Are Government Agencies Using More Volunteers?

Evidence from the United States and Implications for Other Nations

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Rebecca Nesbit, Ph.D.
Seong-Cheol Kang, Ph.D., expected Spring 2018
Jeffrey L. Brudney, Ph.D.

Scholars and practitioners rarely conceive of volunteers as assisting the public sector. Although studies based on the United States suggest that government may be responsible for as much as one-third of all volunteering activity, scant research has examined government preparation for and adoption of volunteer programs (Brudney, 1990). Instead, the great bulk of research on volunteering is directed to the context of nonprofit, voluntary organizations and associations.   In recent years, though, financial stringency and decreased budgets have led elected and appointed government officials to advocate for the use of citizen volunteers to sustain or expand public services, not only in the United States but also cross-nationally.   In the U.S., where the trend has received most attention, national surveys attempt to document the extent of citizen volunteering.   Yet, an effective citizen response to government appeals for volunteers requires greater attention to programs in place that might enable and support more volunteering.

This research examines volunteer programs implemented at the local government level in the United States and the factors that lead local jurisdictions to involve volunteers in the delivery

of services.   We begin by relating volunteer programs organized and housed by local governments to the "coproduction" of services, and develop a framework to explain the adoption of these programs across the U.S.   We next elaborate our data and methodology.   After presenting the findings of our statistical analysis, we discuss the implications for practice and research.

Coproduction of Services and Citizen Volunteers to Government

The burgeoning literature on coproduction advances numerous definitions.   Despite the profusion they have in common the active involvement of lay citizens with paid service agents in the design, and especially the delivery, of services.   As Parks *et al*. (1981) first proposed, coproduction conceives the active participation of citizen "consumer producers" working with "regular producers" or paid government service agents to deliver public services (cf. Brudney and England, 1983).   To Bovaird and Loefler (2015) the most distinctive aspect of coproduction is that it conceives of citizens adding value to the activities of the public sector. They therefore propose the definition that coproduction is "public service professionals and citizens making better use of each other's assets, resources and contributions to achieve better outcomes or improved efficiency" (Bovaird & Loeffler, 2012, p. 1121).   The use of citizen volunteers to assist public service agents in providing services to the citizenry offers an apt example.

Bovaird and Loeffler (2015) illustrate many phases of the service cycle in which citizens may work with paid government officials to make a contribution to services, including co-commissioning, co-designing, co-producing, co-managing, and co-assessing.   To capture the diversity of the involvement of citizens in public services, contemporary definitions of coproduction often introduce typologies of this activity.

A prominent example is the one forwarded by Brandsen and Honingh (2015, p. 431), who define coproduction as "a relationship between a paid employee of an organization and (groups of) individual citizens that requires a direct and active contribution from these citizens to the work of the organization" -- which would seem to encompass citizen volunteers in the delivery of local government services.   In addition to these "basic elements of coproduction," these authors identify two variable elements from which they construct a typology of coproductive activity: the extent to which citizens are involved not only in the implementation but also in the design of organizational services, and the proximity of the tasks that citizens perform to the core services of the organization (p. 432).   By this typology, volunteer programs in local government intended to involve citizens directly in the delivery of services would be classified as "coproduction in the implementation of core services," since the services coproduced are central activities of local government and essential to the welfare of their citizenry.   Citizens may benefit directly as recipients of these services or as members of the larger community. "Coproduction of public services means that services are not only delivered by professional and managerial staff in public agencies but also coproduced by citizens and communities" (Brandsen & Honingh, 2015, p. 427).

In a yet more recent treatment of the coproduction concept, Nabatchi, Sancino, and Sicilia (in press, p. 4) "define coproduction as an umbrella concept that captures a wide variety of activities that can occur in any phase of the public service cycle and in which state actors and lay actors work together to produce benefits."   Like Brandsen and Honingh (2015), these researchers propose a typology of coproduction, in their case based on the "level" or extent of the local citizenry involved in coproduction (individual, group, or collective) and the phase of the service cycle in which they are involved (commissioning, design, delivery, or assessment).   By

their definition, the involvement of citizen volunteers in the delivery of local government services with paid public officials that we examine in our study constitutes coproduction at the "collective" level in the "co-delivery" phase of the service cycle.

In developing their typology Nabatchi, Sancino, and Sicilia (in press) draw on a classic, earlier definition of coproduction by Brudney and England (1983) in which the latter researchers distinguished three levels of coproduction -- individual, group, and collective. Brudney and England (1983, p. 63) proposed that these types formed a hierarchy of coproductive activity according to the "benefits achieved and the degree of overlap found between the activities of regular producers and consumers." Moreover, they linked collective coproduction explicitly to "the labor of citizen volunteers" in government services (p. 64), the subject of our inquiry. Brudney and England (1983) maintain that the benefits of this type of coproduction accrue to the city as a whole, and that the degree of overlap achieved between regular producers and consumers is maximized in these collective coproduction programs of local government. By volunteering their time and talents to government agencies citizens "add value" to the activities of the public sector (Bovaird and Loeffler, 2015).

Accordingly, we view citizen involvement as volunteers in the delivery of government services as an example of "coproduction." In the United States about 62.6 million people volunteered through or for an organization at least once between September 2014 and September 2015 (U.S. Department of Labor, 2016), the most recent year for which national volunteering data for the U.S. are available. According to the results of the survey, one-quarter of the population (24.9 percent) reported doing volunteer work for any organization (public, nonprofit, for-profit) during this period. Contemporary survey research has yet to address the number (or

percent) of these volunteers who may assist governments in the United States, however, other research provides some indication of the scope and magnitude.

A comprehensive analysis of available longitudinal data on citizen involvement in public service delivery undertaken by Brudney, Harris, and Sink (in press) suggests that between 20 and 30 percent of all volunteers in the U.S. donate time to public organizations. This estimate is remarkably consistent with Brudney's (1990, p. 2) conclusion that a "significant amount of volunteer labor is directed to public agencies: U.S. government agencies operate as many as 20 to 30 percent of all organized volunteer programs, and perhaps another 20 to 30 percent of these programs are associated with the public sector." Based on analysis of city and county (local) governments rather than citizens in the United States, Nesbit and Brudney (2013) find that 27 percent of city and county (local) governments use volunteers in the delivery of at least one public service. Using data from the 2007 Alternative Service Delivery (ASD) Survey administered by the International City/County Management Association (ICMA) in the U.S., Nesbit and Brudney (2013) report that the population size of a locality is related to the type of public services volunteers provide: Smaller jurisdictions are more likely to use volunteers in public safety, and larger jurisdictions are more likely to use them in health and human services and cultural and arts programs.

Explaining Local Government Use of Volunteers

Given these results a sufficient volume of volunteering exists in the public sector to warrant explanation of the factors that might contribute to its incidence. Using data collected from local (city and county) governments in the Untied States, in this article we attempt to explain this phenomenon. Although volunteering is an important component of local

government service delivery, we lack an understanding of those factors that influence local government adoption of volunteering programs.

James M. Ferris' (1988) early investigation in this arena used a supply and demand framework to help explain the conditions in which local governments would turn to volunteers for the coproduction of service delivery.   Ferris argued that local governments must be open to and supportive of volunteers, but a supply of individuals willing and able to donate their time to local government must also be available.   Ferris' demand factors included government financial resources, the receptivity of government employees, and the objectives of government managers. Among his supply factors, Ferris included a willing supply of volunteers (based on supportive demographic characteristics) and community heterogeneity and cohesion.   Ferris (188) finds that jurisdictions most likely to use volunteers were those with a higher tax burden, with a manager form of government, with a larger population, a poorer population, and that were not operating under a tax limitation.

Despite the incidence and importance of volunteers to the delivery of public services, we are not able to find further research beyond Ferris (1988) attempting to explain this phenomenon. Accordingly, in this research we extend his analysis.   We agree generally with Ferris' supply and demand framework approach.   However, a greater abundance of data 30 years after the Ferris article appeared in print allow us to consider other supply and demand factors that might influence whether local governments use volunteers.   We elaborate Ferris' supply and demand framework by including additional local government characteristics that might affect the use of volunteers, particularly additional measures of the jurisdiction's civic capacity, or its ability to support volunteerism.   We seek to answer the question: what supply and demand factors affect local government volunteer use in the contemporary context?

Survey and Sample

The primary data for this study comes from the International City/County Management Association (ICMA) survey on local government alternative service delivery (ASD) arrangements administered in 2007 (the most recent publicly-available data). The survey is sent to the Chief Administrative Officers in "municipalities with populations above 10,000, in counties with populations above 25,000, and to a random sample of one in eight municipalities from 2,500 to 9,999 in population and one in eight counties with populations from 2,500 to 24,999." From the 6,095 municipalities and counties that received the survey, the number of respondents was 1,599 (26.2%). For this study, we focus on county governments for a final sample size of 354 (The data we rely on for our study are available at the county level).

The 2007 ICMA Alternative Delivery Survey examines various service delivery mechanisms, such as direct delivery using public employees, intergovernmental agreements, contracting out with private firms or non-profit organizations, franchises, subsidies, and volunteers. The survey assesses a total of 67 services in the seven categories of public works/transportation, public utilities, public safety, health and human services, parks and recreation, culture and arts programs, and support functions. According to Ferris (1988), the use of volunteers and contracting out with nonprofit and community organizations best reflect the concept of coproduction. However, contracting out with nonprofit or community organizations entails a different set of considerations in which the relationship with coproduction is less clear. Therefore, only the use of volunteers qualifies as a coproduction arrangement in this study. Of the 354 county governments in our sample, nearly 29 percent used volunteers in at least one public service area. This captures the extent to which governments rely on volunteers across

service areas. Of these, the maximum percentage of activities in which such arrangements were utilized is 12.50 percent.

Additional data were collected from various sources. These are used to derive measures of community and demographic characteristics that represent the demand and supply factors. Supplemental data sources include the 2007 *County and City Databook*; 2007 *County and City Extra: Annual Metro, City, and County Databook*; and the Lincoln Institute of Land Policy and George Washington Institute of Public Policy's *Significant Features of the Property Tax*.

(Insert Table 1 about here)

Variables

Use of volunteers. The primary dependent variable is the percentage of services delivered by a local government in which volunteers were utilized. This variable is constructed by dividing the total number of services a jurisdiction provides by the total number of services in which volunteers are used, and by multiplying this quotient by 100. This information is used to create a second binary dependent variable indicating whether a jurisdiction used volunteers in any service area (1 = yes, 0 = no).   These measures constitute the dependent variables in our analysis.

Characteristics of Government. The first set of independent variables examine the characteristics of government, or demand factors, including whether the jurisdiction is composed of manager form of government, relative tax burden, total number of public services offered in a jurisdiction, and total government salaries and wages per capita. Local governments operating under a council-manager will be associated with greater volunteer involvement for public services, as they are prone to enhance the efficiency of the service delivery process (Carr, 2015;

Choi, Feiock, & Bae, 2013; Sharp, 1991). The ICMA survey contains a question about whether the form of government consists of a council-manager, commission, mayor-council, representative town meeting, or town meeting. Using this variable, we create a dummy variable for those jurisdictions operating under a council-manager system (1 = council-manager, 0 = otherwise).

Concerning the tax burden, governments in jurisdictions with high tax burdens know that additional taxation will likely be met with citizen resistance, so one way to expand or enhance services without growing the budget significantly is to use volunteers as a means to cost savings (Ferris, 1988). The hypothesis is that governments in areas with high tax burdens should have greater volunteer involvement in order to ease budgetary constraints. Although Ferris identified tax burden as the ratio of local tax revenue to $100 of median household income, we operationalize tax burden by calculating the ratio of local property tax per capita to median household income due to data availability.

We include the total number of public services offered in a jurisdiction and total government salaries and wages per capita. We hypothesize that governments with a greater number of public services to provide should be more willing to utilize volunteers to meet higher service demands. On the one hand, salaries and wages, a decrease in this variable should generally be associated with greater utilization of volunteers as governments facing budget cuts may decide to use volunteers to deliver services. On the other hand, an increase in salaries and wages also signifies an expansion of services, which suggests that governments could use volunteers to fulfill expanding service demands. In this case expenditure increases might occur in the form of additional administrative costs such as the hiring of supervisory staff to manage volunteers.

Civic Capacity. For this category we include the state rate of volunteering, the number of religious adherents per 1,000 population, the number of registered nonprofit organizations, and the education level. These variables reflect the general level of volunteering by citizens (Musick & Wilson, 2007; Verba, Schlozman, & Brady, 1995) and, therefore, should be associated with an increase in volunteer usage by governments as well. One caveat, however, concerns the crowding out phenomenon in which an increase in volunteer involvement in one sector may lead to a loss of volunteering in another sector (Brooks, 2004). If so, we might expect volunteer involvement in local government to decrease as volunteering in nonprofit and other sectors expand. But studies on volunteering rates in general do not distinguish between public or nonprofit organizations, and therefore, we leave the ultimate effect to empirical verification.

Community Characteristics. The remaining variables control for population size and wealth as measured by level of inequality, percent of black population, and percent of owner-occupied housing. These represent demographic and community characteristics that are expected to influence citizens' willingness to volunteer in a community. For population size, we hypothesize that larger communities are more likely to face greater service demands, and therefore are more prone to using volunteers to deliver services. The Gini index is a measure of income inequality operationalized as a function of the cumulative share of people from lower income to the cumulative share of income earned. A perfect zero corresponds to perfect income equality, whereas one corresponds to perfect income inequality. Meanwhile, the percent of black population reflects community diversity and the available pool of volunteers, based on demographics.   Finally, the percent of owner-occupied housing is a measure of community stability, which is expected to lead to greater levels of volunteer involvement.

Estimation Method.   The model to be estimated assumes the following form:

Volunteer Involvement = ƒ(MANAGER, TXBURD2, SERVICES, SALWAGES, STATEVOL,

RELIGAD, NUMREGNONPROFIT, EDUC, POP, GINI, PERBLACK,

PEROWNHOUS).

Our analysis focuses on two dependent variables. The first is a binary variable indicating whether the jurisdiction uses volunteers in any of the public services that it offers (from one to more services). We use logistic regression analysis for this binary variable. The logisitic regression estimates indicate the likelihood that the local government uses volunteers in the production of any service.

The second dependent variable is extent of volunteer use measured as the percentage of government services in which volunteers are utilized. A Tobit regression analysis is used for this variable because many local governments do not report using volunteers in public service delivery at all, and among those that do a wide variation exists in the extent of their usage. This leads to the distribution of the dependent variable being censored, namely, that the distribution has a lower bound of zero. Therefore, a Tobit estimate is relevant for our purposes of dealing with censored data. However, the Tobit coefficients are uninterpretable aside from the sign, since they do not reflect the magnitude of the effect of the independent variables on the dependent variable. Therefore, we also include marginal effects for the Tobit models. Two equations underlie the Tobit model, first, the effect of the independent variables on the probability of observing a non-zero value of the dependent variable, and second, the effect of the independent variables on the observed non-zero values of the dependent variable.

Subsequently, for our analysis we obtain three marginal effects for the Tobit model

(Cong, 2001; McDonald & Moffitt, 1980; Roncek, 1992)[1]. The first is the change in the

unconditional expected value of the latent dependent variable: volunteer coproduction

arrangements by local governments. The second is the change in the expected value of the

dependent variable conditional on the observation being uncensored: the change in the expected

percentage of public services where volunteers are used conditional upon the government using

volunteers in any service at all (a non-zero percentage of services using volunteers). The third

marginal effect is the change in the probability that an observation is uncensored: the change in

the probability that a government utilized volunteers in service delivery (a non-zero percent of

services using volunteers). This marginal effect can be interpreted as one would interpret the

marginal effect in a probit model. We calculate these marginal effects for volunteering at the

point of censoring (zero in volunteer usage) rather than at the variable means to assist in

interpretation.

Findings

Likelihood of Volunteer Involvement.   Table 1 reports the descriptive statistics for the

variables in our study.[2]

(Insert Table 1 about here)

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[1] McDonald and Moffit have demonstrated how these three marginal effects are related in a systematic way. The change in the unconditional expected value of the latent variable (a) is equal to the sum of the expected value conditional on being uncensored, (b) weighted by the probability of being uncensored added to the probability of being uncensored, and (c) weighted by the conditional expected value. These are expressed as the equation:

$$\frac{\partial E[y_i]}{\partial x_i} = \Pr[y_i^* > 0]\left(\frac{\partial E[y_i^*|y_i^* > 0]}{\partial x_i}\right) + E[y_i^*|y_i^* > 0]\left(\frac{\partial \Pr[y_i^* > 0]}{\partial x_i}\right)$$

[2] Public utilities are not included because no county government in the study used volunteers in public utilities.

As mentioned previously, 29 percent of the counties in our sample utilize volunteers in at least one service area. The percentage of services where volunteers are used ranges from 0 to 12.50 with a mean of 0.85 percent. Twenty-seven percent of jurisdictions had a council-manager form of government. The mean of the tax burden for jurisdictions is 1.60, calculated as the ratio of property tax per capita to median household income. The average number of public services offered in a jurisdiction is 34, while the average for government salaries and wages per capita is $2081.40. The state volunteering rate averages 30.14 percent, while the average number of religious adherents per 1,000 population is 482.43. The average number of registered nonprofit organizations in the sampled counties is 750, while the percent of population with a Bachelor's degree averages 19.87 percent. For the control variables, the average county population size as of 2007 is 159,420, while the inequality index has a mean of 0.42. With respect to the minority population, on average these county jurisdictions consisted of 8.92 percent African Americans, while the percent of owner-occupied housing units was 72.66.

(Insert Table 2 here)

The results in Table 2 display the coefficients and percentage change in odds for the logit regression models for the use of volunteers in all service areas. In this model form of government is not statistically significant. While tax burden is statistically significant ($p<.10$), the direction of influence is contrary to our hypothesis that higher tax burden leads to greater likelihood of using volunteers. For our results, estimates show that an increase in tax burden decreases the odds of utilizing volunteers for service delivery in one or more service areas by 40.15 percent ($p<.10$). We also find that the total number of services provided is significant ($p<0.01$), indicating that an

increase in this variable increases the odds of utilizing volunteers in one or more service areas by 129.58 percent. Meanwhile, for the civic capacity category, the state volunteering rate is significant ($p<.05$) and negatively associated with the likelihood of using volunteers. While contradicting our initial hypothesis, this may indicate that increased volunteer involvement in other sectors may decrease volunteer usage by the governments. The estimates show that an increase in the state volunteering rate decreases the odds of utilizing volunteers in the public sector in one or more service areas by 5.34 percent. Finally, for education level, the results show a significant and positive association with volunteer involvement ($p<0.01$), indicating that an increase in education level increases the odds of utilizing volunteers in one or more service areas by 4.59 percent.

While Table 2 shows the results for all service areas, Table 3 contains the results for different service categories. For summary purposes, only the sign of the coefficient and significance levels are reported. The results indicate that each service area is significantly influenced by different factors. Examining some of the key results, we find that a council-manager form of government is significant for public works and transportation only and is associated with a decrease in the likelihood of using volunteers ($p<0.05$). Tax burden is significant and negative for parks and recreation ($p<0.05$), while the total number of services provided is significant and positively associated with the use of volunteers in public works and transportation ($p<0.10$), public safety ($p<0.05$), and culture and arts ($p<0.05$). Meanwhile, total salaries and wages per capita is significant and positively related to the use of volunteers in public safety ($p<0.01$), parks and recreation ($p<0.05$), and culture and arts ($p<0.05$). The state volunteering rate is negatively associated with volunteer usage in culture and arts ($p<0.10$) as well as support functions ($p<0.05$). Finally, higher education levels are significant and positively

associated with volunteer usage in health and human services (p<0.05) and support functions (p<0.10), while percent of owner-occupied housing is positively associated with volunteer use in health and human services only (p<0.05).

(Insert Table 3 about here)

Degree of Volunteer Involvement. Table 4 provides the results for the Tobit regression and marginal effects for the model using the percentage of local government services utilizing volunteers as the dependent variable.

(Insert Table 4 about here)

The first marginal effect in Table 4 (ΔUEV) is the change in the expected value of coproduction (the latent variable) arrangements in local governments. The second (ΔCEV) and third marginal effects (ΔProb) are the change in the percentage of services with volunteer usage and the change in the probability of volunteer usage in any service. We focus on those results that are statistically significant. The total number of services provided is statistically significant and in line with our hypothesis that an increase in service provision leads to greater usage of volunteers. In our results, a one-unit change in the log of the number of services provided increases the percentage of services using volunteers 0.29 percentage points (ΔProb=0.10, p<.05). Next, the state volunteering rate is significant but negatively associated with greater usage of volunteers. As with the logit analysis, the result contradicts the hypothesis that an increase in volunteering rate should be associated with greater use of volunteers. A one-unit

increase in the state volunteering rate decreases the percentage of volunteer usage for service delivery by 0.03 percentage points (ΔProb=-0.01, p<.05). Finally, we find that education level is significant and positively associated with greater usage of volunteers. A one-unit increase in education level increases the percentage of volunteer usage for service delivery by 0.02 percentage points (ΔProb=-0.01, p<.05).

For the Tobit regression and marginal effect, we also present the results for different service categories in Table 5. Focusing on the key results, we find that manager form of government is significant and negatively associated with greater use of volunteers in public works and transportation (p<0.10). The tax burden is only significant and negative for public safety (p<0.10), while the total number of services provided is significant and positive with greater use of volunteers in public safety (p<0.05), parks and recreation (p<0.05), and culture and arts (p<0.05). Higher education level is significant and positively associated with volunteer usage in health and human services only (p<0.10). Meanwhile, greater inequality as measured by the Gini index is significant and negatively associated with greater volunteer usage in parks and recreation (p<0.10) as well as culture and arts (p<0.10). Finally, the percent of owner-occupied housing is significant and positively associated with greater use of volunteers in health and human services (p<0.10).

(Insert Table 5 about here)

Discussion

The primary purpose of this article has been to explore how demand and supply factors affect local governments' decisions to utilize volunteers for public service delivery.   We find

that supply and demand considerations do matter for local government volunteer use -- both the likelihood of using volunteers and the degree of volunteer usage. Similar to Ferris (1988), though, who found only four variables achieving significance in his statistical analysis (including one significant effect contrary to hypothesis), a much narrower range of factors were significantly related to volunteer use by counties than we had anticipated.   In sum, much remains to be learned about this phenomenon.

Nevertheless, across all service areas we found that tax burden, total number of services provided, state volunteering rate, and education level affect the likelihood of using volunteers in county governments.   With respect to the degree of volunteer usage, our results show that the total number of services provided, state volunteer rate, and education level have a significant effect in determining the extent of county government volunteer use in all service areas.

Our study is an extension of Ferris (1988) study, which also used ICMA Alternative Service Delivery data (for 1982). Although the lack of available data precluded a complete replication of Ferris' study, our study potentially points to different supply and demand dynamics leading to local government volunteer program adoption twenty years after Ferris' study.   One striking difference between our study and Ferris' is that local government's demand context for volunteers seems to have shifted.   Although Ferris finds that tax burden is positively related to volunteer use in the 1980s, in the 2000s, we find that tax burden is negative related to volunteer use.   Ferris's hypothesis was that local governments in high tax burden areas would feel pressures to use volunteers as a cost-savings mechanism to enhance service delivery without increasing taxes.   Our contradictory finding could be evidence that citizen preferences for local government are shifting -- perhaps more citizens have a preference for professionally delivered or more complex services, which might limit opportunities for volunteer involvement (Forrer,

Kee, Newcomer, & Boyer, 2010; Guttman, 2000).   Another difference is having a council-manager form of government.   Ferris found that having a city manager was positively related to the likelihood of a local government using volunteers, but in our study this variable was not statistically significant in the overall model (but it was negatively related to the likelihood of using volunteers in public works/transportation).   Ferris argued that the manager form of government would be more efficient and thus lead to volunteer use from an efficiency standpoint.   Again, our contradictory finding could be evidence of shifts in local government practices related to service delivery—one such practice could be the availability of more alternative service delivery options that might be perceived as being more efficient than volunteers.   In any case, the decreased likelihood of using volunteers in public works/transportation might be because infrastructure projects involve higher risk and might require professional delivery mechanisms such as public-private partnerships (PPPs) (Koppenjan & Enserink, 2009).

We consider several other demand factors that Ferris (1988) did not employ.   The total number of services provided in a jurisdiction was positively related to utilizing volunteers, but not the degree, in the areas of public works and transportation, public safety, and culture and arts. This finding seems to indicate that local governments which provide a greater range of services might be more open to using various methods of coproduction, such as volunteers.   For instance, Bovaird and Loeffler (2012) discuss how coproduction is often most common in countries with large welfare states, although the degree in which governments involvement different users and stakeholders will depend on constitutional and political differences between nation-states (Pestoff, 2012). An interesting study by Gazley and Brudney (2005) compared how local government administration in the US state of Georgia perceived volunteer involvement

from 1990 to 2003. While in 1990 the predominately listed advantage of using volunteers was cost savings, in the 2003 survey local government administrators consistently ranked increased capacity, better community relations, and improved quality of services as fairly equal advantages of volunteer use. This result seems to indicate that the attitudes of local government administrators toward coproduction, particularly volunteer use, is changing. Those local governments offering more services might be more eager to capture all the perceived advantages of using volunteers.

Total local government salaries and wages per capita is positively related to both the decision to utilize volunteers and the degree of volunteer usage only in public safety, parks and recreation, and culture and arts. Initially, this finding is contrary to our hypothesis that a decrease in salaries and wages should generally be associated with greater utilization of volunteers -- a view that volunteers might be a substitute to paid staff. The positive relationship in this case might indicate local government capacity to implement and oversee coproduction arrangements, including the use of volunteers (Bovaird & Loeffler, 2012).

One way that we extended Ferris (1988) study was to include several measures of a community's civic capacity and capacity to volunteer. In terms of civic capacity, the state volunteering rate is significant but negatively related to the decision to utilize volunteers and not the degree of volunteer usage. The result contradicts the hypothesis that an increase in the state volunteering rate should be positively associated with volunteer usage. As discussed earlier, however, this finding seems to confirm the notion of crowding out in which an increase in volunteer involvement in the nonprofit sector generated a loss of volunteering in the public sector. A higher volunteering rate could mean greater within and across-sector competition for volunteers. Meanwhile, a higher education level is significantly related to the decision to

utilize volunteers and the degree of volunteer usage particularly in the realm of health and human service.   Although all service areas require a certain level of education on the part of volunteers, studies have discussed how health services require a higher degree of skills, qualifications, and effectiveness (Handy, Mook, & Quarter, 2008).   Community education levels might shape the kinds of coproduction activities in which citizens can participate effectively.

We also obtained interesting results in regard to other supply-side factors -- community characteristics.   Although none of the community characteristic variables were statistically significant in the overall logit or tobit models, certain community characteristics were related to volunteer use in certain domains.   Greater income inequality decreased the likelihood of using volunteers in public works/transportation, parks and recreation, and arts and culture.   A higher percentage of Blacks in the community was negatively related to using volunteers in parks and recreation.   Finally, the percent of housing that is owner-occupied is positively related to volunteer use in health and human services.   These findings are interesting because community characteristics might represent both the potential supply of volunteers and the demand for public services.   Parks and recreation and arts and culture services might be the most difficult to provide through coproduction arrangements in more disadvantaged communities.

Conclusion

Based on our analysis and that of Ferris (1988), which provides the springboard for our inquiry, researchers have a long way to go in identifying a comprehensive set of factors that reliably predict the use of volunteer-driven coproduction arrangements in local government.   It appears that both supply and demand factors matter, and that their relative importance varies across the different areas of service delivery.   With respect to practice, our results suggest that

relatively few characteristics of the government, the community, or civic capacity would seem to limit the amount of coproduction achieved in the delivery of public services.   Thus, county officials interested in increasing volunteerism in services would seem to face little constraint from this relatively enduring characteristics.

For researchers, the results likewise seem positive.   Research on coproduction has been targeted on definitional and conceptual issues, to determine the parameters and potential of this important concept.   With the profusion and breadth of contemporary definitions, such as the ones we have reviewed (Bovaird and Loeffler, 2015; Brandsen and Honingh, 2015; Nabatchi, Sancino, and Sicilia, in press), coproduction research may have moved to a new phase where empirical inquiry on its sources and effects may become more of a priority.   We look to future research to help explain the variation in the adoption and use of coproduction arrangements across local governments.

Table 1. Descriptive Statistics

Variables	Mean	Std. Dev.	Min	Max
Dependent variables (likelihood of volunteer usage)				
Use of volunteers in any area	0.29	0.45	0	1
Use of volunteers, public works / transportation	0.04	0.21	0	1
Use of volunteers, public safety	0.13	0.34	0	1
Use of volunteers, health and human services	0.10	0.30	0	1
Use of volunteers, parks and recreation	0.05	0.22	0	1
Use of volunteers, cultural and arts programs	0.10	0.30	0	1
Use of volunteers, support functions	0.84	0.15	0	1
Dependent variables (degree of volunteer usage)				
Percent of services using volunteers in any area	0.85	1.48	0	12.50
Percent of services using volunteers, public works / transportation	0.14	0.67	0	6.25
Percent of services using volunteers, public safety	0.39	1.01	0	5
Percent of services using volunteers, health and human services	0.30	1.05	0	12.50
Percent of services using volunteers, parks and recreation	0.14	0.61	0	4.76
Percent of services using volunteers, cultural and arts programs	0.26	0.80	0	5.26
Percent of services using volunteers, support functions	0.09	0.77	0	12.50
Characteristics of government				
Jurisdiction has council-manager form of government (dummy)	0.27	0.44	0	1
Ratio of property taxes per capita to median household income	1.60	0.68	0.36	4.64
Total number of public services offered in jurisdiction	34	13	0	67
Total government salaries and wages, per capita	2081.40	8799.50	13.58	125948
Civic Capacity				
State volunteering rate	30.14	5.64	17.50	45.90
Number of religious adherents per 1,000 population	482.43	164.42	133.43	992.70
Number of registered nonprofit organizations	750	1411	1	11788
Percent of population with Bachelor's degree	19.87	9.07	6.20	60.20
Community Characteristics				
Population, in thousands	159.42	326.28	2.45	3002.05
Gini index of inequality	0.42	0.03	0.33	0.57
Percent of Black population	8.92	13.17	0.07	79.73
Percent of jurisdiction's households who own homes	72.66	7.51	43.30	88

* Unit of analysis is county-level for all variables, unless otherwise stated.

Table 2. Logit Estimates, Determinants of Volunteer Usage, All Service Areas

Variables	Slope	%Δ Odds
Characteristics of Government		
Council-manager form of government	0.26(0.30)	30.23
Tax burden	-0.51(0.27)*	-40.15
Total # of services provided (log)	0.83(0.25)***	129.58
Total salaries and wages per capita (log)	0.07(0.10)	7.35
Civic Capacity		
State volunteering rate	-0.05(0.02)**	-5.34
Religious adherence per 1,000 pop (log)	0.17(0.40)	18.37
Number of registered nonprofits (log)	-0.06(0.28)	-5.51
Education level (% Bachelor degree)	0.04(0.02)***	4.59
Community Characteristics		
Population (log)	-0.25(0.27)	-22.37
Gini index	-6.89(4.39)	-99.90
% of Black population	-0.003(0.01)	-0.30
% of owner-occupied housing	-0.02(0.02)	-1.80
N	354	
Wald Chi^2	30.85	
R^2	0.09	

Note: Unit of analysis is county-level unless otherwise stated.

* p<0.1; **p<0.05; ***p<0.01

Table 3. Summary of Logit Regression Estimates, Likelihood of Using Volunteers

	All Service Areas	Public Works & Transportation	Public Safety	Health and Human Services	Parks and Recreation	Culture and Arts	Support Functions
Characteristics of Government							
Council-manager form of government		(-)**					
Tax burden	(-)*				(-)**		
Total number of services provided (log)	(+)***	(+)*	(+)**			(+)**	
Total salaries and wages per capita (log)			(+)***		(+)**	(+)**	
Civic Capacity							
State volunteering rate	(-)**					(-)*	(-)**
Religious adherence per 1,000 pop (log)							
Number of registered nonprofits (log)							
Education level (% Bachelor degree)	(+)***			(+)**			(+)*
Community Characteristics							
Population (log)							
Gini index		(-)*			(-)**	(-)**	
% of Black population					(-)*		
% of owner-occupied housing				(+)**			

*p<0.10; **p<0.05; ***p<0.01

Table 4. Tobit Estimates, Determinants of Volunteer Usage, All Service Areas

Variables	Slope	ΔUEV	ΔCEV	ΔProb
Characteristics of Government				
Council-manager form of government	0.52(0.64)	0.15	0.14	0.05
Tax burden	-0.73(0.45)	-0.22	-0.19	-0.07
Total number of services provided (log)	1.12(0.51)**	0.33	0.29	0.10
Total salaries and wages per capita (log)	0.05(0.22)	0.01	0.01	0.004
Civic Capacity				
State volunteering rate	-0.11(0.05)**	-0.03	-0.03	-0.01
Religious adherence per 1,000 pop (log)	0.11(0.84)	0.03	0.03	0.01
Number of registered nonprofits (log)	0.13(0.74)	0.04	0.03	0.01
Education level (% Bachelor degree)	0.08(0.03)**	0.02	0.02	0.01
Community Characteristics				
Population (log)	-0.65(0.69)	-0.19	-0.17	-0.06
Gini index	-10.43(8.64)	-3.09	-2.74	-0.95
% of Black population	-0.01(0.02)	-0.003	-0.003	-0.001
% of owner-occupied housing	-0.02(0.04)	-0.005	-0.004	-0.001
N	354			
Likelihood-Ratio Chi^2	24.89			
R^2	0.03			

ΔUEV: Change in the unconditional expected value of the latent variable (use of volunteers in public services)
ΔCEV: Change in the conditional expected value (change in the percentage of volunteer usage)
ΔProb: Change in the probability of observing an uncensored value (change in the probability of using volunteers)
* $p<0.1$; **$p<0.05$; ***$p<0.01$

Table 5. Summary of Tobit Decomposition Estimates, Degree of Using Volunteers

	All Service Areas	Public Works & Transportation	Public Safety	Health and Human Services	Parks and Recreation	Culture and Arts	Support Functions
Characteristics of Government							
Council-manager form of government		(-)*					
Tax burden			(-)*				
Total number of services provided (log)	(+)**					(+)*	
Total salaries and wages per capita (log)			(+)**		(+)**	(+)**	
Civic Capacity							
State volunteering rate	(-)**						
Religious adherence per 1,000 pop (log)							
Number of registered nonprofits (log)							
Education level (% Bachelor degree)	(+)**			(+)*			
Community Characteristics							
Population (log)							
Gini index					(-)*	(-)*	
% of Black population							
% of owner-occupied housing				(+)*			

*p<0.10; **p<0.05; ***p<0.01

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