Are Special Districts Strategic Complements or Strategic Substitutes?[*]

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What happens to service provision when a special district enters the public service market? Theoretically, special districts can act either as complements by supplementing existing service provision, or as substitutes by supplanting current service provision. We find a substitution effect using fixed effects regression on urban counties in the United States from 1972 to 2017. Special districts replace public service provision by county governments; however, we find no similar result for municipal governments. The results are nuanced – findings are confined mainly to spatially expansive public services like fire protection, sewerage, and solid waste management. Furthermore, we find evidence that day-to-day operations drive observed substitution and that county size is an important factor depending on the functional service area.

Keywords: Special Districts, Public Service Provision, Local Government, Complements vs. Substitutes

INTRODUCTION

Special districts are the fastest growing and most numerous individual form of local government in the United States (Goodman 2019). These districts are often single function in nature, providing a single service[1] to a fixed geographic area with resources from within its boundaries. Additionally, special districts are dynamic – many are created each year, and a percentage of existing districts are eliminated each year by dissolution or merger (Goodman 2020). The special district landscape changes often; however, even with its prominence in U.S. federalism, little is known about the systematic effects on service delivery in local areas. How do general-purpose local governments react to the changing service delivery patterns of special districts? The literature is relatively silent on the matter.

Specialization is a hallmark of special district service delivery (Foster 1997); however, special districts are not necessarily the only service provider within a specific policy domain in a geographic area. What happens to general-purpose local government service provision when a special district increases or decreases its spending in the same policy area? Theoretically, service provision by special districts can substitute for general-purpose local government spending, lowering general government spending in the policy area. Or special districts can complement general-purpose local government spending, raising spending in the same policy area. However, there is little empirical evidence on which force dominates.

This analysis examines the relationship between special district spending and general-purpose local government spending in various functional areas to determine the dominant nature of the relationships described above. Drawing on the literature on the interaction between municipalities and homeowners' associations (a type of quasi-public organization with features like special districts), we analyze a panel of urban counties from 1972 to 2017 in 5-year increments using fixed effects regression while controlling for important demand-related factors. Our analysis suggests special district spending can substitute

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1. See Carter, Deslatte, and Scott (2019) for a more complete explanation of multi-function special districts.

for general-purpose local government spending; however, the results depend upon which kind of local government is examined. County governments appear to be the most common target for substitution – particularly for spatially expansive services like fire protection, sewerage, and solid waste management.

Much of the empirical literature on the strategic interaction of local governments focuses on the relationship between horizontally arranged governments, e.g., local governments that do not overlap or share a similar tax base. These governments compete for residents and mobile capital in various ways, including yardstick competition and tax mimicry. Our contribution focuses on vertically arranged governments that overlap and share a common tax base. To our knowledge, the extant literature has not directly examined this relationship outside of homeowners' associations.

The analysis proceeds as follows. First, the relevant literature on the proliferation and dissolution of special districts, functional responsibilities of local governments, and service providers as substitutes vs. complements is discussed. Next, the data and empirical strategy are explained. Results are presented, and policy implications are discussed.

PREVIOUS LITERATURE

Special District Proliferation and Dissolution

The first official Census of Governments survey reported 12,340 special districts in the U.S. in 1952 (Goodman 2020). By the 2017 Census of Governments survey, there were 38,542 independent special districts in the United States (U.S. Census Bureau 2019), constituting a 212% increase or annualized growth rate of 1.7% (Goodman 2020). This proliferation compares to the growth in general-purpose governments (e.g., counties, municipalities, and towns/townships) of only 4.64% overall or 0.07% annually (Goodman 2020). Much of this growth in special districts occurred between 1962 and 1992 – a 68% increase in the number of special districts overall and a 152% increase in the number of special districts in metropolitan areas, including both single-purpose special districts (57% increase) and multipurpose special districts (713% increase) – when there was a commensurate increase in functional responsibilities and professionalization of governments (Stephens and Wikstrom 1998). At the same time, however, the number of county governments remained the same, there was only a modest increase in municipalities, and we saw a decrease in towns and townships (Stephens and Wikstrom 1998).

More recently, Clark (2014) noted that while the number of special districts nearly tripled between 1952 and 1997, the growth of special districts slowed to less than half this rate and even declined in some areas in the fifteen years since, despite continued population growth across the nation. The limited body of research examining the creation of special districts offers mixed evidence on the fiscal autonomy and health of general-purpose local governments and how special districts might be formed to circumvent fiscal constraints imposed by states or to alleviate tax burdens during times of fiscal stress.[2] However, very little evidence exists explaining the dissolution of these forms of special purpose governments. Yet, such research suggests that special district dissolution is not always a reverse process of special district creation, as the procedures guiding special district dissolution are often very different from those governing incorporation (Bauroth 2010; Clark 2014; Moldogaziev, Scott, and Greer 2019). Moreover, once special districts

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2. See, for example, Bollens (1957), MacManus (1981), Nelson (1990), McCabe (2000), Carr (2006), Berry (2009), Carr and Farmer (2011), Billings and Carroll (2012), Bauroth (2015), Shi (2017), Goodman (2018), Greer, Moldogaziev, and Scott (2018), Zhang (2018), Goodman and Leland (2019).

are created, it might be difficult to dissolve them even if they become problematic regarding accountability and/or service performance (Little Hoover Commission 2000).

Although most states have codified statutes governing the formation of special districts, few states have a statutory process for mergers and dissolutions of special districts (see, for example, Hudson 1982), which makes for rather chaotic and ad hoc processes (Clark 2014). In fact, most states do not emphasize one set of procedures for all special districts but rather many ways for special districts to dissolve (Bauroth 2010). And, while dissolution may result from legislative action by the state, particularly for inactive special districts, or by local ordinance (Hudson 1982), it only very rarely occurs as a result of state legislatures acting on their own citepbauroth2010. Still, special districts must often meet state-level criteria related to local government administrative and fiscal responsibilities, in addition to rules embedded in their enabling documentation before they are able to dissolve (Moldogaziev, Scott, and Greer 2019). For example, in Texas, fiscal rules placed upon special districts prevent those with outstanding revenue- and tax-backed debt from dissolving (Moldogaziev, Scott, and Greer 2019). In Florida, the county or municipality might be required to demonstrate the ability to provide the services offered by the special district prior to its dissolution (Hudson 1982). These statutory provisions reiterate that the survivability of special districts depends upon important institutional constraints such that dissolution is not simply a reversal of special district creation (Bauroth 2010).

Through analysis of data from the U.S. Census Bureau from 1987 to 2002, Bauroth (2010) found that special district dissolutions are primarily driven by changes in service demands, local government autonomy, influential public entrepreneurship, fiscal capacity of the districts, and stewardship by elected officials. Clark (2014) surveyed more than 40 practitioners, government administrators, and local government experts in 30 states to explain the declining growth rate of special district creation since the late 1990s. Clark's (2014) survey findings revealed that the most common explanation for the decline in special district growth was mergers and consolidations in attempts to reduce costs. Generally speaking, there is some consensus that special districts are too small to realize economies of scale and operate efficiently; in essence, their existence creates duplication of services and competition for general-purpose governments (Clark 2014). This overlap in service delivery can result in higher taxes for residents in areas where multiple entities with taxing authority operate (Berry 2008). Finally, drawing on the broader organizational ecology and industrial organizations literatures, Moldogaziev, Scott, and Greer (2019) examined the internal and external factors influencing the dissolution of municipal utility districts operating in fragmented service delivery systems. Through quantitative analysis and event history modeling, the authors found that the newness of special municipal utility districts, mimetic pressures, size of service population, and willingness to pay for water services all impact the survivability of these special purpose governments (Moldogaziev, Scott, and Greer 2019).

Functional Responsibilities of Local Governments

Local governments of the same type, cities for instance, often vary considerably in the number and intensity of public services they provide. Even within the same state or same metropolitan area, local governments provide a broad array of services from very few to a great many. In some ways, this arrangement is predicted by Tiebout (1956), who suggested that numerous local governments will compete by providing a diverse array of public services at different tax prices. A small literature emerged in the late 1970s and early 1980s in attempts to quantify the differences in functional responsibilities of municipalities across states and metropolitan areas (Liebert 1974; Dye and Garcia 1978; Clark, Ferguson, and Shapiro 1982). The

methodologies developed during this period and the subsequent research sought to understand changes in the number and quantity of services provided in an area. However, many of these analyses were explicitly focused on comparing areas horizontally, that is, non-overlapping city to non-overlapping city. In fact, much of the comparison was between cities over long geographical distances, such as comparing New York City to Chicago or Los Angeles. So, although the literature has considered how functional responsibilities are assigned, extant research often fails to consider the vertical dimension of local service delivery.

Much of this prior literature is based on research conducted by the Advisory Commission on Intergovernmental Relations (ACIR) in the 1960s and 1970s. The ACIR was concerned with identifying the optimal level of government vertically to provide common municipal services (Advisory Commission on Intergovernmental Relations 1963, 1976). Specifically, ACIR (1963) attempted to chronicle the assignment of responsibilities and examine whether those assignments were optimal given a list of criteria. ACIR (1976) took this further to examine how states and localities transferred functional responsibilities between governments, both horizontally and vertically. This examination is particularly important for our analysis, because ACIR (1976) found a relatively large amount of service transferring between cities, counties, special districts, and their respective state. Specifically, ACIR (1976) reported that 19% of all service responsibilities transferred were moved to special districts. This represents the second largest recipient of transferred services behind county governments. Further, this finding suggests some substitution of service delivery between general-purpose local governments and special districts.

Substitutes or Complements?

The introduction (expansion) or dissolution (contraction) of a special district is likely to have ripples through the local service delivery market. Transferring services between forms of local governments suggests a substitutive relationship between those governments. Rather than enhancing local service delivery, the responsibility for services is merely transferred between governments with no net loss or gain in the quantity of services provided. On the other hand, if different forms of governments have a complementary relationship, in which case a new service is added with the introduction of a new or different service provider, service delivery is enhanced. For example, Turnbull and Djoundourian (1993) examined the demand relationship between activities of overlapping county and municipal governments and found a complementary relationship except for police and infrastructure expenditures. Specifically, the authors found a public sector expansionary effect such that county service provision is reinforced by greater municipal spending.

Similar to the findings of Clark (2014) explaining the slowing growth rate of special districts, ACIR (1976) reported that the most common reason for transferring a service (to any recipient) is to achieve economies of scale or reduce duplication. However, research findings on special districts and this efficiency outcome are mixed. DiLorenzo (1981) argued that since monopolistic local governments have fewer incentives to decrease costs to compete with other local governments, they tend to be more expensive. He found that during 1967-1977, restrictions placed upon the growth of single-function special districts lead to expenditure growth as local governments became more monopolistic. Conversely, Zax (1989) found that fragmentation of single-function governments increased the size of the public sector due to the loss of economies of scale when such special purpose governments serve small populations. Similarly, Eberts and Gronberg (1990) also found a positive relationship between special districts and aggregate local expenditures in their study of 218 standard metropolitan areas in 1977, and Thomas and Boonyapratuang (1993) found greater property tax efforts in Texas cities associated with greater numbers of special districts. However, Nelson (1987) found no effect on local expenditures from the fragmentation posed by single-purpose

governments. Importantly, these studies examine the role of special districts on the overall size of the local public sector, rather than the tradeoff between special districts and other forms of local governments.

More closely aligned with our research, Park (1995) sought to determine the extent to which the proliferation of special districts increases the size of the local public sector and particularly spending by other individual local governments. By focusing on the size of special districts instead of their number within a geographic area, Park (1995) was better able to capture the abilities of special districts to achieve economies of scale and operate more efficiently. In doing so, Park (1995) provided a better measure of local competition and suggested that the impact of special district expenditures on local expenditures may be interpreted as either complementary or substitutionary. A complementary effect would imply a positive correlation as special districts add to local expenditures by adding more services or costs to existing services. In contrast, a substitution effect would imply a negative correlation as special district expenditures reduce local expenditures by replacing general-purpose spending with their own spending (Park, 1995). "These two types of effects are at least implicitly related to the scale efficiency argument because local governments, individually or in aggregate, may replace their own services with those of efficient special districts or incur additional regulation costs from inefficient special districts" (Park 1995, p. 199).

Further, Park (1995) explains that these two conflicting expectations exist because special districts might promote greater competition among local governments. This would keep expenditures lower overall or more diffused among taxing jurisdictions. Or special districts might require more regulatory activities, which would increase costs for general-purpose governments as they appoint officials, collect taxes, underwrite debt, provide personnel and technical support, and/or provide audits for special districts (Park 1995). Through an examination of 53 MSAs in 1977, 1982, and 1987, Park (1995) found support for both the competition effect and the diseconomies of scale effect; however, the latter effect was more dominant as special district expenditures increased MSA expenditures. These findings characterize the relationship between special districts and general-purpose governments as complementary.

More recently is the work by Cheung (2008) on private residential governments, namely homeowners' associations. In posing the question of whether public and private government activities might be considered strategic substitutes or complements, Cheung (2008) examines whether local governments in California adjust their levels of public spending in response to increased membership in private residential governments. Like the creation of special districts, local governments grant public authority to private associations by proving them with powers related to service provision, taxation, and enforcement. And private governments provide services similar to local governments such as sanitation, policing, and recreation. Proponents of private governments suggest they fill service gaps from underfunded or inefficient local governments. However, critics argue that private governments erode support for public institutions, as they divert resources that would otherwise be invested in public services more broadly, which further erodes municipal services as fiscally constrained local governments shift service provision responsibility to private parties. Overall, Cheung (2008) found that a 10% increase in the prevalence of planned developments in a city leads to an average decrease of 1.51% of per capita public expenditures, particularly in the categories of police and parks, but not infrastructure. As such, the author contends that public and private governments are perfect substitutes in consumption, which makes their spending strategic substitutes. In equilibrium, public governments provide less public service in response to private governments.

Theoretical Framework

Our analysis builds upon the work of Helsley and Strange (1998, 2000) on private governments such as Residential Community Associations (or Homeowners Associations) and Business Improvement Districts. In their theoretical work, the local public sector is a perfect substitute for service provision by a private government. By extension, spending by the public sector is a strategic substitute for spending by the private government. This relationship is similar to the general-purpose local government versus special district arrangement. Specifically, local governments (cities and/or counties) provide public services to all residents within their geographic boundaries, attempting to maximize the collective welfare of residents. At the same time, special districts operate like private governments, as they are often formed voluntarily to provide services solely within their boundaries (and also attempt to keep the benefits within their boundaries) using exclusively within-district resources. In this sense, special district spending should be a strategic substitute for municipal and/or county spending. Helsley and Strange (1998, 2000) refer to this as 'strategic downloading,' where municipal governments reduce their spending on service provision in response to spending by private governments in the same service area.

Proposition 1: Special district spending is a strategic substitute for general-purpose local government spending.

Helsley and Strange (1998, 2000) do not explicitly consider the possibility of complementarity; however, Cheung (2008) explains that complementarity is possible.[3] The provision of a service by a city does not rule out that members of an HOA (or special district) may prefer higher levels of service than provided by the general-purpose government. Particularly in areas with high wealth, special districts may be a way to supplement existing service provision while maintaining all the benefits to only those who pay for them, the members of the district. Alternatively, a complementary relationship may arise from spillovers in service provision between the two entities. If a special district operates a sewer system but outsources sewage treatment to a centralized, general-purpose government, a symbiotic and complementary relationship could form.

Proposition 2: Special district spending is a strategic complement for general-purpose local government spending.

As explained above, Cheung (2008) provides limited evidence of strategic substitution between planned developments and municipal spending; however, it is unclear if this relationship holds for special districts and local (municipal and/or county) government spending. Ultimately, which proposition dominates is an empirical question.

DATA & METHODOLOGY

Empirical Strategy

To examine the question of whether special district spending is a strategic substitute or strategic complement to general-purpose local government (city and/or county) spending, the following equation is specified.

$$ln g_{it}^{genpurp} = \beta g_{it}^{spdist} + \delta X_{it} + d_i + d_t + d_{rt} + \varepsilon_{it} \tag{1}$$

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3. Similarly, Brueckner (2003) explains the potential for strategic vertical interactions; however, he admits these types of interactions do not fit within the standard horizontally focused strategic interaction models (e.g., yardstick competition or tax mimicking).

Where i indicates counties, r indicates MSAs, and t indicates years. The dependent variable is the natural log of per capita direct public spending ($g_{it}^{genpurp}$) at the general-purpose local government (municipality and/or county) level. Our primary variable of interest is per capita special district spending (g_{it}^{spdist}). The null hypothesis is $\beta = 0$ or no relationship between special district spending and general-purpose local government spending. If the null hypothesis is rejected, the sign of β indicates which proposition outlined in the previous section prevails. When $\beta > 0$ special district spending is a strategic complement and when $\beta < 0$ special district spending is a strategic substitute. X_{it} is a vector of control variables and is outlined below.

Our analysis contains three sets of fixed effects. First, d_i is a county-level fixed effect that controls for any unmeasured county-specific heterogeneity. This includes unchanging factors such as geography, prior infrastructure investments, and other unmeasured items that could lead a county to higher or lower public spending levels. Second, d_t is a year fixed effect controlling for any time-varying factors that jointly affect counties in the sample. This primarily includes business cycles; however, it is not limited to such factors. Lastly, d_{rt} is an MSA-year fixed effect controlling for regional shocks that jointly influence all local governments within the MSA but not between MSAs. These include items such as localized natural disasters, MSA-specific business patterns, and other MSA-specific factors. Identification is based on within county changes in special district spending. Additionally, standard errors are clustered on the county.

Data

The primary data for this analysis comes from the Census of Governments, a full census survey conducted by the U.S. Census Bureau every five years on years ending in "2" and "7". The dependent variable is aggregated general-purpose local government per capita total direct expenditures, which includes all current, construction, and capital outlays but excludes utilities and intergovernmental expenditures.[4] We also disaggregate these total direct expenditures by function to examine how different kinds of special districts may influence general-purpose local government spending. Importantly, this disaggregation procedure requires both the general-purpose governments and special districts to provide the service, which effectively excludes two major local government functions – public education and policing. The remainder of the functions can be seen in Table 1 and Figure 1. Figure 1 plots the seven functions across time. Aggregate general-purpose local government direct expenditures are increasing for most functions; however, some (largely more expensive) functions are growing at a faster rate than others.

Table 1 shows our primary variable of interest – per capita special district spending. Overall, special district spending is a small fraction of general-purpose local government spending; however, some functions demonstrate near parity between the two service delivery arrangements when the data are disaggregated by function. This is particularly true for housing and community development and natural resource management. Table 1 also outlines the control variables for this analysis. They include measures of community wealth and population characteristics.

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4. In subsequent analyses, we disaggregate total direct expenditures to focus exclusively on current expenditures, which best reflect day-to-day operations.
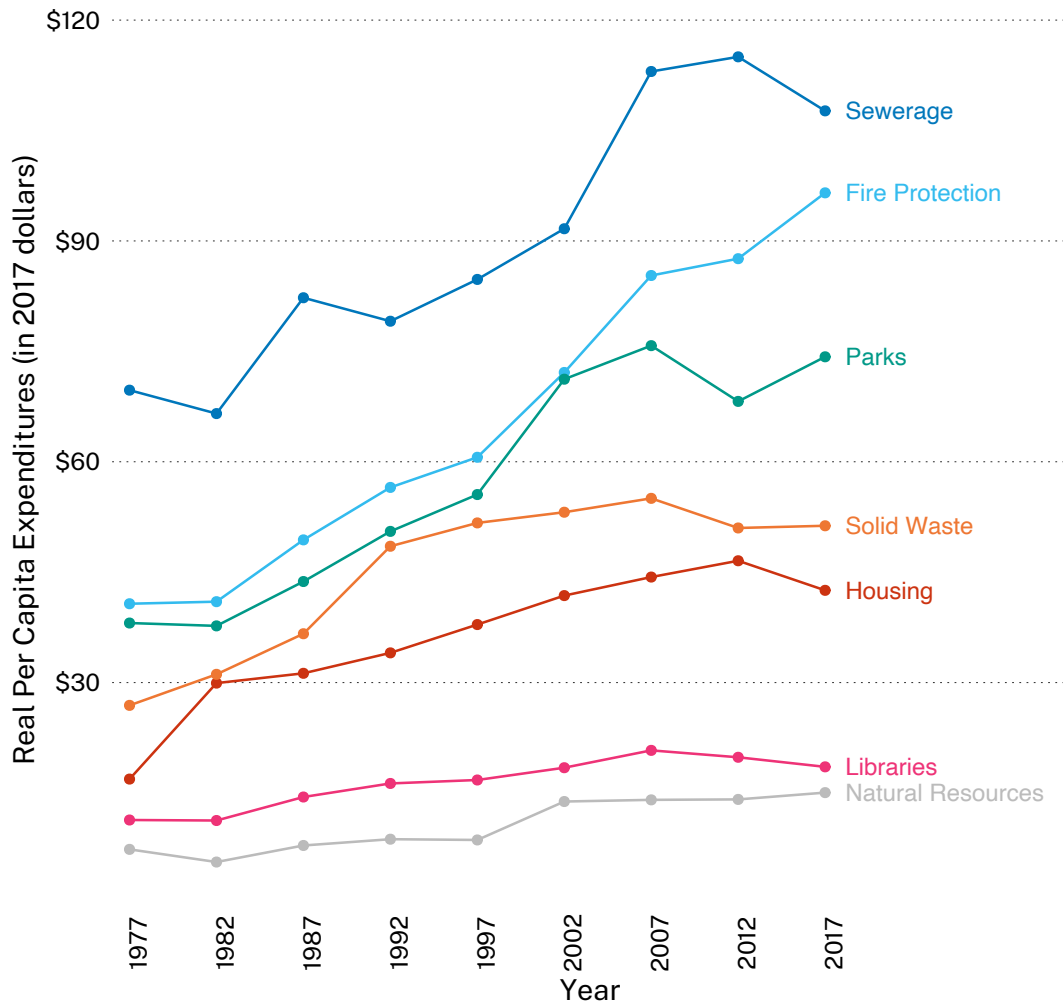
Figure 1: Mean Expenditure by Category (All General-Purpose Local Governments)

Table 1: Summary Statistics

Variable	Source	Units	Mean	St. Dev.	Min	Max
GP spending, all categories	CoG	$, per capita	1617.606	1639.451	0.000	52610.461
GP spending, fire protection	CoG	$, per capita	65.578	76.111	0.000	1980.578
GP spending, housing & community development	CoG	$, per capita	36.164	121.137	0.000	3572.541
GP spending, libraries	CoG	$, per capita	16.424	20.954	0.000	337.701
GP spending, natural resources	CoG	$, per capita	10.593	36.622	0.000	1738.628
GP spending, parks & recreation	CoG	$, per capita	57.265	64.759	0.000	918.469
GP spending, sewerage	CoG	$, per capita	90.015	101.824	0.000	2029.267
GP spending, solid waste management	CoG	$, per capita	45.065	52.078	0.000	1054.499
SD spending, all categories	CoG	$, per capita	212.234	390.211	0.000	7151.815
SD spending, fire protection	CoG	$, per capita	10.072	27.558	0.000	350.176
SD spending, housing & community development	CoG	$, per capita	33.218	58.801	0.000	1051.500
SD spending, libraries	CoG	$, per capita	8.188	20.740	0.000	335.668
SD spending, natural resources	CoG	$, per capita	9.333	59.869	0.000	1881.960
SD spending, parks & recreation	CoG	$, per capita	7.208	28.787	0.000	475.896
SD spending, sewerage	CoG	$, per capita	22.039	70.268	0.000	1489.938
SD spending, solid waste management	CoG	$, per capita	3.589	18.830	0.000	416.071
Personal income, per capita	REIS	$1,000s	37.504	11.626	15.470	183.568
Population	Census	1,000s	229.355	395.082	3.617	5367.293
Population density	Census	per square mile	0.644	2.758	0.000	71.431
Population growth	Census	Constant annual rate	1.350	1.714	-19.294	17.450
% 19 and younger	SEER	Proportion	0.292	0.040	0.150	0.467
% 65 and older	SEER	Proportion	0.125	0.037	0.009	0.360
Ethnic fractionalization	SEER	Index	0.204	0.156	0.002	0.585

Notes: GP=General-purpose Government; SD=Special District; COG = Census of Governments; REIS = Regional Economic Information System; Census = U.S. Census Bureau; SEER = Surveillance Epidemiology and End Results program. N=5925

REGRESSION RESULTS

Aggregated Local Government Direct Expenditures

The results of our analysis of total aggregated direct expenditures for all local governments are presented in Table 2. For most functional expenditure categories, we fail to reject the null hypothesis on our variable of interest, per capita special district spending. This result of hypothesis testing indicates that special district spending is unrelated to aggregate general-purpose local government spending when considering all types of direct expenditures (i.e., current, construction, and capital outlay). Therefore, we can conclude at this level of expenditure aggregation that special districts are neither complements nor substitutes but rather independent service providers.

An important caveat to this finding is fire protection and housing and community development functions. For these two functions, we reject the null hypothesis that $\beta = 0$ and conclude that special district spending on these functions is a substitute for aggregate general-purpose local government spending because of the negative sign on the coefficients. As shown in Table 2, a $1 per capita increase in special district fire protection expenditures (roughly equivalent to 10% of mean spending in this category) is associated with a 1.15% decrease in general-purpose local government spending. Put into elasticity terms,[5] for a county area with average aggregate local government fire protection spending of approximately $10 per capita, the elasticity of general-purpose local government spending on fire protection with respect to special district spending is -0.116. This suggests that a 10% increase in special district fire protection spending is associated with a 1.2% decline in general-purpose local government spending on the same function. The effect size for housing and community development is half as large, with a $1 increase in special district functional expenditures associated with a 0.5% decrease in aggregate general-purpose local government spending. For the average county, the elasticity of general-purpose local government spending on housing and community development with respect to special district spending is 0.176, suggesting that a 10% increase in special district spending is associated with a 1.8% decrease in general-purpose local government spending in the same functional area.

Disaggregated City & County Expenditures

Three further questions linger, given the results presented above. First, are municipalities or counties driving the general-purpose local government results presented? The results in Table 2 aggregate these two forms of government together; however, they may display distinct patterns of complementarity or substitution. The second is whether the effect is driven by operating or capital expenditures – a popular use for special districts. Finally, are larger central counties or more suburban or exurban peripheral counties driving the results? We explore these questions in Tables 3, 4, and 5, respectively.

Turning to the first question, Table 3 presents the same empirical approach as Table 2; however, the aggregations change – one is for municipalities (top), and one is for counties (bottom). As seen in the top panel, there is generally no relationship between special district spending (by function) and municipal spending on the same function. The one exception is solid waste management, where a $1 increase in special district spending in this area is associated with a 0.68% increase in municipal spending. The positive sign indicates a complementary relationship – special district spending spurs additional municipal expenditures. However, the elasticity is low at 0.024. This complementary result may indicate a collaborative relationship

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5. Calculated as the relevant coefficient multiplied by the mean spending on the function from Table 1.

Table 2: All General-Purpose Local Government Spending

	All Expenditures	Fire Protection	Housing & Community Development	Libraries	Natural Resources	Parks & Recreation	Sewerage	Solid Waste Management
Per capita special district spending in same functional area	0.0000	-0.0115*	-0.0053**	-0.0159	0.0014	-0.0008	-0.0021	0.0041
	(0.0000)	(0.0046)	(0.0019)	(0.0083)	(0.0010)	(0.0010)	(0.0016)	(0.0027)
Personal income per capita	0.0057**	-0.0018	0.0115	0.0157	0.0179	0.0134	0.0234	-0.0033
	(0.0018)	(0.0086)	(0.0276)	(0.0191)	(0.0268)	(0.0102)	(0.0186)	(0.0110)
Population (1000s)	0.0000	0.0003	-0.0009	-0.0011*	0.0001	0.0000	-0.0010	0.0001
	(0.0001)	(0.0003)	(0.0010)	(0.0005)	(0.0009)	(0.0003)	(0.0006)	(0.0004)
Population density	-0.0099	-0.1147	0.5953	0.3704	0.1190	-0.0132	-0.0269	-0.2855
	(0.0219)	(0.1346)	(0.3767)	(0.6504)	(0.3917)	(0.1583)	(0.3332)	(0.4418)
Population growth	-0.0202**	0.0146	-0.3004**	-0.1388	-0.0726	-0.0516*	-0.0976	-0.0970*
	(0.0051)	(0.0295)	(0.1016)	(0.0728)	(0.0810)	(0.0238)	(0.0606)	(0.0410)
% 19 and younger	-0.6342	1.6714	-2.7480	4.3609	-2.0930	-4.7012	-5.9944	-0.8603
	(0.7883)	(5.5171)	(13.2598)	(13.6525)	(11.1336)	(5.6290)	(8.7871)	(6.2437)
% 65 and older	-1.1452	7.6151	-2.0959	4.5500	-15.6997	0.7546	3.8365	-1.3187
	(0.6742)	(4.4203)	(9.5856)	(8.3365)	(9.5081)	(4.2101)	(7.5229)	(5.7287)
Ethnic fractionalization	0.0971	-0.9152	-3.4617	1.0740	4.9845	-3.8737**	-4.7567	-2.7831
	(0.2231)	(1.1762)	(3.0794)	(2.6412)	(2.8555)	(1.3001)	(2.8895)	(1.4366)
Constant	7.2382**	2.4539	1.1922	-2.3206	0.2268	4.9505*	5.1764	4.2824
	(0.2711)	(2.0018)	(4.3826)	(4.3397)	(3.9329)	(1.9459)	(3.0260)	(2.3047)
County FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MSA-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	5,925	5,925	5,925	5,925	5,925	5,925	5,925	5,925

Dependent variable: Log per capita real direct expenditures on various categories. Robust standard errors clustered on the county in parentheses. + $p<0.1$, * $p<0.05$, ** $p<0.01$.

Table 3: Subgroup Analysis

	Dependent Variable: Log of per capita spending by **municipalities**							
	All Expenditures	Fire Protection	Housing & Community Development	Libraries	Natural Resources	Parks & Recreation	Sewerage	Solid Waste Management
Per capita special district spending in same functional area	0.0000	−0.0087	−0.0038	−0.0083	0.0006	−0.0018	−0.0005	0.0068*
	(0.000 0)	(0.004 8)	(0.002 1)	(0.005 3)	(0.001 5)	(0.001 4)	(0.001 4)	(0.003 2)

	Dependent Variable: Log of per capita spending by **counties**							
	All Expenditures	Fire Protection	Housing & Community Development	Libraries	Natural Resources	Parks & Recreation	Sewerage	Solid Waste Management
Per capita special district spending in same functional area	0.0000	−0.0190**	−0.0034	−0.0166*	0.0011	0.0002	−0.0053**	−0.0119*
	(0.000 1)	(0.005 9)	(0.002 6)	(0.008 4)	(0.001 0)	(0.007 3)	(0.001 9)	(0.005 4)
County FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MSA-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	5,925	5,925	5,925	5,925	5,925	5,925	5,925	5,925

Robust standard errors clustered on the county in parentheses. $+ p<0.1$, $* p<0.05$, $** p<0.01$.

where providers specialize. In the example of solid waste management, it is conceivable that one actor is the garbage collector while the other is the garbage processor. Given the fragility of these results, more research is necessary.

The bottom panel of Table 3 demonstrates that the aggregate analysis presented in Table 2 was masking important underlying variation related to county governments. While there is no relationship for overall spending, fire protection, libraries, sewerage, and solid waste management demonstrate a negative relationship between special district spending and county government spending on the same function. The negative signs suggest a substitutive relationship. However, the elasticities range between 0.05 and 0.2, indicating far from a one-to-one substitution. These functions tend to be spatial in nature, providing the service over a large land area. Nonetheless, the increased prevalence of special district spending, likely of a regional nature, supplants county spending in the same area.

Table 4 respecifies the analyses from Tables 2 and 3 with current expenditures rather than total direct expenditures. This change focuses the service provision arrangement on the day-to-day operations of both kinds of governments and eliminates concerns that capital expenditures drive any prior findings. The top panel of Table 4 examines all general-purpose local governments, the middle panel examines municipalities only, and the bottom panel examines county governments only. Overall, the results are like those found in Tables 2 and 3, suggesting that capital expenditures do not drive those findings. The statistically significant elasticities of general-purpose local government current expenditures with respect to special district spending are -0.107 for fire protection, -0.192 for housing and community development, and -0.177 for libraries. Elasticities for fire protection and housing and community development are nearly identical to those found in the total direct expenditure models in Table 2. The finding for libraries is new, suggesting the inclusion of capital expenditures masked the more nuanced operating expenditures relationship between special districts and libraries. The sign is negative, indicating a substitutive effect.

The middle panel of Table 4 indicates no relationship between special district spending and municipal spending in any spending category. The result is similar to what is found in Table 3. Paired with the findings in the bottom panel of Table 4, the results suggest the relationship between special district spending and general-purpose local government spending is related mainly to county governments. The county-specific results from Table 3 are largely replicated in Table 4, indicating a substitutive effect across the statistically significant functional areas. Combining all the results thus far, it appears the relationship between special district spending and general-purpose local government spending is a substitutive one confined largely to county governments, particularly in spatially expansive functional areas like fire protection, sewerage, and solid waste management.

Finally, Table 5 explores the potential for the size of the county to impact the preceding analyses. Here, we disaggregate the results in Tables 2 and 3 by the size of the county in 1970.[6] The first column of each grouping replicates the findings from Tables 2 and 3 for the appropriate grouping. Focusing specifically on the prior findings for county governments, small to mid-sized county governments drive the findings for fire protection. Large counties, likely the home of central cities, do not see the same substitution effect. Perhaps an unsurprising finding given that central city municipal governments likely provide fire protection services in most large county areas. We find the opposite to be true with respect to libraries. The observed substitution effect appears driven solely by large counties. The prior finding of substitution for sewerage

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6. The population ranges roughly approximate a 0th to 50th percentile, 50th to 80th percentile, and 80th to 100th percentile in 1970. While no grouping is perfectly defendable, the 80th percentile is roughly the cut-off point for membership in the National Association of Counties Large Urban Counties Caucus. The 50th percentile cut point is arguably more arbitrary; however, given the right skew of county population, we believe the median makes most sense.

Table 4: Current Expenditures

	All Expenditures	Fire Protection	Housing & Community Development	Libraries	Natural Resources	Parks & Recreation	Sewerage	Solid Waste Management
Dependent Variable: Log of per capita spending by general-purpose local governments								
Per capita special district spending in same functional area	0.0000	−0.0130*	−0.0072**	−0.0255*	0.0009	−0.0006	−0.0042	0.0018
	(0.0000)	(0.0055)	(0.0023)	(0.0121)	(0.0014)	(0.0015)	(0.0053)	(0.0031)
Dependent Variable: Log of per capita spending by municipal governments								
Per capita special district spending in same functional area	0.0001	−0.0095	−0.0028	−0.0115	0.0010	−0.0023	−0.0005	0.0049
	(0.0000)	(0.0058)	(0.0024)	(0.0074)	(0.0022)	(0.0019)	(0.0047)	(0.0031)
Dependent Variable: Log of per capita spending by county governments								
Per capita special district spending in same functional area	0.0000	−0.0210**	−0.0048	−0.0262*	0.0001	−0.0004	−0.0153**	−0.0188**
	(0.0002)	(0.0071)	(0.0031)	(0.0128)	(0.0013)	(0.0073)	(0.0050)	(0.0073)
County FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MSA-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	5,925	5,925	5,925	5,925	5,925	5,925	5,925	5,925

Robust standard errors clustered on the county in parentheses. + $p<0.1$, * $p<0.05$, ** $p<0.01$.

Table 5: County Size Disaggregation

	All General-Purpose Local Governments				Municipal Governments				County Governments			
	All Urban Counties	Small Counties (<80,000)	Mid-size Counties (80,000-300,000)	Large Counties (>300,000)	All Urban Counties	Small Counties (<80,000)	Mid-size Counties (80,000-300,000)	Large Counties (>300,000)	All Urban Counties	Small Counties (<80,000)	Mid-size Counties (80,000-300,000)	Large Counties (>300,000)
All Expenditures	0.0000	0.0000	0.0000	-0.0001	0.0000	0.0001	0.0000	0.0000	0.0000	-0.0004	0.0003	-0.0001
	(0.00000)	(0.00000)	(0.00000)	(0.00000)	(0.00000)	(0.0001)	(0.00000)	(0.0001)	(0.0001)	(0.0003)	(0.0002)	(0.0001)
Fire Protection	-0.0115*	-0.0167*	0.0042	-0.0028	-0.0087	-0.0134	0.0071	0.0016	-0.0190**	-0.0176*	-0.0263**	0.0013
	(0.0046)	(0.0069)	(0.0070)	(0.0017)	(0.0048)	(0.0072)	(0.0070)	(0.0050)	(0.0059)	(0.0085)	(0.0088)	(0.0242)
Housing & Community Development	-0.0053**	0.0012	-0.0022	-0.0035	-0.0038	0.0006	-0.0017	-0.0051	-0.0034	0.0035	-0.0039	-0.0045
	(0.0019)	(0.0026)	(0.0050)	(0.0026)	(0.0021)	(0.0030)	(0.0056)	(0.0030)	(0.0026)	(0.0030)	(0.0080)	(0.0053)
Libraries	-0.0159	-0.0078	-0.0161	-0.0218	-0.0083	0.0002	-0.0206	0.0028	-0.0166*	-0.0109	-0.0010	-0.1242*
	(0.0083)	(0.0118)	(0.0133)	(0.0208)	(0.0053)	(0.0064)	(0.0147)	(0.0133)	(0.0084)	(0.0113)	(0.0154)	(0.0606)
Natural Resources	0.0014	-0.0005	0.0015	-0.0507	0.0006	-0.0011	0.0128*	-0.0173	0.0011	0.0000	-0.0045	-0.0328
	(0.0010)	(0.0021)	(0.0018)	(0.0336)	(0.0015)	(0.0026)	(0.0052)	(0.0386)	(0.0010)	(0.0023)	(0.0028)	(0.0440)
Parks & Recreation	-0.0008	0.0014	-0.0002	-0.0010	-0.0018	-0.0025	-0.0001	-0.0015	0.0002	-0.0001	0.0273	-0.0044
	(0.0010)	(0.0016)	(0.0014)	(0.0011)	(0.0014)	(0.0029)	(0.0010)	(0.0010)	(0.0073)	(0.0060)	(0.0193)	(0.0173)
Sewerage	-0.0021	-0.0103*	-0.0029	0.0027*	-0.0005	-0.0049	0.0016	0.0031*	-0.0053**	-0.0109*	-0.0119	-0.0079*
	(0.0016)	(0.0045)	(0.0021)	(0.0013)	(0.0014)	(0.0037)	(0.0027)	(0.0012)	(0.0019)	(0.0052)	(0.0062)	(0.0034)
Solid Waste Management	0.0041	0.0039	-0.0001	0.0055	0.0068*	0.0032	0.0017	0.0112	-0.0119*	-0.0167	-0.0075	-0.0188
	(0.0027)	(0.0079)	(0.0027)	(0.0089)	(0.0032)	(0.0071)	(0.0036)	(0.0090)	(0.0054)	(0.0115)	(0.0084)	(0.0255)
Region x time dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of counties	660	403	111	45	660	403	111	45	660	403	111	45

Robust standard errors clustered on the county in parentheses. + $p<0.1$, * $p<0.05$, ** $p<0.01$.

services seems to be driven by both small counties and large counties. Finally, the previous finding of a substitution effect for solid waste management does not have a county-size component. Overall, the results in Table 5 provide important explanations for what appears to be a rather nuanced relationship between special districts and counties. The prior county government findings replicate; however, the size of the county drives many of these results.

CONCLUSION

This manuscript sought to understand the relationship between special district service provision and service provision by other general-purpose forms of local government. The literature suggests two potential relationships: complementarity or substitution. The theoretical literature largely points to a substitution effect – spending by special districts lowers spending by other general-purpose local governments. Our results suggest a substitution effect between special districts and county governments, largely confined to spatially expansive public services like fire protection, sewerage, and solid waste management. These findings appear driven by current expenditures, indicating that the trade-off among service providers is for day-to-day operations and not capital expenditures. However, the elasticity of substitution is small – ranging between 0.05 and 0.2 – far from the theoretically assumed elasticity of one (perfect substitution). The county-specific results are nuanced with some functional areas only demonstrating substitution in certain population groupings. We largely fail to reject the null hypothesis when comparing special districts to municipal governments and conclude no systematic relationship between special district spending and municipal spending.

The analysis as presented is not with limitations. Due to a lack of data on the exact shape of special districts, the analysis relies on a rough approximation of overlap between districts and other forms of local government. We cannot be certain exactly which special districts overlap each general-purpose local government. Therefore, the results presented are subject to some bias introduced by the geographical approximation. It is difficult to put a sign on the bias; however, the potential problem is the smallest for our strongest results – the ones related to county governments. This data issue is not limited solely to the analysis presented but to almost all special district research.

State policymakers often decry the growth of the number of local governments, and much of this growth over the last 60 years has been from special districts (Goodman 2019). However, much of the concern for the growth in the number of governments are concerns over new or additional spending at the local level. If special district spending substitutes for other general-purpose local government spending, these concerns are lessened. We find evidence of such an arrangement between special districts and county governments in urban areas; however, the elasticity of substitution is far below one – indicating much less than perfect substitution. While our results suggest substitution does occur, it occurs at a level too low to sufficiently offset additional spending.

These results leave concerned policymakers with two avenues. First, policymakers could encourage or mandate additional substitution between special districts and county governments. This likely involves additional collaboration between the two kinds of local governments and could take the form of separating production from provision to find efficiencies in service provision (Ostrom, Tiebout, and Warren 1961). Second, state policymakers could decree which forms of local governments have exclusive domain over what policy areas. This recommendation refers to the debates over the functional assignment of service responsibilities (Advisory Commission on Intergovernmental Relations 1976). Given how small the elas-

ticity of substitution is, clearly delineating functional roles would likely lower local public expenditures by eliminating service duplication.

This research is among the first empirical studies to examine the tradeoff in service provision between general-purpose local governments and special districts – an explicitly vertical relationship. Prior research has considered how municipalities and counties might interact (e.g., Turnbull and Djoundourian 1993) or the connection between general-purpose governments and school districts (Brien 2018); however, special districts are an important and growing service provider in the local intergovernmental sphere. Given this growing influence on service provision, more attention should be paid to how special districts interact (or do not interact) with other governments in local areas. Voluminous literature exists on the spatial relationship between similar forms of government (see Brueckner 2003); however, the vertical relationship has not been completely explored. Future studies should focus on the sub-state level, where data quality is higher and more robust geospatial data can be brought to bear.

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