value $\leq$ 10%, 5%, and 1%, respectively. † indicates that we constrain the coefficients for value of operating as gym and for value of operating as combined gym and daycare facility to be the same. Specification also includes State Income Tax rate (for-profit).

Table 7: Endogenous Ownership-Type Model Estimates
Choice of Organizational Form by NP: Offering After-school Services

	Number of For-Profit Firms	Presence of Nonprofit Gym	Presence of Nonprofit Gym & After-School Services
Log of Pop	1.157***	0.586**	1.193***
	(0.079)	(0.261)	(0.230)
Log of Income	0.225**	0.650***	0.951***
	(0.087)	(0.235)	(0.202)
Perc BA+	0.202***	−0.425*	−0.287**
	(0.076)	(0.224)	(0.144)
Perc Single	$9.0E{-}5$	0.329*	0.564***
	(0.068)	(0.182)	(0.121)
Perc Youth		0.159	0.276**
		(0.184)	(0.134)
Median Age†	0.144*	−0.027	−0.027
	(0.076)	(0.156)	(0.156)
Dist Coast†	−0.178***	−0.095	−0.095
	(0.046)	(0.128)	(0.128)
Weather index†	0.244***	0.147	0.147
	(0.065)	(0.112)	(0.112)
Health index†	−0.193***	−0.239**	−0.239**
	(0.054)	(0.099)	(0.099)
Retail Wage	0.038	−0.234	−0.256**
	(0.061)	(0.182)	(0.126)
Fixed cost index	−0.206***	−0.439*	−0.445***
	(0.074)	(0.263)	(0.156)
Prop Tax	−0.154***		
	(0.052)		
Y 25m†		0.288**	0.288**
		(0.134)	(0.134)
Pres of Univ	0.005	0.065	0.065
	(0.054)	(0.090)	(0.090)
Pres of NP	−0.160		
	(0.198)		
# FPs		−0.104	−0.203
		(0.168)	(0.147)
FP = 2	−1.224***		
	(0.090)		
FP = 3	−0.833***		
	(0.066)		
FP = 4	−0.751***		
	(0.069)		
FP = 5	−0.595***		
	(0.073)		
FP = 6	−0.523***		
	(0.083)		
Log-likelihood		-1342.120	

Note: *, **, *** p-value $\leq$ 10%, 5%, and 1%, respectively. † indicates that we constrain the coefficients for value of operating as gym and for value of operating as combined gym and after-school facility to be the same. Specification also includes State Income Tax rate (for-profit).

Table 8: Crowd-Out and the Role of Tax Exemptions in Affecting Market Structure

					No tax exemption			
					Full tax impact		Limited tax impact	
	Base (1)	No nonprofit (2)	FP Tax decrease (3)	No tax (4)	N_{FP} fixed (5)	N_{FP} responds (6)	N_{FP} fixed (7)	N_{FP} responds (8)
Outcome								
For-profit	2.767	2.852	2.933	3.104	2.767	2.785	2.767	2.774
Nonprofit	0.420	0.000	0.416	0.411	0.336	0.332	0.391	0.387
Change								
For-profit	0.000	0.085	0.166	0.337	0.000	0.019	0.000	0.007
Nonprofit	0.000	−0.420	−0.004	−0.009	−0.084	−0.088	−0.029	−0.033
Percentage Change								
For-profit	0.000	3.092	7.813	16.230	0.000	0.789	0.000	0.304
Nonprofit	0.000	−100.000	−1.369	−2.645	−25.589	−26.668	−9.310	−10.465

Note: We display predicted numbers of firms, as well as changes therein under counterfactual assumptions on the profit function shifters. Equilibrium entry predictions are based on the parameter estimates in Table 4. The 'Base' case corresponds to the demographics used in estimation. Columns (2) through (4) illustrate outcomes under the absence of a nonprofit, a one standard deviation decrease in property taxes, and a removal of the property tax liability for for-profits, respectively. Columns (5) and (6) illustrate outcomes under a removal of the property tax exemption for nonprofits, assuming the tax impact on nonprofit value is identical to the for-profit impact. Columns (7) and (8) assume the nonprofit tax impact accounts for the same proportion of mean nonprofit tax-exclusive value as for the for-profit. Columns (5) and (7) hold for-profit market structure fixed at 'base' levels; columns (6) and (8) allow for-profits to respond to the change in the nonprofit's economic environment.

Table 9: The Role of Property Taxes in Affecting Nonprofit Choice of Organizational Form

	Base (1)	No FP tax (2)	No NP tax exemption (3)
(A) Daycares			
Outcome			
For-profit	2.777	3.126	2.788
Nonprofit Gym only	0.185	0.178	0.152
Nonprofit Gym & Daycare	0.231	0.225	0.195
Change			
For-profit	0.000	0.349	0.011
Nonprofit Gym only	0.000	−0.008	−0.034
Nonprofit Gym & Daycare	0.000	−0.006	−0.036
Percentage Change			
For-profit	0.000	16.828	0.466
Nonprofit Gym only	0.000	−4.725	−21.625
Nonprofit Gym & Daycare	0.000	−3.552	−21.507
(B) After-school Programs			
Outcome			
For-profit	2.785	3.127	2.797
Nonprofit Gym only	0.075	0.075	0.058
Nonprofit Gym & After-school Program	0.346	0.333	0.296
Change			
For-profit	0.000	0.342	0.012
Nonprofit Gym only	0.000	−0.001	−0.017
Nonprofit Gym & After-school Program	0.000	−0.013	−0.051
Percentage Change			
For-profit	0.000	16.435	0.491
Nonprofit Gym only	0.000	−0.987	−24.325
Nonprofit Gym & After-school Program	0.000	−5.012	−19.928

Note: We display predicted numbers of firms, as well as changes therein under counterfactual assumptions on the profit function shifters. Equilibrium entry predictions are based on the parameter estimates in Tables 6 and 7. The 'Base' case corresponds to the demographics used in estimation. Columns (2) and (3) illustrate, respectively, outcomes under a removal of the property tax liability for for-profits and a revocation of the property tax exemption for nonprofits, assuming the tax impact on nonprofit value is identical to the for-profit impact.

Table 10: Market Correlates to Predicted Changes in Nonprofit Entry by Organizational Type from Removal of the Property Tax Exemption

	Youth Service=Daycare			Youth Service=After-School Program		
	Change in Entry Probability			Change in Entry Probability		
	Gym Only (1)	W Daycare (2)	(2)−(1) (3)	Gym Only (4)	W Aft School (5)	(5)−(4) (6)
Log of Pop	−0.004***	0.002	0.007***	−0.007***	0.002	0.009***
	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)
Log of Income	0.045***	0.066***	0.021***	0.029***	0.082***	0.053***
	(0.007)	(0.008)	(0.007)	(0.003)	(0.010)	(0.008)
Median Age	−0.001***	−0.001***	0.000	−0.001***	−0.002***	−0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Perc BA+	−0.002	−0.097***	−0.095***	−0.065***	−0.057**	0.008
	(0.015)	(0.019)	(0.014)	(0.007)	(0.025)	(0.021)
Perc Single	0.084***	0.372***	0.288***	0.083***	0.359***	0.276***
	(0.026)	(0.040)	(0.034)	(0.013)	(0.045)	(0.036)
Retail Wage	−0.000***	0.000***	0.000***	−0.000**	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Fixed cost index	−0.005***	−0.005***	0.000	−0.003***	−0.008***	−0.005***
	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)	(0.001)
Perc Christian	−0.008*	−0.012**	−0.004	−0.001	−0.018**	−0.016***
	(0.005)	(0.005)	(0.003)	(0.003)	(0.007)	(0.005)
Perc Youth	0.001***	0.000	−0.001**	−0.000	0.001	0.001**
	(0.000)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)
Constant	−0.303***	−0.698***	−0.395***	−0.169***	−0.808***	−0.639***
	(0.061)	(0.080)	(0.066)	(0.030)	(0.097)	(0.079)
Obs	629	629	629	629	629	629

Note: *, **, *** p-value $\leq$ 10%, 5%, and 1%, respectively. We display linear regression estimates of the change in the nonprofit entry probability from removing the property tax exemption. Columns (1) and (4) employ the change in the probability of entering as a standalone gym. Columns (2) and (5) employ the change in the probability of entering as a combined gym and daycare or afterschool program respectively. Columns (3) and (6) employ the difference between the change in the entry probability with a youth services facility and the change in the entry probability as a gym alone.

Table 11: Estimate of Subsidy to After-school Programs from Generated Nonprofit Property Taxes ($N = 266$ Markets)

	Mean	25^{th} Pctile	Median	75^{th} Pctile
Per-Firm Property Tax ($000)	7.30	4.90	6.76	8.56
Subsidy (%)				
Assumed capacity of 67.5	4.09	2.75	3.79	4.80
Est. capacity adj for demographics	4.72	3.03	4.37	5.71

Note: The table provides estimates of the average tax generated per firm under revocation of the nonprofit property tax exemption, together with estimates of the potential percent subsidy to after-school programs if 100% of the generated revenues were applied. We assume that following a property tax revocation, the nonprofit pays the same property tax as the for-profit to predict revenues. We estimate the capacity of after-school programs (i) using the average California YMCA after-school program capacity of 67.5 students and (ii) adjusting for demographic characteristics of the market using the predicted capacity relationship based on all California after-school programs.

A Appendix

A.1 History and Structure of the YMCA

While the first US YMCA organization was founded in Boston in 1851 with evangelical objectives, today's YMCAs primary activities include operation of fitness facilities, sports and aquatic programs, and child care, including after-school programs.

The YMCA is comprised of both a national resource office and a set of so-called 'member associations', or local YMCAs. Each local YMCA is a locally funded independent and autonomous 501(c)(3) tax-exempt corporation governed by a volunteer board of directors. According to ReferenceUSA, there are 4,519 facilities nationwide associated with the YMCA in 2009. This facility count overestimates the number of fitness centers as some of these facilities are located at churches or schools, primarily providing after-school services. Tax return information[32] provides a lower bound on the number of YMCAs since we obtain firm, not facility, level information. In 2010, there were approximately 1,100 active YMCAs in the country. Many of these firms operate multiple branches.

The YMCA operates in some aspects akin to a franchisor. It has ownership to the name "Young Men's Christian Association" and all other intellectual property, which can only be used under its authorization by member associations. The local associations must meet certain affiliation requirements, including supporting the organization's statement of purpose, providing regular financial and other information to the National Council, obtaining recognition by the Internal Revenue Services as a tax exempt organization, and paying member dues to the National Council. Each local YMCA's national member dues are calculated on the basis of a "fair share support" formula, which amounts to approximately 1 to 2% of its revenue.[33]

The National YMCA provides leadership and support to individual members. This consists of both financial and non-financial support. It acts as a unified voice of the YMCA and communicates the message to national audiences; in 2010 the National Council spent $1.4 million on lobbying expenditures.[34] The National Association also works directly with local YMCAs by providing training and leadership development, helping develop skills in program areas such as child

[32] Obtained from GuideStar, http://www.guidestar.org/.

[33] Based on member dues expenses listed on Form 990 tax returns for a sample of 15 YMCAs in our data set.

[34] See the National Council's 2010 tax filings, available at www.ymca.net/organizational-profile/form-990-2010.pdf, accessed 11/29/2011.

care, aquatics safety, and community development. Lastly, the National YMCA provides program support funding to new and under-served communities, which allows local YMCAs to offer financial assistance to low-income members of their community. These grants are usually limited in size, however. In 2010, the National Council distributed $8.3 million in grants to 593 US-based member associations.[34] The range of grant sizes awarded is from $5,050 to $1,126,741, with an average of $26,416 and median of $10,655.

In contrast to typical franchise arrangements, the National YMCA is passive in the development and expansion of local YMCAs, leaving entry, changes in ownership, and consolidation decisions to its local member firms. If a community is interested in establishing a new YMCA, it must apply to the National Council for recognition and meet certain minimum requirements: a population of at least 25,000 residents within a 12-mile radius and a primary market analysis that determines community need and capacity.[35] If the proposed new market falls within 50 to 75 miles of a city with an already existing YMCA, the potential entrant enters into negotiations with that firm about expansion into the interested community. The National Council estimates the initial start-up cost for the first three years of operation to be one million dollars and these funds must be raised within the local community before a YMCA is recognized. Member associations must be self-supporting and derive revenue from contributions, membership, and program fees.

A.2 Details on Variable Construction

In Tables A-1 through A-3, we summarize the variables used to construct the weather, health, and fixed cost indices. We implement principal components factor analysis, rotate the factor loadings using varimax, and use the resulting first factor. As discussed in the Data section, the first factor captures a large portion of the total variance from all of the variables used for each index. The first two columns provide descriptive statistics for each variable, while the last provides the correlation of each individual variable to the first factor.

[35] See http://www.ymca.net/start-new-y/start-a-y-form.pdf, accessed 11/25/2011.

Table A-1: Variables used in construction of Weather Index

	Mean	SD	Corr to First Factor
Mean # of Days Min Temperature ≤32 Deg. F	96.860	55.185	0.917
Mean # of Days Max Temperature ≥90 Deg. F	42.891	35.791	−0.844
Mean # of Heating Degree Days (Base 65 Degrees F)	145.855	59.741	0.973
Mean # of Cooling Degree Days (Base 65 Degrees F)	68.902	36.330	−0.934
Mean # of Days with Precipitation ≥0.01 Inch	104.393	31.661	0.520
Snowfall - Avg Total in Inches	29.406	34.991	0.829
Average Relative Humidity	68.282	8.989	0.085
Normal Precipitation, Inches	36.285	15.509	−0.177
Average number of unhealthy days	5.881	1.643	−0.100
Number of days air quality was unhealthy, 2005	3.097	4.987	−0.203
Ozone Days	3.337	10.259	0.016

Note: All weather information comes from the National Environmental Satellite, Data, and Information Service (NOAA). Averages are calculated from the beginning of data recording at a weather station through 2009. Climatological normals are 30-year average values over the period 1971-2000. For each market, we use data from the closest weather station to the market centroid.

Table A-2: Variables used in construction of Health Index

	Mean	SD	Corr to First Factor
% of zips w/ healthy food store	0.376	0.157	−0.001
Liquor stores/population×10,000	1.075	0.824	−0.259
variableposition== 3.0000	0.279	0.037	0.450
% Binge Drinking	0.137	0.056	0.030
Average life expectancy	76.450	2.081	−0.517
Self-rated health status	0.163	0.060	0.805
Death: coronary heart disease (count)	152.782	103.755	0.048
Death: lung cancer (count)	48.836	32.648	0.087
Death: stroke (count)	53.678	38.035	0.038
% Smokers	0.212	0.072	0.754
% Uninsured	0.170	0.058	−0.049
(# of Primary Care Physicians/pop)×100,000	102.027	46.637	−0.303

Note: Data on the presence of healthy food stores, the density of liquor stores, and prevalence of binge drinking comes from the University of Wisconsin Population Health Institute's County Health Rankings 2006, and 2002–2008 in the case of binge drinking. The remaining data come from the Department of Health and Human Services' Community Health Status Indicators (CHSI) report, 2008. All data are at the county level and are matched to markets based on the market's primary county.

Table A-3: Variables used in construction of Fixed Cost Index

	Mean	SD	Corr to First Factor
Median Housing Value (000), 2005-2009	147.737	97.068	0.942
Military Housing Allowance for Pay Grade E1, 2008	634.562	197.483	0.942

Note: Data on median home values from the Census Bureau's American Community Survey 5-Year Estimates of Median Housing Value of Owner-Occupied Housing Units. All data are at the county level and are matched to the markets based on the market's primary county. Data on military housing allowance from the Department of Defense Travel Management Office. Data matched to markets based on zip codes.

A.3 Regression estimates of joint provision of fitness center and youth services

In Table A-4, we present probit models of observing a daycare or after-school program controlling for market characteristics and the presence of a fitness center. To control for competitive effects and market unobservables in the provision of youth services, we include the total number of daycare centers or after-school programs in the market.

Column (1) contains the results of single-equation probit models of the nonprofit decision to offer daycare and after-school programs. Column (2) displays results for a bivariate probit model of the joint youth services and fitness center entry decision[36] to investigate the correlation between unobserved shifters of the youth services provision decision and the fitness center entry decision. Using the Health and Weather indices, which are insignificant in the youth service provision models, as exclusion restrictions, we find correlations of approximately .9 between the unobservables of the youth service provision and fitness center entry decisions for both daycare and after-school services. Column (3) presents this correlation between the provision of youth services and entry into fitness services differently by including an indicator of whether the nonprofit offers fitness services, which – as expected – is strongly positively correlated with the value of youth services provision.

[36] We suppress the coefficient estimates for the determinants of fitness center entry, which are available upon request, for brevity.

Table A-4: Probit Models of the Nonprofit's Decision to Offer Youth Services

	Probit (1)	Biv Probit, Youth Program & Fitness Ctr (2)	Probit (3)
Daycare			
Log of Pop	0.800***	0.888***	0.596**
	(0.189)	(0.173)	(0.245)
Log of Income	4.533***	3.961***	2.103*
	(0.898)	(0.831)	(1.140)
Median Age	−0.052*	−0.047	−0.033
	(0.029)	(0.030)	(0.042)
Perc BA+	−4.957***	−3.973**	−3.452
	(1.746)	(1.615)	(2.190)
Perc Single	8.305***	7.818***	7.442**
	(2.713)	(2.670)	(3.524)
Fixed cost index	−0.167	−0.074	0.014
	(0.139)	(0.132)	(0.182)
# daycares	−0.007	−0.012*	−0.012
	(0.007)	(0.006)	(0.009)
Pres of Y fitness center			2.616***
			(0.366)
After-school program			
Log of Pop	0.792***	0.926***	0.845***
	(0.158)	(0.129)	(0.225)
Log of Income	3.672***	3.470***	0.008
	(0.744)	(0.723)	(1.090)
Median Age	−0.034	−0.034	0.008
	(0.026)	(0.025)	(0.040)
Perc BA+	−1.392	−0.703	4.466*
	(1.457)	(1.442)	(2.295)
Perc Single	2.743	2.218	−2.620
	(2.315)	(2.253)	(3.280)
Fixed cost index	−0.101	−0.104	0.014
	(0.122)	(0.120)	(0.180)
# after-school offerings	0.001	−0.008**	−0.017**
	(0.006)	(0.003)	(0.008)
Pres of Y fitness center			2.995***
			(0.260)
Obs	457	457	457

Note: *, **, *** p-value $\leq$ 10%, 5%, and 1%, respectively. All specifications also include retail wages, the fixed cost index, the percent youth, and the percent Christian, which are statistically insignificant across specifications in affecting the youth program offering decision.

A.4 Robustness: Endogenous Ownership-Type Model

Table A-5 investigates the robustness of our primary estimation results to a multiplicative specification for the state income tax rate and to a more flexible specification of the competitive effects of the for-profit on nonprofit value from entering.

Table A-5: Alternative Profit Function Specifications: Highest Value Firm Moves First

	Additive Income Tax in FP Profit		FP Profit Interacted with Income Tax	
	Base Specification	Nonlinear Cross-Competitive Effects	Linear Cross-Competitive Effects	Nonlinear Cross-Competitive Effects
Select For-Profit Profit Shifters				
Fixed cost index	−0.222***	−0.216***	−0.226***	−0.218***
	(0.075)	(0.075)	(0.076)	(0.076)
Prop Tax	−0.151***	−0.153***	−0.164***	−0.166***
	(0.052)	(0.052)	(0.058)	(0.059)
Pres of Univ	0.013	0.013	0.012	0.009
	(0.054)	(0.054)	(0.060)	(0.060)
Pres of NP	−0.189	−0.097	−0.180	−0.079
	(0.215)	(0.227)	(0.236)	(0.251)
FP = 2	−1.199***	−1.197***	−1.324***	−1.325***
	(0.086)	(0.087)	(0.129)	(0.128)
FP = 3	−0.825***	−0.817***	−0.911***	−0.906***
	(0.066)	(0.065)	(0.099)	(0.097)
FP = 4	−0.746***	−0.753***	−0.829***	−0.838***
	(0.069)	(0.073)	(0.100)	(0.102)
FP = 5	−0.585***	−0.580***	−0.652***	−0.649***
	(0.072)	(0.071)	(0.096)	(0.094)
FP = 6	−0.515***	−0.510***	−0.573***	−0.571***
	(0.078)	(0.078)	(0.096)	(0.096)

Table A-5: Alternative Profit Function Specifications (continued)

	Additive Income Tax in FP Profit		FP Profit Interacted with Income Tax	
	Base Specification	Nonlinear Cross-Competitive Effects	Linear Cross-Competitive Effects	Nonlinear Cross-Competitive Effects
Select Nonprofit Value Shifters				
Fixed cost index	−0.327***	−0.306**	−0.324***	−0.304**
	(0.115)	(0.124)	(0.115)	(0.124)
Y 25m	0.271***	0.282***	0.269***	0.277***
	(0.090)	(0.088)	(0.090)	(0.089)
Pres of Univ	0.030	0.034	0.028	0.033
	(0.063)	(0.064)	(0.063)	(0.064)
# FPs	−0.084		−0.087	0.281
	(0.096)		(0.095)	(0.311)
FP = 1		0.269		0.281
		(0.304)		(0.311)
FP = 2		−0.009		−0.012
		(0.217)		(0.217)
FP = 3		−0.552**		−0.563***
		(0.215)		(0.213)
FP = 4		−0.125		−0.133
		(0.286)		(0.285)
FP = 5		0.261		0.270
		(0.338)		(0.339)
FP = 6		−0.053		−0.066
		(0.338)		(0.334)
Log-likelihood	−1233.301	−1228.7333	−1232.749	−1228.065

A.5 Robustness: Models of Nonprofit Choice of Organizational Form

In Tables A-6 and A-7, we present three alternative specifications of the joint fitness center and youth services provision model. In column (2), we allow the full set of demographic coefficients to vary by nonprofit entry mode as a stand-alone fitness facility or in combination with a daycare center or after-school program. While similar to the main specification in column (1), the larger set of coefficients requires more of the data, resulting in decreased significance for some coefficients. In order to account for the potential supply side impacts of other youth service facilities in the market on the nonprofit entry mode, we include the total number of such service providers in the market as an additional regressor. Lack of comprehensive daycare and after-school program information reduces our sample size to 457 markets; we use the reduced sample in columns (3) and (4). Column (4) includes the total number of daycare centers or after-school programs in the market, which we

instrument for using a control function approach (Blundell and Powell, 2004; Petrin and Train, 2010) to control for the possibility that the number of programs is correlated with unobservable cost or demand side shifters of entry. We use the total number of Catholic and the total number of Christian churches as instruments for number of youth service offerings in the market.[37] While the YMCA's roots are Christian, the number of churches in a market does not correlate with its entry, while it serves as a strong instrument for the number of program offerings in total (first-stage F-statistic of 33.07 for day care centers and 9.29 for after-school programs. The number of daycare providers negatively affects the nonprofit's propensity to enter as a combined fitness and daycare facility, while the number of after-school programs does not affect the nonprofit choice of entry model. Comparing columns (1) and (3) demonstrates, however, that the smaller sample differs significantly in composition from the larger one, and we rely on the full sample in our preferred estimates in the main body of the paper.

Table A-6: Alternative Specifications for Endogenous Ownership-Type Model Estimates
Choice of Organizational Form by NP: Offering Daycare Services

	Base Specification (1)	Unconstrained Demographic Effects (2)	Base Subset of Markets (3)	Controlling for Daycare Competition (4)
Select ForProfit Profit Shifters				
Fixed cost index	−0.242***	−0.240***	−0.018	−0.008
	(0.077)	(0.077)	(0.090)	(0.090)
Prop Tax	−0.156***	−0.156***	−0.110*	−0.112*
	(0.052)	(0.052)	(0.063)	(0.063)
Pres of Univ	0.023	0.024	0.042	0.048
	(0.055)	(0.055)	(0.069)	(0.069)
Pres of NP	−0.143	−0.126	−0.232	−0.240
	(0.198)	(0.210)	(0.220)	(0.250)
FP = 2	−1.207***	−1.207***	−1.256***	−1.262***
	(0.090)	(0.090)	(0.108)	(0.109)
FP = 3	−0.821***	−0.826***	−0.793***	−0.800***
	(0.066)	(0.066)	(0.077)	(0.078)
FP = 4	−0.745***	−0.749***	−0.831***	−0.835***
	(0.068)	(0.068)	(0.084)	(0.085)
FP = 5	−0.590***	−0.586***	−0.663***	−0.661***
	(0.073)	(0.073)	(0.099)	(0.099)
FP = 6	−0.521***	−0.518***	−0.482***	−0.484***
	(0.080)	(0.080)	(0.095)	(0.097)

[37] Descriptive statistics for these instruments (mean, sd, min, max) are as follows: # of Catholic churches: 4.50, 6.16, 0,96.08; # of Christian churches: 73.64, 54.09, 5.56, 490.45.

Table A-6: Alternative Specifications, Endogenous Ownership-Type Model Estimates (cont'd)

	Base Specification (1)	Unconstrained Demographic Effects (2)	Base Subset of Markets (3)	Controlling for Daycare Competition (4)
Select Shifters to Nonprofit Value of Entering as Standalone Gym				
Median Age†	−0.009	−0.016	−0.085	−0.093
	(0.148)	(0.182)	(0.182)	(0.182)
Dist Coast†	−0.131	−0.182	−0.083	−0.139
	(0.125)	(0.158)	(0.136)	(0.137)
Weather index†	0.167	−0.020	0.347**	0.221
	(0.110)	(0.144)	(0.144)	(0.141)
Health index†	−0.182*	−0.166	−0.040	−0.091
	(0.102)	(0.110)	(0.127)	(0.127)
Retail Wage	−0.444***	−0.394***	−0.305*	−0.328**
	(0.145)	(0.152)	(0.170)	(0.163)
Fixed cost index	−0.451***	−0.400**	−0.126	−0.175
	(0.173)	(0.171)	(0.192)	(0.185)
Y 25m†	0.317***	0.245*	0.400***	0.370***
	(0.123)	(0.146)	(0.137)	(0.141)
Pres of Univ†	0.045	0.040	0.096	0.104
	(0.083)	(0.100)	(0.106)	(0.106)
# FPs	−0.179	−0.208	−0.126	−0.142
	(0.137)	(0.150)	(0.173)	(0.177)
Select Shifters to Nonprofit Value of Entering as Gym and Daycare Program				
# Daycare Programs				−0.837***
				(0.294)
Residual, First-Stage				0.608***
				(0.183)
Median Age†	−0.009	−0.069	−0.085	−0.093
	(0.148)	(0.192)	(0.182)	(0.182)
Dist Coast†	−0.131	−0.032	−0.083	−0.139
	(0.125)	(0.144)	(0.136)	(0.137)
Weather index†	0.167	0.333***	0.347**	0.221
	(0.110)	(0.125)	(0.144)	(0.141)
Health index†	−0.182*	−0.200	−0.040	−0.091
	(0.102)	(0.141)	(0.127)	(0.127)
Retail Wage	−0.233	−0.147	−0.118	−0.201
	(0.144)	(0.153)	(0.174)	(0.175)
Fixed cost index	−0.423**	−0.493**	−0.265	−0.324
	(0.210)	(0.240)	(0.252)	(0.272)
Y 25m	0.317***	0.319**	0.400***	0.370***
	(0.123)	(0.147)	(0.137)	(0.141)
Pres of Univ	0.045	0.106	0.096	0.104
	(0.083)	(0.101)	(0.106)	(0.106)
# FPs	−0.155	−0.183	−0.202	−0.206
	(0.134)	(0.140)	(0.169)	(0.180)
Log-likelihood	−1403.144	−1394.712	−989.939	−985.076
Number of markets	629	629	457	457

Note: *, **, *** p-value $\leq$ 10%, 5%, and 1%, respectively. † indicates that we constrain certain coefficients for value of operating as gym and for value of operating as combined gym and daycare facility to be the same (Specifications (1) and (3)). Specification (2) allows all coefficients to vary with organizational form. # Daycare Programs denotes the number of daycare programs in each market, available for a subset of 457 markets.

Table A-7: Alternative Specifications for Endogenous Ownership-Type Model Estimates
Choice of Organizational Form by NP: Offering After-school Services

	Base Specification	Unconstrained Demographic Effects	Base Subset of Markets	Controlling for Afterschool Competition
Select ForProfit Profit Shifters				
Fixed cost index	−0.206***	−0.231***	−0.033	−0.035
	(0.074)	(0.079)	(0.092)	(0.092)
Prop Tax	−0.154***	−0.158***	−0.118*	−0.121*
	(0.052)	(0.052)	(0.063)	(0.064)
Pres of Univ	0.005	0.030	0.041	0.044
	(0.054)	(0.055)	(0.067)	(0.067)
Pres of NP	−0.160	−0.127	−0.201	−0.200
	(0.198)	(0.202)	(0.210)	(0.218)
FP = 2	−1.224***	−1.206***	−1.251***	−1.250***
	(0.090)	(0.090)	(0.106)	(0.106)
FP = 3	−0.833***	−0.824***	−0.797***	−0.798***
	(0.066)	(0.066)	(0.078)	(0.078)
FP = 4	−0.751***	−0.741***	−0.833***	−0.832***
	(0.069)	(0.068)	(0.085)	(0.085)
FP = 5	−0.595***	−0.588***	−0.660***	−0.660***
	(0.073)	(0.073)	(0.099)	(0.100)
FP = 6	−0.523***	−0.525***	−0.476***	−0.473***
	(0.083)	(0.083)	(0.095)	(0.096)
Select Shifters to Nonprofit Value of Entering as Standalone Gym				
Median Age†	−0.027	0.122	−0.025	−0.039
	(0.156)	(0.260)	(0.188)	(0.190)
Dist Coast†	−0.095	−0.102	−0.111	−0.113
	(0.128)	(0.221)	(0.139)	(0.140)
Weather index†	0.147	0.286	0.292**	0.235
	(0.112)	(0.189)	(0.138)	(0.172)
Health index†	−0.239**	−0.233*	−0.087	−0.119
	(0.099)	(0.138)	(0.117)	(0.124)
Retail Wage	−0.234	−0.296	−0.250	−0.247
	(0.182)	(0.202)	(0.229)	(0.227)
Fixed cost index	−0.439*	−0.308	−0.417	−0.435
	(0.263)	(0.352)	(0.451)	(0.458)
Y 25m†	0.288**	−0.121	0.406***	0.412***
	(0.134)	(0.370)	(0.151)	(0.152)
Pres of Univ†	0.065	−0.034	0.096	0.074
	(0.090)	(0.147)	(0.105)	(0.108)
# FPs	−0.104	−0.154	−0.132	−0.132
	(0.168)	(0.177)	(0.176)	(0.172)

Table A-7: Alternative Specifications, Endogenous Ownership-Type Model Estimates (cont'd)

	Base Specification	Unconstrained Demographic Effects	Base Subset of Markets	Controlling for After-school Competition
Select Shifters to Nonprofit Value of Entering as Gym and After-school Program				
# After-school Programs				−0.308
				(0.556)
Residual, First-Stage				0.310
				(0.417)
Median Age†	−0.027	−0.072	−0.025	−0.039
	(0.156)	(0.172)	(0.188)	(0.190)
Dist Coast†	−0.095	−0.081	−0.111	−0.113
	(0.128)	(0.136)	(0.139)	(0.140)
Weather index†	0.147	0.132	0.292**	0.235
	(0.112)	(0.124)	(0.138)	(0.172)
Health index†	−0.239**	−0.241**	−0.087	−0.119
	(0.099)	(0.112)	(0.117)	(0.124)
Retail Wage	−0.256**	−0.246*	−0.176	−0.200
	(0.126)	(0.131)	(0.147)	(0.152)
Fixed cost index	−0.445***	−0.516***	−0.246	−0.292
	(0.156)	(0.170)	(0.175)	(0.192)
Y 25m	0.288**	0.356**	0.406***	0.412***
	(0.134)	(0.138)	(0.151)	(0.152)
Pres of Univ	0.065	0.094	0.096	0.074
	(0.090)	(0.094)	(0.105)	(0.108)
# FPs	−0.203	−0.205	−0.241	−0.241
	(0.147)	(0.148)	(0.154)	(0.158)
Log-likelihood	−1342.120	−1338.300	−947.041	−946.094
Number of markets	629	629	457	457

Note: *, **, *** p-value $\leq$ 10%, 5%, and 1%, respectively. † indicates that we constrain certain coefficients for value of operating as gym and for value of operating as combined gym and after-school facility to be the same (Specifications (1) and (3)). Specification (2) allows all coefficients to vary with organizational form. # After-school Programs denotes the number of after-school programs in each market, available for a subset of 457 markets.