Nonprofit Spending and Government Provision of Public Services: Testing Theories of Government-Nonprofit Relationships

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ABSTRACT

Empirical studies and theories of government-nonprofit relationships have assumed a unidirectional funding flow from governments to nonprofits and therefore focusing on the impact of governments on nonprofits. By articulating multiple mechanisms of how nonprofits may influence government spending and utilizing a unique panel dataset that contains nonprofit and local government spending on parks, this article tests several prominent theoretical models of government-nonprofit relationships to answer the question of how spending by park-supporting charities influences the level of public spending on parks and recreation services. The findings indicate that spending by park-supporting charities spending has a decreasing effect on the level of public operational spending on parks, which supports the supplementary model. However, there is a net gain in total community support for parks and recreation services. Finally, this article suggests that government-nonprofit relationships are not identical when funding sources for public service provision differ in subsectors. A two-way understanding is essential for the theory building and testing in government-nonprofit relationships.

INTRODUCTION

In the last twenty years, we have witnessed a paradigm shift in public management from the hierarchical authority paradigm of bureaucratic management to collaborative and networked management (Agranoff and McGuire 2001; Ansell and Gash 2008; Bryson, Crosby and Stone 2006; Kettl 2006; O'Toole 1997; Salamon 2002). Milward and Provan (1993, 222) used the somewhat frightening phrase "hollow state" to signify the changing landscape in public services where "command and control" is no longer the dominant governance mechanism. Contracting out and third-sector service providers are dominant in public service delivery.

Scholars outside the U.S. have also discovered this new public management reality. Rhodes (1996) characterized this new governance era as "governing without government" in the UK. Osborne and Gaebler's (1992) influential book *Reinventing Government* suggested a new model of public management that uses market forces to foster competition in service delivery. Cross-sector interactions and the value of collaboration are increasingly recognized as not only a *reality* but also a *necessary condition* for addressing some of the society's most challenging problems (McGuire 2006; Bryson et al. 2006). Smith and Lipsky (1993) used *Nonprofits for Hire* to describe the particular prevalence of nonprofit providers in public services.

Despite the surge of scholarly interest in collaborative management and government-nonprofit relationships in the past two decades (Gazley and Guo 2015), existing literature tends to focus

predominantly on social service industries and the contracting regime. Moreover, a unidirectional funding flow from governments to nonprofit organizations is assumed (Brecher and Wise 2008). As a result of this assumption, theory building in government-nonprofit relationships is largely biased toward the distinction between provision and production. Nonprofit and for-profit providers are regarded as an alternative arrangement of public service production while public service provision is determined and financed by government agencies (McGinnis 1999). Existing literature on government-nonprofit relationships also tends to focus exclusively on the influence of government funding and assistance on nonprofit finances and activities (Brooks 2000; Gazley and Brudney 2007; Guo 2007; Nikolic and Koontz 2007).

Reversing this assumption, it may be possible for nonprofits to both fund and influence government services. Empirical evidence also supports this academic conjecture. Nelson and Gazley (2014) documented a rapid growth of school-supporting charities, which are set up to raise money and provide programs for public schools. Schatteman and Bingle (2015) demonstrated that public libraries in Illinois relied on philanthropic funds raised by library friends and foundations to supplement public spending on these services. Gazley, Cheng, and LaFontant (2016) presented a non-linear increase in the rate of creation of public park-supporting charities at the state and federal levels, suggesting that the creation rate is a function of government fiscal stress. Follman, Cseh, and Brudney (2016) also found a significant growth of volunteer programs that are co-managed by the National Park Service and its nonprofit partners.

This emerging phenomenon of governments relying on philanthropy and nonprofits to fund public services has only been partially explored by public management scholars. As governments at all levels suffer from extensive budget cuts and financial crisis, it is a timely policy and management question to ask about the consequences of philanthropy supporting public service provision, especially in subsectors where services are traditionally provided and managed by government agencies. It is also a theoretically important question to investigate the possible mechanisms and consequences of nonprofit organizations influencing governments through funding public services, which is less familiar to public management scholars compared with the mechanism of service delivery and advocacy (Fyall 2016).

Situated in the context of local parks and recreation services in the 149 largest U.S. cities, this article investigates whether spending by park-supporting charities influences the level of public spending on corresponding public services. It tests three important theoretical models of government-nonprofit relationships – the supplementary model, the complementary model, and the critical mass model –, in their ability to explain these government-nonprofit funding interactions. This article makes several theoretical and methodological contributions to the literature on government-nonprofit relationships. First, this article tests the assumption of a unidirectional funding flow from governments to nonprofit organizations (Lecy and Van Slyke 2013; Grønbjerg and Paarlberg 2001), which implies that government funding would impact the

behavior of nonprofit organizations instead of the other way around. This article argues that a two-way understanding is essential for the theory building and development in government-nonprofit relationships. Second, by relaxing the linearity assumption employed by previous studies, this article incorporates the theory of critical mass and builds a nonlinear model to generate a more nuanced understanding of the dynamics of cross-sector government-nonprofit funding interactions. Mechanisms through which nonprofits may influence governments in each of the three theoretical models are also reviewed and discussed in this article. The findings contribute to the existing literature of government-nonprofit relationships and inform current policy and management discussions of alternative ways of financing public services.

CONTEXT AND BACKGROUND

This study takes place within the context of local parks and recreation services in the U.S., focusing on the increasing reliance by cities on nonprofit organizations for park financing and management. The policy area of local parks and recreation services provides a particularly rich setting for studying government-nonprofit interactions when philanthropy and nonprofits play an important role in financing public services. As Ostrom (1990, 26) pointed out in the analogy between biology and studying complex social processes, "Their (biologists) scientific strategy frequently has involved identifying for empirical observation the simplest possible organism in which a process occurs in a clarified, or even exaggerated, form…The organism is not chosen because it is representative of all organisms. Rather, the organism is chosen because particular

processes can be studied more effectively". Similarly, local parks and recreation services are chosen because the influence of philanthropy on governments in this policy area tends to be exaggerated compared with other policy areas. Parks and recreation services are regarded as a local public good in the sense that they provide multiple social and environmental benefits to the whole community, therefore typically provided and managed by local governments (Walls 2014). However, because of its relatively low priority in local government spending, parks departments are constantly pushed to find partners and alternative funding sources (Skidmore and Scorsone 2011; Kaczynski and Crompton 2006).

On the other hand, nonprofit organizations have become instrumental in financing and supporting local parks and recreation services. By studying the 41 most prominent park conservancies in the U.S., Harnik and Martin (2015, 9) found that "on a per acre basis, conservancies spent an average of $14,400, about 50 percent more than public park departments". Those park-supporting charities are also growing very rapidly (Harnik and Martin 2015). In a recent survey of local parks directors by Resources for the Future, Walls (2014) found that among the 44 local park directors who responded to the survey, only five reported that park foundations, friends' organizations or park conservancies generated no money for their park systems. A total of $143 million in private support toward park systems was documented in the survey. In addition, Walls (2014, 8) found that these park conservancies and friends' organizations were most heavily reliant on individual donations, special events, corporate

contributions and foundation grants for funding (more than 70 percent). Local government funding was not a significant funding source for these park conservancies and friends' groups.

In terms of the supporting activities of these nonprofits, city park-supporting charities are mainly involved in fundraising, volunteer recruitment, planning and construction of capital projects, education and outreach, developing recreational programs, natural resource conservation and maintenance, and advocacy (Cheng 2018a; Madden et al. 2000). In the case of national and state park-supporting charities, Gazley et al. (2016) also found that more than 60 percent of these park-supporting charities were involved in fundraising, natural resource maintaining, volunteer management, and public education and outreach. Although different park-supporting charities may have different focuses of their supporting activities, a typical park-supporting charity generally provides operational and programming support for public parks. Even for large capital projects these charities do sometimes get involved in, park-supporting charities usually take the role of raising funds and organizing volunteers for these projects, while leaving the construction of these projects to local governments, which is too costly for most of these charities to take on (Madden et al. 2000).

In sum, local parks and recreation services are not only a policy area where significant philanthropic support for public service provision takes place but the processes and consequences of nonprofits influencing the government provision of public services can also be

studied more effectively. As nonprofit organizations become an important source of support for funding local parks and recreation services, it is an important public policy and management question to investigate the impact of these government-supporting charities on the level of public spending on corresponding public services.

THEORETICAL PERSPECTIVES

There are mainly three theoretical models in place that deal with how nonprofit organizations may interact with local governments in the provision of public services. The supplementary and complementary models have been extensively discussed in the existing literature of government-nonprofit relationships. The critical mass model provides an alternative lens to understand the dynamics and evolvement of government-nonprofit relationships. We will review these three theoretical models, explain how they contribute to the understanding of how government funding may influence nonprofit activities, identify possible mechanisms through which nonprofit activities may also influence government spending, and finally draw hypotheses for subsequent modeling and testing.

The Supplementary Model

Young (2000) proposed the supplementary model of government-nonprofit relationships to describe the interaction between governments and nonprofits when nonprofits serve as a substitute for government service provision. In this view of nonprofits as a supplement, “private

financing of public goods provision can be regarded to have an inverse relationship with government expenditures" (Young 2000, 150). Smith and Grønbjerg (2006) used the market niche model to characterize a similar type of government-nonprofit relationships in which governments and nonprofits supply particular types of goods and services to occupy special niches in a mixed economy. The government failure theory offers perhaps the most articulated understanding of the how governments may influence nonprofits in the supplementary model. Government failure results from the constraints of the democratic system and policy-making processes. Governments are not able to meet the demand of heterogeneous citizen preferences beyond the median voter or the dominant political coalition. The role of nonprofits is, therefore, to provide those necessary services to meet the heterogeneous demands of local citizens which governments may not be able to provide due to median voter constraints (Weisbrod 1977).

How Nonprofit Spending Might Reduce Government Spending. Although the theorizing and empirical testing in the supplementary model focus heavily on how government funding may reduce private donations and how donative support drives nonprofit growth, several mechanisms have been identified in terms of how public spending can also be negatively impacted by nonprofit spending. When deciding the level of appropriation to a certain public function area, public officials may take existing levels of spending by nonprofit and private institutions into consideration, thus reducing the levels of public spending in those areas. Peltzman (1973, 10) described this phenomenon as the political substitution effects of private expenditures. Becker

and Lindsay (1994) used government free riding in the provision of public services to describe a similar phenomenon. Marwell and Calabrese (2015) developed a deficit model of collaborative governance using a case of child welfare in the New York State, in which local governments tend to cut the resources dedicated to nonprofits while expecting them to use private subsidization to fulfill the same level of public service provision goals. In the context of higher education, several studies validate this proposition that private giving may crowd out government spending (Becker and Lindsay 1994; Peltzman 1973; Sav 2012). Walls (2014) also regarded the crowding out of public funding as a potential drawback of a heavy reliance on philanthropy for public parks. Based on the supplementary model of government-nonprofit relationships and the mechanisms described above, the following hypothesis can be drawn:

Hypothesis 1: Everything else being equal, an increase in spending by park-supporting charities leads to a decrease in the level of local government spending on parks and recreation services.

The Complementary Model

Rather than "competing" or serving as supplements to provide particular types of services, the complementary model focuses on the ability of nonprofits to engage in partnerships with governments for public service provision (Young 2000). In this view of nonprofits as complements to the government, nonprofit spending and government expenditures have direct positive relationships. Salamon and Anheier (1998) articulated the interdependence theory to

describe the resource exchange and contractual relationships between nonprofits and government agencies to make up each other's weakness. This perspective emphasizes the fact that governments give financial resources and grants to nonprofits for service delivery, which drives the growth of the nonprofit sector (Grønbjerg 1993). Empirically, Lecy and Van Slyke (2013) have shown that human service nonprofits tend to have a higher community density when the government provides funding to nonprofits. Compared with the case of government failure, their finding supports the complementary view of the government-nonprofit relationship. By surveying local governments and nonprofits in Georgia, Gazley and Brudney (2007) indicated that in government-nonprofit partnerships, both sides sought multiple goals, with local governments emphasizing more the goal of expertise and capacity while nonprofits are more likely to seek funding from the partnership. Paarlberg and Yoshioka (2016) also found a positive correlation between local government revenues and the level of community philanthropy. There seem to be robust findings in social and human services that government spending is positively associated with the size of the nonprofit sector. However, this seemingly robust finding is worth being tested in other policy contexts (Lecy and Van Slyke 2013), especially when funding sources for public service provision differ in subsectors.

How Nonprofit Spending Might Increase Government Spending. The existence of nonprofits may also drive up the level of public spending in corresponding service subsectors. Using a grounded theory approach and drawing on the experiences of public officials in the low-income

housing subsector, Fyall (2016) identified multiple theoretical mechanisms through which nonprofits may shape government budgetary decisions and policy conversations. Several of them point to the possibility that nonprofit activities may bring in more public dollars for local governments. First, nonprofits can help governments voice their preferences. Nonprofits may serve as the advocate for government agencies to influence public officials and the public, thus bringing in more public spending (Mosley 2012). It is sometimes difficult for public officials to publicly advocating for their own agencies because of the political constraints they face. However, it will be permissible if their nonprofit partners advocate or mobilize community support on their behalf (Fyall 2016, 6). For example, Friends of Metro Parks, a nonprofit partner of the Columbus and Franklin County Metro Parks (Metro Parks), not only helps Metro Parks raise money but also creates ways for the community to advocate for the public agency and ensure its level of public spending. Through this mechanism, more active nonprofit partners may help public agencies secure more public resources, thus increasing the level of public spending in a public service subsector.

Second, nonprofits can serve as "funding levers for public services" (Fyall 2016, 7). Nonprofits can set up conditions of their investment to obtain matching funds from local governments. This is particularly popular when nonprofits finance and support public services. During the late nineteenth and early twentieth century, Andrew Carnegie boosted the public library movement in the U.S. through his "wholesale" philanthropy model: Carnegie would grant money to create

libraries in a city only when the city governments are committed to levy taxes or allocate fund to maintain and operate those libraries (Kevane and Sundstrom 2016).

Finally, nonprofits may engage in rent-seeking behaviors to advocate for increased public financing in public service areas where they have a vested interest in local governments (Carroll and Calabrese 2017, 250). Marwell (2004) used machine politics community-based organizations (CBOs) to describe a model of exchange between CBOs and local elected officials. In this model, CBOs create voting constituencies for elected officials while these officials trade these constituencies by generating greater contract revenue for these CBOs. Based on the complementary model and the above mechanisms, the following hypothesis can be drawn:

Hypothesis 2: Everything else being equal, an increase in spending by park-supporting charities leads to an increase in the level of local government spending on parks and recreation services.

The Critical Mass Model

Although not as frequently used in the literature of government-nonprofit relationships as the other two models, the critical mass model provides another lens to disentangle the complicated and dynamic relationships between governments and nonprofit organizations. In classical social science theories, the critical mass theory is used to explain the emergence of successful collective actions: “some threshold of participants or action has to be crossed before a social movement

'explodes' into being" (Oliver, Marwell, and Teixeira 1985). In the literature of public management and representative bureaucracy, Meier (1993) suggested that a critical mass of Latino teachers was needed before they could serve as active representatives for Latino students. In the literature of social innovation and social entrepreneurship, the idea of collective impact was raised to illustrate the idea that systematic change will not take place unless all parts of the network work at the same time (Kania and Kramer 2011).

How Nonprofit Spending Might Have a Nonlinear Impact on Government Spending. In terms of nonprofits' impact on local governments, the critical mass model suggests that nonprofit organizations may have to reach a certain size and scale before certain influences on governments take place. In other words, the nature of the relationships between governments and nonprofits may change as nonprofits get more involved in public service provision (Cheng 2018b). Young (2000) also suggested that private financing of government services need to be understood both from supplementary and complementary perspectives. One mechanism may be that as services provided by nonprofits become more prevalent and reach more constituents, the preferences of citizens may be shifted. A higher level of service provision may either help more citizens recognize the importance of those services or incentivize low demanders who prefer less public spending on certain public services to migrate to a community that has a lower provision level of the collective goods (Wolpert 1977), thus driving up the average preference for the collective good in their home community. "At some points, the difference between the

preferences of the median voter and the preference of the high demanders may shrink sufficiently that the nonprofit organization's shifts from donative finance to government provision-of-service contracts" (Steinberg 2006, 123). In other words, governments may initially stay away from a service provided by nonprofits, as suggested by the supplementary model. However, as nonprofits reach more constituents and mobilize more interests of citizens, governments may over time find themselves aligned with the agenda of those nonprofits that have public goals and priorities, thus delegating the production of those services to nonprofit organizations (Milward and Provan 2000).

Empirically, the development of the Central Park Conservancy in New York City provides an example of how government-nonprofit relationships may change as nonprofits become more influential in funding public services. The Central Park Conservancy was formed in 1980 as a private voluntary organization providing support to a declining city-run park. Because of the exploded fundraising efforts and multiple renovation projects provided by the Central Park Conservancy, the condition of the park was greatly improved. Visitation thus ballooned in the Central Park. Recognizing the growing roles played by the Conservancy, the city decided to sign a formal contractual agreement to transfer the management responsibility of Central Park to the Conservancy in 1998. In the agreement reached by the two parties, there are also clear provisions about how governments would finance the Conservancy and match their contributions based on how much money the Conservancy could raise (Brecher and Wise 2008). The Central Park

Conservancy has evolved from an independent citizen group, which provides discretionary support to the park, to an integrative partner of the city parks and recreation department, which makes joint and coordinated investments in the park with the city government. Based on the critical mass model and the above mechanisms, the following hypothesis can be drawn:

Hypothesis 3: Everything else being equal, spending by park-supporting charities has a curvilinear relationship and threshold effect with the level of local government spending on parks and recreation services.

DATA AND METHODOLOGY

Data Source and Sample

This study draws on several primary data sources that span from government finance, nonprofit finance, to community characteristics. The primary government finance dataset contains information about local public spending on parks and other public finance information for the 149 largest cities in the U.S. in the period from 1989 to 2012. Cities are identified through the Lincoln Institute's Fiscally Standardized Cities (FiSCs) database, which includes more than 120 categories of revenues, expenditures, debt, and assets information, for the 150 largest U.S. cities in the period from 1977 to 2012 period (Lincoln Institute of Land Policy 2016). Washington, D.C. is excluded from the dataset because its jurisdictional level is not compatible with other cities and the public finance structure in Washington, D.C. is different from other U.S. cities.

The major advantage of the FiSCs database is that it provides comparable public finance data for large U.S. cities. The provision and delivery of public services are organized in different ways in different cities. While some cities take the sole responsibilities of providing public services to their residents, others share the responsibilities with other overlapping jurisdictions, such as county governments and special districts. The FiSCs database accounts for those differences by "adding revenues and expenditures of each central city municipal government to a portion of the revenues and expenditures of overlying governments, including counties, independent school districts, and special districts" (Lincoln Institute of Land Policy 2016). It also differentiates capital outlay expenditures from the total direct expenditures on selected functions. According to the U.S. Bureau of the Census (2006), total direct expenditures are defined as all expenditures other than intergovernmental expenditures. Capital outlay is the direct expenditures for the construction of buildings, grounds, and other improvements, and the purchase of equipment, land, and existing structures.

By using the FiSCs database, this study is able to both delineate specific government expenditures on parks and recreation services and take different structures of local governments into consideration. Although the 149 largest cities may not be a representative of all the local municipal governments in the U.S., the advantages of precision and comparability that the FiSCs dataset provides outweigh its disadvantage in representativeness. In addition, since park-supporting charities are still a relatively new phenomenon and the need for public greens spaces

tends to be more significant in large cities, the focus on these large cities may give us the freshest and most dynamic examination of this emerging phenomenon. Theory testing in less populous and resourced communities are worthy of future exploration though.

Information on the finances of park-supporting charities is mainly accessed through and based on the National Center for Charitable Statistics (NCCS) 2013 Core Public Charity Files dataset. NCCS maintains the most comprehensive nonprofit financial data based on their annual returns of form 990. One limitation of the NCCS dataset is that it may miss public charities that do not meet the filing threshold of $50,000 in annual revenues. However, since this study mainly focuses on the "financial" impact of those park-supporting charities and charities that do not file form 990 tend to have a small budget size, the problem is less serious in this case. The NCCS dataset was first filtered to nonprofits that are located only in the 149 largest U.S. cities. Park-supporting charities were then identified in the NCCS database by using both keywords search and National Taxonomy of Exempt Entities (NTEE) codes. NTEE codes are developed by NCCS to characterize the major types of activities those public charities are involved in. However, relying solely on NTEE codes tend to be insufficient to capture all cases and understand nonprofit activity (Fyall, Moore, and Gugerty 2018), which is also true in the case of park-supporting charities[1]. To achieve both efficiency and comprehensiveness, a carefully designed

[1] Through a random test of existing park friends' organizations, the author found that NTEE codes do not provide the most comprehensive coverage of park-supporting charities. For example, Friends of the Garfield Park in Indianapolis is characterized as A (Arts, Culture & Humanities), instead of C (Environment) or N (Recreation & Sports).

three-step approach was followed to identify park-supporting charities in those cities[2]. Each identified park-supporting charity in the 2013 NCCS dataset was then linked to the historical NCCS Core PC File dataset from 1989 to 2012 to construct the complete panel dataset of park-supporting charities in the 149 largest U.S. cities. Total expenses of park-supporting charities were aggregated at the city level to represent cities' nonprofit spending on parks and recreation services in a given year.

Geographic identifiers in the FiSCs dataset and NCCS dataset were used to merge with the 1990 Decennial Census, the 2000 Decennial Census, the 2010 Decennial Census, the 2006-10 American Community Survey (ACS), the Economic Census (1997, 2002, 2007), and the Voting and Elections Collection at the CQ Press (1992, 1996, 2000, 2004, 2008). All the census datasets are accessed through the U.S. Census Bureau and measured at the county level. Since the Census does not provide yearly information for U.S. counties, existing data points in the dataset were used to linearly interpolate and extrapolate variables to fill in data for missing years. Finally, all variables measured in dollars are transformed to inflation-adjusted 2012

[2] First, a different set of keywords search is used to identify potential park-supporting charities under the full NCCS database and under NTEE code C for Environment and NTEE code D for Recreation & Sports. Second, the database is complemented by looking through existing research or reports on city park-supporting charities (Walls, 2014; Harnick & Martin, 2015) to find additional cases of large city park conservancies. Third, a comprehensive examination based on organizations' websites and form 990 was conducted to exclude any organization that does not have a major purpose of supporting local public parks or local public park systems at the city or county level (some land conservancies are supporting private land and some park conservancies are supporting state parks, national parks, or parks in other jurisdictions). Each eligible organization was further coded to identify whether it serves specific city park units or the whole city park system. The resulting search produced 267 city or county park-supporting charities in the largest 149 U.S. cities, excluding Washington, D.C.

dollars. The final analysis sample includes the largest 149 U.S. cities in the period from 1989 to 2012.

Variables and Measurement

The dependent variable – public spending on parks and recreation services – is measured in two forms: real per capita government operational expenditures on parks and recreation services and government operational expenditures on parks as a percentage of total government operational expenditures in all functional areas. Operational expenditures are calculated by subtracting capital outlay expenditures from the total direct expenditures on parks and recreation services. The dependent variable is specified as these two forms to capture the differential impact nonprofit spending may have on public spending both in terms of absolute amount and relative proportion, thus strengthening the robustness of the findings. The absolute size of public spending on parks is specified in per capita forms to address the problem of outliers and the heteroscedasticity of the error terms due to larger variance in public spending for larger cities.

The analysis is limited to government operational expenditures on parks for two major reasons. First, from a measurement perspective, nonprofits and governments report their spending in different ways. Nonprofits report their expenses based on the accrual basis accounting, which does not recognize capital purchase as expenses (Bowman, Tuckman, and Young 2012). Instead, the decline of the value of these properties due to depreciation in that year is reported as a type of

functional expense of the nonprofit. In other words, total nonprofit expenses reported in the NCCS dataset are nonprofits' functional and operational expenses on parks. Government entities, instead, use the modified accrual basis of accounting, which capture capital expenditures in their reported expenditures. To ensure the consistency of measurements between government and nonprofit spending on parks, local governments' operational expenditures on parks are used as the dependent variable[3]. Second, it is theoretically justifiable to limit the analysis to government operational expenditures as existing literature would suggest nonprofits have limited effect on government capital expenditures. State and local governments are constrained by the balanced budget requirement in their general operating budgets but not capital budgets, which makes governmental actors less inclined to change public capital spending when additional funds on capital outlay projects are available (Poterba 1995a). In addition, there is a line of research on the benefits of government using debt to finance capital projects (Poterba 1995b). Governments would have no incentive to offload capital acquisition to nonprofits as a result. Finally, capital spending is generally more difficult to predict compared with operational spending as a city does not need capital projects in parks as regularly as operational projects. A local government's decision to finance capital projects in parks may be determined by certain events or opportunities that are beyond the impact of park-supporting charities.

[3] Results for other categories of government expenditures on parks are available by request. The results meet the theoretical expectations articulated here.

Key independent variables. The key measure for nonprofit spending on parks and recreation services is the lagged real per capita total expenses of park-supporting charities aggregated at the city level by year. Nonprofit expenses are selected over nonprofit revenues since expenses are expected to have a more direct impact on park-related projects and government operation. Per capita measures of total nonprofit expenses on parks is taken to ensure the consistency of the public spending measure and facilitate a more straightforward interpretation of the result. The square of per capita nonprofit expenses is also included in the model to capture the expected nonlinear relationships between public and nonprofit spending on parks, suggested by the critical mass model. The logarithmic form of nonprofit expenses is not taken mainly for two reasons. First, there are a lot of zeros in the dataset for nonprofit expenses due to the absence of park-supporting charities in some cities or some years of a particular city. The logarithmic form will, therefore, generate a significant amount of missing cases, thus causing bias to the sample. Second, it is complicated to interpret the nonlinear impact when both the logarithmic form and its square term are included in the model.

The supplementary model would suggest a negative correlation between nonprofit spending and public spending on parks, while the complementary model would suggest a positive correlation. The critical mass model would indicate that nonprofit spending is related to public spending on parks in a curvilinear pattern, initially in one certain direction related to public spending on parks but turning to the other direction as nonprofit spending on parks continues to rise. There should

also be sufficient data points on both sides of the threshold point to fully support the critical mass model.

Control variables. Drawing on existing studies of the determinants of local governments' expenditures and city park systems, four types of control variables are included in the study to control for community's general demographic characteristics, wealth and economic resources a community has, the structure of government revenue, and the revenue generated for local governments by city park systems. All control variables are lagged by one year to account for local governments' budget cycle. Table 1 and Table 2 provide the summary statistics for each of the variables finally included in the panel dataset, including their overall, between, and within variations.

[Insert Table 1 and Table 2 Here]

Empirical Strategy

A two-way fixed effects (FE) model and a lagged dependent variable (LDV) model are estimated here as a baseline identification strategy to investigate the impact of nonprofit spending on the level of public spending on parks and recreation services. The Arellano-Bond generalized-method-of-moments (GMM) estimator is designed for situations with a linear functional

relationship (Roodman 2009; Zhu 2013). It is not used in the first step of the analysis because of the existence of the quadratic term of the key independent variable to test the critical mass model. It will serve as a robustness check if a linear relationship is supported by the LDV and FE models. The FE model and LDV models are both used in this article for two major reasons. First, the FE model and the LDV model are two powerful panel data models and based on alternative identifying assumptions of the data generating processes, with the FE model assuming time-invariant omitted variables and the LDV model temporal dependence. In the context of this article, they are both valid for different methodological and theoretical reasons. However, there is the risk of a "Nickell bias" in which the combination of lagged dependent variables and fixed effects in the same model can bias the estimates (Nickell 1981; Zhu 2013). Therefore, to strengthen the robustness of the findings, it is recommended that applied researchers use both models to see whether they generate similar results (Angrist and Pischke 2009).

Second, FE and LDV estimates have a nice bracketing property: bounding the causal effect of interest. If the underlying assumption of the LDV model is correct, but the FE model is used, estimates of a positive treatment effect by the FE model will be too large. On the other hand, If the underlying assumption of the FE model is correct, but the LDV model is used, estimates of a positive treatment effect by the LDV model tend to be too small. (Angrist and Pischke 2009, 246). Therefore, by using both the FE and the LDV model, we are likely to have a range of possible causal effect of interest, with the true effect lying somewhere in between.

The LDV model is used to capture the persistence of public spending[4], which is suggested by the theory of budgetary incrementalism (Davis, Dempster, and Wildavsky 1966). Scholars also found prior government funding to be one of the strongest predictors of nonprofits' government revenue (Suárez 2010). However, the LDV model may inflate the overall model fit, decrease the explanatory power of repressors, and cause the coefficients of explanatory variables to be biased downward (Zhu 2013; Keele and Kelly 2006). In other words, the LDV model offers a conservative estimate of a possible causal effect, which makes a stronger case for the causal inference if the estimates of key explanatory variables turn to be significant in the LDV model. The LDV model equation can be written as:

$$(\text{GOVEXPARKS})_{i,t} = \alpha_0 + \alpha_1 (\text{GOVEXPARKS})_{i,t-1} + \alpha_2(\text{NONPROFIT-SUPPORT})_{i,t-1} + \alpha_3(\text{NONPROFIT-SUPPORT})^2_{i,t-1} + \beta X_{i,t-1} + \varepsilon_{i,t}$$

$(\text{GOVEXPARKS})_{i,t}$ is city *i*'s various forms of local governments' operational expenditures on parks and recreation in year *t*. $(\text{GOVEXPARKS})_{i,t-1}$ is the previous year's local governments' operational expenditures on parks in city *i*. $(\text{NONPROFIT-SUPPORT})_{i,t-1}$ is previous year's real per capita total expenses of park-supporting charities in city *i*. $(\text{NONPROFIT-SUPPORT})^2_{i,t-1}$ is the quadratic term of previous year's real per capita total expenses of park-supporting charities in

[4] The Levin-Lin-Chu unit root test and Harris-Tzavalis unit root test both suggest that the panel is stationary, thus justifying the use of lagged dependent variables in the model.

city *i*. $X_{i,t-1}$ is a vector of control variables employed in the model. They are lagged for one year to allow for the reaction of the budget cycle. Subscripts *i* and *t* index city and time, respectively.

In the two-way FE model, city fixed effects are included in the model to account for any time-invariant difference between cities in the time frame of the study. In addition to some observable differences that are captured by the model, there may be some fundamental time-invariant differences between cities that may determine the levels of public spending on parks, such as the weather conditions and the natural endowment of the city. City fixed effects are a powerful way of accounting for those differences by giving each city a unique intercept. Year fixed effects are included to capture the influence of aggregate time trends, such as inflation and economic growth, thus reducing the bias to the estimates. By including city fixed effects, year fixed effects, and a series of control variables, the FE model enables a more consistent and unbiased estimate of the impact of nonprofit funding on public spending *within* a particular city. For the purpose of this article, since the key independent variable of interest – per capita total nonprofit expenses on parks – varies across years and within cities, the two-way FE model is a powerful way of controlling for cross-unit unobserved heterogeneity (Zhu 2013).

The two-way FE model is specified as the following equation:

$$(\text{GOVEXPARKS})_{i,t} = \alpha_0 + \alpha_1(\text{NONPROFIT-SUPPORT})_{i,t-1} + \alpha_2(\text{NONPROFIT-SUPPORT})^2_{i,t-1} + \beta\, X_{i,t-1} + \mu_i + \lambda_t + \varepsilon_{i,t}$$

Compared with the LDV model, the lagged dependent variable is no longer in the FE model. Instead, μ_i and λ_t are included as city-specific and year-specific fixed effects in the model. Other components are identical in the two models. Robust standard errors are used to account for the potential heteroscedasticity of the error term in both models. The results of the analysis for different forms of public operational spending on parks and recreation services are reported in the next section of the article. The estimates of the LDV model and the FE model are listed side by side to facilitate comparison. Both of the two models are also estimated without the inclusion of the quadratic term of the per capital total nonprofit expenses on parks and recreation services in order to demonstrate the necessity and magnitude of the curvilinear relationship between public and nonprofit spending on these services. The percentage and per capita public operational spending on parks and recreation are estimated separately as dependent variables to show the impact of nonprofit spending on various aspects of public spending on parks. We will also use the Arellano-Bond System GMM estimator to check the robustness of the finding if a linear functional relationship is supported by the FE and LDV models.

EMPIRICAL FINDINGS AND RESULTS

Baseline Specifications and Results

The multivariate analysis of different forms of local governments' operational spending on parks and recreation services is presented in Table 3 and Table 4. Since the main concern of this article

is with the impact of nonprofit spending on the level of public spending rather than the determinants of public funding for parks, the coefficients of control variables will not be interpreted here.

[Insert Table 3 and Table 4 Here]

Table 3 displays the estimation results by both the FE model and LDV model for the real per capita public operational spending on parks and recreation services. First, across different model specifications, the coefficients on the squared terms of total nonprofit expenses are not statistically significant. The inclusion of the quadratic term of total nonprofit expenses on parks also does not contribute to the improvement of the model fit indexes. Such evidence suggests that there is not a curvilinear relationship between real per capita nonprofit and public operational spending on parks and recreation services, as predicted by the critical mass model. Hypothesis 3 is therefore rejected from the analysis results.

In terms of the linear relationship between nonprofit and public operational spending on parks, the estimated coefficients of the linear term are negative and statistically significant across the FE model ($p < 0.01$) and LDV model ($p < 0.05$). Such evidence suggests a strong and robust linear negative relationship between the total expenses of park-supporting charities and local governments' operational expenditures on parks and recreation services. The supplementary

model and Hypothesis 1 are therefore supported in this scenario. The LDV model generates a significantly smaller coefficient in scale than the FE model, which meets the expected properties of the two models (Angrist and Pischke 2009). Substantively, as park-supporting charities jointly spend $1 per resident more on parks and recreation services in a city, local governments reduce their levels of public operational spending on these services from $ 0.359 to $ 0.605 per resident. There is a net gain in total community support for parks and recreation services.

Table 4 displays the estimation results by both the FE model and the LDV model for the percentage of local governments' operational expenditures on parks and recreation services in total government operational expenditures in all functional areas. Compared with the size of real per capita public operational spending on parks, the findings are very similar in terms of the linear models. There is a strong support for the supplementary model in terms of the percentage of public operational spending on parks and recreation services. $ 1 more per capita expenses of park-supporting charities will result in a 0.81 - 1.71 percent decrease in public operational spending on parks.

The findings in the quadratic models for the percentage of public operational spending on parks deserve some further discussion since they generate slightly different results compared with per capita public operational spending on parks. The squared term of per capita total nonprofit expenses on parks is statistically significant in the FE Quadratic model for the percentage public

operational expenditures on parks. Since the linear term is negative and the squared term positive, these results suggest a possibility of the U-shaped relationship between nonprofit spending and the proportion of public operational spending on parks. In other words, public operational spending on parks seems to first decrease as the spending of park-supporting charities increase. However, to fully establish this U-shaped relationship, we also need to calculate the turn-around value and understand the distribution of the data below and beyond the turn-around value (Wooldridge 2006). By taking the first derivative of the equation and setting the equation to zero, the threshold point or the "critical mass" of per capita spending of park-supporting charities is $105.461 for the percentage of public operational spending on parks. Since the maximum of per capita total nonprofit expenses on parks is $85.643 (Table 2), this result suggests that for all the cities in the dataset, per capita total expenses of park-supporting charities have a decreasing effect on public operational spending on parks. In other words, even by taking the estimates of the quadratic models into consideration, the supplementary model and Hypothesis 1 are supported.

In sum, by examining both the size and proportion of per capita local governments' operational expenditures on parks and recreation services, the finding suggests that total expenses of park-supporting charities in a city have a significant decreasing effect on local governments' operational spending on these services, thus supporting the supplementary model (Hypothesis 1). To verify this central conclusion, we turn to the next section for a series of robustness checks.

Robustness Checks

First, the endogeneity of nonprofit spending on parks is certainly a possibility as park-supporting charities may not only influence government spending but also respond to the changes of government funding, such as filling the gap of government budget cuts on parks and recreation services. To fully address the endogeneity problem and consistently identifying the effect of nonprofit spending, natural experiments or valid exogenous instrumental variables remain the gold standard. However, a potential instrument of nonprofit spending needs to be orthogonal to local government spending and valid for 149 cities in 24 years, which makes it difficult to find. To our knowledge, scholars have not yet found a consistent instrument for nonprofit spending when the dependent variable is local government spending. Since a linear functional relationship between government and nonprofit spending on parks is supported by our baseline models, we can use a well-developed linear dynamic panel generalized method of moments (GMM) estimator to further alleviate the endogeneity problem and check the robustness of the finding.

A dynamic panel GMM estimator is designed to take advantage of the panel structure of the data and use lags of the endogenous variables to serve as available "internal" instruments of the endogenous variable (Arellano and Bond 1991; Liu and Mikesell 2014). The system GMM estimator is chosen in this study over the difference GMM estimator as the Levin-Lin-Chu test suggests that some variables are persistent (Blundell and Bond 2000). The regressions are executed using xtabond2 in Stata with the lagged dependent variable, total nonprofit expenses on

parks, and per capita public revenue generated by parks being treated as endogenous variables, and other community-level control variables as exogenous variables in these estimations (Roodman 2009). The "collapse" option of xtabond2 is invoked to effectively reduce the instrument counts as the number of instruments grows quadratically in time dimensions, which may undermine the over-identifying restrictions of the model[5].

[Insert Table 5 Here]

Table 5 displays the system GMM estimation results of both the per capita and percentage of public spending on parks. Consistent with the findings of the FE and LDV models, per capita total nonprofit expenses in a city have a statistically significant decreasing effect on per capita and percentage public operational spending on parks. $ 1 more per capita expenses of park-supporting charities will result in a $0.424 decrease in per capita public operational spending on parks, and a 1.37% decrease in the percentage of public operational spending on parks. These two numbers are within the range of the effect estimated by the FE and LDV models, partially supporting the bracketing property of using both models simultaneously. To fully establish the validity of the instruments, table 7 also reports the results of some specification tests suggested by the existing literature (Roodman 2009). The AR(2) test suggests that there is no second-order serial correlation in the idiosyncratic errors, and the Hansen test cannot reject the hypothesis that

[5] The Stata coding is followed by the manual of Roodman (2009). Wintoki, Linck, and Netter (2012) also provided detailed illustrations about how to conduct the system GMM estimation using xtabond2.

the instruments are exogenous. The assumptions of the system GMM estimator are met and the model is specified. Based on these results, we can conclude that the endogeneity of nonprofit spending on parks does not pose serious problems for the key findings that total expenses of park-supporting charities have a decreasing effect on local governments' operational spending on parks. The supplementary model is supported by the analysis.

Second, because of the structure of the IRS 990 data, this study cannot distinguish between nonprofit expenses that are based on private contributions and government grants & contracts. Such measurement errors may cause estimation biases. We collect additional data and gather anecdote evidence to show that park-supporting charities are mainly donative charities. The inability of distinguishing different sources of nonprofit revenues may not be as big a problem compared with other nonprofit sectors in which they heavily rely on government grants and contracts to provide services. According to a 2009 survey of park conservancies and advocacy organizations conducted by the Resources for the Future, park-supporting charities received more than 63 percent of their revenue from private donations and grants, but less than 20 percent from governments (Walls 2014). By merging our data with the NCCS-GuideStar National Nonprofit Research Database (the "Digitized Data") which separates private contributions and government grants, we found the government grant ratio for these park-supporting charities is 7.18%, and program service ratio 14.9%. Those are considerably lower than the numbers of the general nonprofit sector. Since the "Digitized Data" only contains public charities that filed form

990 from 1998 to 2003, this database is not used for the scope of in this study. Such additional evidence suggests that double counting is not a significant problem in the empirical setting of this article.

Finally, even if double counting of government and nonprofit spending on parks does exist, it will bias toward a positive correlation between the two. Since the major finding of this study supports a negative correlation between government and nonprofit spending on parks, the possibility of double counting achieves additional robustness of this negative correlation and the supplementary model of government-nonprofit relationships. We may even underestimate the decreasing effect of nonprofit spending on government operational spending on parks.

CONCLUSION

A central question in the academic debate about government-nonprofit relationships is how funding interacts across these two sectors. Previous empirical studies have assumed a unidirectional funding flow from governments to nonprofits and therefore focusing on the impact of governments on nonprofits. This study seeks to answer a different question: how does the spending of public charities influence local governments' public spending on corresponding public services, especially when there is significant philanthropic support for public service provision? Drawing on a unique panel dataset that contains nonprofit and local government spending on parks and recreation services in large U.S. cities, this article articulates possible

mechanisms through which nonprofit spending may influence government spending. It also uses multiple panel data analysis models to empirically test several prominent theories of government-nonprofit relationships and alleviate the endogeneity problem. The findings suggest that total expenses of park-supporting charities in a city have a decreasing effect on the level of public operational spending on parks, which supports the supplementary model of government-nonprofit relationships. However, local governments are still taking the major responsibility of financing and managing parks services. There is also a net gain in total community support for parks and recreation services. This article validates scholars' concerns that government-nonprofit relationships may not be identical when subsectors rely on government funding in different ways (Grønbjerg and Paarlberg 2001; Lecy and Van Slyke 2013). The complementary model, which is empirically supported by multiple studies in the nonprofit human services sector, is not supported by the findings of this study. Funding sources for public service provision seem to be a key factor in shaping government-nonprofit relationships.

This study contributes to the theory development of government-nonprofit relationships by articulating a two-way interaction across these two sectors in the existing models of government-nonprofit relationships. We surely have not identified every mechanism by which nonprofit funding may increase or decrease government funding or influence government funding in a nonlinear fashion. However, these mechanisms we identified in the existing literature are sufficient to conclude that nonprofit spending can influence government spending in multiple

ways. The empirical inquiry we address in this article tests the relative strength of these paths in the aggregate form as multiple mechanisms may be at play simultaneously. The role of nonprofits in public service provision is beyond the tool or agent of the government (Cheng 2018a). Neglecting the impact of nonprofit spending on government spending may significantly compromise our ability to fully understand and model these important relationships. Some of the findings and conclusions in the existing literature of government-nonprofit relationships may also need to be reexamined as they treat government funding as a strictly exogenous variable, while in fact, nonprofit spending can also influence government funding. Such an endogeneity problem may compromise the internal validity of previous observational studies (Jilke, Lu, Xu and Shinohara 2018). By utilizing multiple panel data analysis models, this study offers some empirical solutions to alleviate such problems in observational research designs.

Moving forward, this study provides ample opportunities for future research to advance our understanding of government-nonprofit relationships. The conscientious selection of parks and recreation services is based on the rationale that the processes and consequences of how nonprofits would influence the government provision of public services can be studied more effectively in a situation where there is significant philanthropic support for public service provision. The contrast of findings between this study and previous empirical studies suggest that funding sources for public service provision matter for the modeling of government-nonprofit relationships. There are multiple mechanisms through which nonprofits may influence

government provision of public services. These mechanisms are distinct from the mechanisms of how government funding influence nonprofit activities. The next step is to apply the findings and theoretical insights gained from this study to different geographical and policy contexts. As Marwell and Calabrese (2015) pointed out, even in the context of child welfare services where government funding is the major funding source of nonprofits, the ability of child welfare nonprofits to raise private contributions may influence the level of public funding governments are willing to allocate for nonprofit service provides. A two-way understanding is essential for the theory building and development in government-nonprofit relationships across different public service subsectors.

In addition, more in-depth qualitative research needs to be done to understand the causal mechanisms of why certain models work better in certain government-nonprofit relationships. This study sets the first step by examining the aggregate effects of these different mechanisms. Field research and case studies could be done to examine why public charities could collectively have such an impact, what governance mechanisms governments and nonprofits are using to manage their collaborative relationships, and whether these government-supporting charities help or hinder citizen engagement and participation as leaders of these charities are often nonelected (Mosley and Grogan 2012). The distributional and performance implications of these cross-sector interactions also deserve more scholarly attention. As we celebrate the value of partnerships, not all cross-sector partnerships generate better results (Andrew and Entwistle

2010). To critically examine these alternative models of public service provision is not only important for parks and recreation services, but also for the better understanding of government-nonprofit relationships and cross-sector interactions. This is a very promising line of research that contributes to the larger theory of how nonprofits influence governments and the role of nonprofits in public service provision.

From a public policy and management perspective, this study raises the question of how much philanthropic support is good for the management of city's parks and recreation services. The findings seem to support Walls' (2014) concern about the potential crowding out effect of philanthropic support for public parks. However, if specific numbers are taken into account, this is not a zero-sum game of nonprofit and government support for public service provision. First, the scale of philanthropic support for parks and recreation services is limited compared with the level of government provision of these services. As an example, the average spending of park-supporting charities in a city is $1.17 per capita on parks and recreation services while the average per capita government operational spending is $116.25 on these services (Table 1 and Table 2). If park-supporting charities increase their per capita spending by $1, which nearly doubles their average spending on parks services, our models predict only approximately a 1 percent reduction in government operational spending on these services (Table 4 and Table 5). Although such differences may be exaggerated because of the absence of park-supporting charities in quite a few cities in our sample, it does suggest that local governments are still taking

the major responsibility of financing parks and recreation services. They are just ceding some of the service provision responsibility to nonprofits. In addition, since the increase in nonprofit spending more than offsets any decrease in government operational spending, there is a net gain in total community support for parks and recreation services. If non-monetary support of those park-supporting charities (e.g., volunteering and advocacy by citizens) is also taken into account, the net gain will be even larger. Based on such evidence, the benefits of philanthropic support for parks and recreation services outweigh its costs. Local governments should be more active in seeking citizen support and collaborating with nonprofit organizations to fund and manage parks and recreation services. As this trend of philanthropy supporting public services continue to grow and the pie becomes bigger, the pattern of government-nonprofit interactions may also shift. The distributional consequences and social equity implications of philanthropic support for public service provision also need to be thoroughly examined.

Fundamentally, this study suggests that nonprofits can influence government provision of public services. Broadening the research scope from the one-way impact of government funding on nonprofits to a two-way interaction is essential for further theoretical developments and a more nuanced understanding of government-nonprofit relationships. In this new context where nonprofits support and fund government services, new theories of government-nonprofit relationships may be required. This study starts this endeavor by bringing in one of the prominent models in collective action theories, the critical mass model. It also elaborates several

possible mechanisms of how nonprofits may influence governments. The policy and management implications of studying such phenomenon tend to be huge when governments at all levels and around the world are suffering from extensive budget cuts and financial losses.

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Table 1: Descriptive Statistics of Government Expenditures on Parks and Recreation Services

Government Expenditure Categories		Mean	SD	Min.	Max.	Observations
Per capita public total direct expenditures	overall	159.537	105.624	0.970	1539.210	N = 3576
	between		80.455	32.507	408.481	n = 149
	within		68.740	-22.366	1420.230	T = 24
Per capita public operational expenditures	overall	116.251	64.868	0.940	568.550	N = 3576
	between		56.660	26.983	290.407	n = 149
	within		31.908	-28.744	530.805	T = 24
Per capita public capital outlay expenditures	overall	43.286	69.263	0	1391.300	N = 3576
	between		33.737	0.100	173.470	n = 149
	within		60.552	-126.334	1337.682	T = 24
Percentage public total direct expenditures	overall	3.627	2.203	0.014	-0.950	N = 3576
	between		1.685	0.893	8.856	n = 149
	within		1.426	-1.283	33.429	T = 24
Percentage public operational expenditures	overall	3.138	1.647	.015	12.812	N = 3576
	between		1.466	0.697	7.619	n = 149
	within		0.760	-1.309	10.806	T = 24
Percentage public capital outlay expenditures	overall	6.156	7.182	0	73.815	N = 3576
	between		3.593	0.047	17.565	n = 149
	within		6.226	-10.439	70.259	T = 24

Note: All the above categories are for parks and recreation services

Table 2: Descriptive Statistics of the Independent and Control Variables

Variable		Mean	SD	Min.	Max.	Observations
Per capita nonprofit expenses on parks	overall	1.167	3.709	0	85.643	N = 3576
	between		2.466	0	15.581	n = 149
	within		2.777	-14.414	71.229	T = 24
Median household income (thousands of dollars)	overall	56.289	10.628	32.942	102.402	N = 3576
	between		10.416	36.754	94.037	n = 149
	within		2.273	44.332	64.654	T = 24
Median housing value (thousands of dollars)	overall	197.089	131.743	71.500	1333.222	N = 3576
	between		123.788	83.387	1027.982	n = 149
	within		46.167	-97.027	502.328	T = 24
Percentage homeownership	overall	61.527	7.793	17.680	79.600	N = 3576
	between		7.630	20.478	77.866	n = 149
	within		1.700	50.722	67.289	T = 24
Percentage population in poverty	overall	12.871	4.150	4.478	30.520	N = 3576
	between		4.044	4.590	25.367	n = 149
	within		0.986	5.688	18.536	T = 24
Median age	overall	34.168	2.870	22.420	46.960	N = 3576
	between		2.526	23.503	43.825	n = 149
	within		1.377	28.318	39.798	T = 24
Percentage white	overall	73.429	14.515	26.622	99.299	N = 3576
	between		14.061	31.473	98.074	n = 149
	within		3.778	62.214	91.662	T = 24
Percentage bachelor's degree or higher	overall	26.952	7.366	10.130	59.360	N = 3576
	between		6.888	12.605	50.118	n = 149
	within		2.667	16.720	36.195	T = 24
Percentage voted for the Democratic party	overall	49.873	13.774	0	89.300	N = 3576
	between		11.978	0	81.729	n = 149
	within		6.872	26.827	76.183	T = 24
Percentage intergovernmental revenue	overall	37.531	10.597	12.790	71.499	N = 3576
	between		9.729	16.643	64.392	n = 149
	within		4.273	13.929	55.942	T = 24
Percentage property tax revenue	overall	26.055	10.173	6.675	72.064	N = 3576
	between		9.383	8.897	66.780	n = 149
	within		4.003	5.902	50.914	T = 24
Per capita government revenue from parks	overall	36.722	32.556	0	276.72	N = 3576
	between		26.662	0.148	151.913	n = 149
	within		17.309	-65.931	190.721	T = 24

Table 3: FE and LDV Models of Per Capita Public Operational Expenditures on Parks

	DV: Per Capita Public Operational Expenditures on Parks			
	FE Linear	**FE Quadratic**	**LDV Linear**	**LDV Quadratic**
Lagged DV			0.834***	0.834***
			(0.0335)	(0.0336)
Per capita nonprofit	-0.605***	-0.942**	-0.359**	-0.423*
expenses	(0.218)	(0.390)	(0.141)	(0.222)
Per capita nonprofit		0.00718		0.00175
expenses squared		(0.00454)		(0.00364)
Log of median	82.66	81.10	-11.86*	-11.86*
household income	(52.41)	(52.36)	(7.038)	(7.037)
Log of median housing	13.35	13.15	2.484	2.453
value	(11.09)	(11.07)	(1.793)	(1.797)
Percentage	-0.0964	-0.0794	-0.00717	-0.0105
homeownership	(1.003)	(1.012)	(0.0838)	(0.0844)
Percentage in poverty	-1.675	-1.678	-0.795***	-0.794***
	(1.795)	(1.797)	(0.284)	(0.283)
Median age	0.208	0.152	0.0208	0.0279
	(2.492)	(2.498)	(0.195)	(0.195)
Percentage white	0.592	0.600	-0.0480	-0.0474
	(0.577)	(0.576)	(0.0515)	(0.0517)
Percentage bachelor's	0.264	0.363	0.0869	0.0907
degree or higher	(1.068)	(1.075)	(0.0865)	(0.0873)
Percentage voted for	0.451	0.438	0.128***	0.128***
the Democratic	(0.328)	(0.325)	(0.0470)	(0.0472)
candidate				
Percentage	-0.378	-0.379	-0.255***	-0.255***
intergovernmental	(0.308)	(0.307)	(0.0720)	(0.0721)
revenue				
Percentage property tax	-0.146	-0.145	-0.329***	-0.330***
revenue	(0.353)	(0.352)	(0.0700)	(0.0700)
Per capita government	0.738***	0.737***	0.175***	0.175***
revenue from parks	(0.0753)	(0.0756)	(0.0460)	(0.0460)
Year fixed effects	Yes	Yes	No	No
City fixed effects	Yes	Yes	No	No
Constant	-1014.2*	-996.3*	136.7*	136.9*
	(600.2)	(600.5)	(75.36)	(75.37)
Observations	3427	3427	3427	3427
Rho	0.747	0.747		
R^2			0.851	0.851

Note: DV = dependent variable. All independent variables are lagged by one year.
Robust standard errors are in the parentheses. Year and city dummies are not reported.
Significance Level: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4: FE and LDV Models of Proportion Public Operational Expenditures on Parks

	DV: Percentage Public Operational Expenditures on Parks			
	FE Linear	**FE Quadratic**	**LDV Linear**	**LDV Quadratic**
Lagged DV			0.869***	0.869***
			(0.0200)	(0.0200)
Per capita nonprofit	-0.0171***	-0.0309***	-0.00805***	-0.00994**
expenses	(0.00585)	(0.00796)	(0.00286)	(0.00471)
Per capita nonprofit		0.000293***		0.0000516
expenses squared		(0.0000937)		(0.0000759)
Log of median	1.363	1.299	-0.748***	-0.748***
household income	(1.540)	(1.529)	(0.177)	(0.177)
Log of median housing	0.0698	0.0618	0.0851**	0.0842**
value	(0.260)	(0.259)	(0.0389)	(0.0390)
Percentage	0.00575	0.00644	0.00428**	0.00419**
homeownership	(0.0283)	(0.0285)	(0.00187)	(0.00189)
Percentage in poverty	-0.0153	-0.0155	-0.0221***	-0.0221***
	(0.0506)	(0.0507)	(0.00669)	(0.00669)
Median age	-0.0161	-0.0184	-0.0142***	-0.0140***
	(0.0572)	(0.0573)	(0.00510)	(0.00511)
Percentage white	0.0316**	0.0320**	0.000134	0.000156
	(0.0145)	(0.0144)	(0.00117)	(0.00118)
Percentage bachelor's	-0.0242	-0.0201	0.00658***	0.00670***
degree or higher	(0.0331)	(0.0330)	(0.00206)	(0.00208)
Percentage voted for the	0.00420	0.00367	-0.000349	-0.000327
Democratic candidate	(0.00900)	(0.00899)	(0.00115)	(0.00116)
Percentage	-0.000836	-0.000847	-0.00387***	-0.00386***
intergovernmental	(0.00764)	(0.00760)	(0.00141)	(0.00141)
revenue				
Percentage property tax	0.0105	0.0105	-0.00340***	-0.00343***
revenue	(0.00764)	(0.00760)	(0.00130)	(0.00130)
Per capita government	0.0184***	0.0184***	0.00309***	0.00309***
revenue from parks	(0.00223)	(0.00223)	(0.000755)	(0.000756)
Year fixed effects	Yes	Yes	No	No
City fixed effects	Yes	Yes	No	No
Constant	-15.18	-14.46	8.009***	8.022***
	(16.66)	(16.57)	(1.875)	(1.875)
Observations	3427	3427	3427	3427
Rho	0.773	0.772		
R^2			0.871	0.871

Note: DV = dependent variable. All independent variables are lagged by one year.
Robust standard errors are in the parentheses. Year and city dummies are not reported.
Significance Level: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5: System GMM Estimates of Public Operational Expenditures on Parks

	DV: Per Capita Public Operational Expenditures	DV: Percentage Public Operational Expenditures
Lagged DV	0.629***	0.572***
	(0.0753)	(0.0595)
Per capita nonprofit expenses	-0.424**	-0.0137***
	(0.195)	(0.00395)
Log of median household income	-59.11**	-2.707***
	(24.96)	(0.701)
Log of median housing value	18.92***	0.459***
	(7.005)	(0.165)
Percentage homeownership	0.420	0.0190**
	(0.386)	(0.00815)
Percentage in poverty	-1.597*	-0.0663***
	(0.962)	(0.0225)
Median age	0.642	-0.0258
	(0.729)	(0.0209)
Percentage white	-0.198	-0.00294
	(0.166)	(0.00383)
Percentage bachelor's degree or higher	0.318	0.0266***
	(0.315)	(0.00940)
Percentage voted for the Democratic candidate	0.214	-0.000913
	(0.145)	(0.00400)
Percentage intergovernmental revenue	-0.577**	-0.0139***
	(0.229)	(0.00536)
Percentage property tax revenue	-0.598**	-0.0121**
	(0.247)	(0.00610)
Per capita government revenue from parks	0.0984	0.00464**
	(0.0904)	(0.00189)
Year dummies	Yes	Yes
Observations	3427	3427
Number of instruments	102	102
Number of groups	149	149
AR(1) test (p-value)	0.000	0.000
AR(2) test (p-value)	0.138	0.214
Hansen test of over-identification (p-value)	0.306	0.316

Note: DV = dependent variable. All independent variables are lagged by one year.
Robust standard errors in two-step estimation are in the parentheses. Year dummies are not reported.
Significance Level: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$