

# The interaction between public and private governments: An empirical analysis

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## Abstract

Private governments, found in planned developments and condominiums, are increasingly common methods of delivering local services to residents. This paper provides the first empirical study of their impact on local public finance. A novel data set of homeowners' associations allows construction of a panel of private governments in California. Panel methods test whether public expenditures respond to private government prevalence. Estimates indicate that local governments lower spending moderately in response to private government activity, consistent with strategic substitution. The paper then examines various mechanisms to explain this downloading and shows that the substitutability between public and private providers is key to which services are downloaded. Evidence also suggests that the economies of scale in service production in small cities temper the offloading of public services to private governments.

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## 1. Introduction

Private governments are a form of collective decision-making that is an increasingly popular method of providing local public services to city residents. This paper examines whether local governments alter their levels of public expenditure in response to increased membership in private residential governments. Previous theoretical research has modeled the interaction between private and public governments, but empirical analysis has been limited by the lack of data. This paper presents the first econometric study of the effects of private government

on local public finance. The paper develops from a novel data set a measure of private government prevalence in California cities from 1970 to 1999 and employs panel data methods to test whether public and private government activities can be regarded as strategic substitutes or complements.

In the residential setting, private governments take the form of homeowners' associations, and they are found in planned developments, condominiums and co-operatives. Local governments transfer public authority to private associations by giving them powers in service provision, taxation and enforcement. Associations provide goods and services similar to those provided by a local government, including sanitation, policing, recreation and many others. Their popularity has soared to

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the point where an estimated half of all new housing in metro areas in the United States includes membership in a homeowners' association. A few hundred homeowners' associations existed in the United States in the 1960s; their number climbed to 249,000 by 2003. The Community Associations Institute (2004) states that these private associations now govern at least 50 million Americans in 20 million housing units.

With this tremendous growth, there is fierce debate about the impact of private governments on the public sector. Supporters argue that they fill the gaps left by underfunded and inefficient local governments. They claim that private governments reflect the self-help attitude of their members, who pay for and receive local services that would otherwise not be provided. Proponents also contend that transferring some provision responsibility to private associations may free up public resources to be used elsewhere, so that everyone, even non-members, can benefit.

On the other hand, critics of private governments claim that homeowners' associations erode support for public institutions. Those who can afford to join can bypass the public system: for example, homeowners can build a gate to keep the criminals out rather than investing in police. Opponents maintain that the erosion of public support leads to further deterioration of municipal services. Local governments, under pressure to cut expenditures, shift the responsibility of providing public services to private developers. Non-members experience a reduction in public service levels and may be worse off.

This paper sheds light on these controversies by making three contributions. Most importantly, this is the first direct empirical study of the effects of private government on public government behavior. Previous studies relied on descriptive statistics or isolated case studies. This paper develops an empirical methodology to estimate the interaction effect and accounts for the endogeneity between public and private governments. The paper's theoretical framework generalizes Helsley and Strange (1998, 2000), where the interaction between private and public governments and the supplementary nature of private provision combine to imply strategic substitution by the public government. This paper accommodates strategic complements, so the empirical analysis consists of testing for the sign of strategic interaction, in the style of studies cited by Brueckner (2003). A second major contribution is the construction of a panel of California cities over a thirty-year period, merging novel private government data with local government finance data. Finally, the empirical analysis shows that local governments in California do react

moderately to private government and that they selectively reduce spending on certain types of services.

As a preview of the results, a 10% increase in the prevalence of planned developments in a city will, on average, decrease per capita total expenditures by 1.51%, a small but significant percentage. The analysis also uncovers marked differences between expenditure categories. More private governments decrease public government spending in police and parks, but not on roads. In addition, city size matters in the types of services downloaded to private governments.

The paper is organized as follows. It begins with a brief look at residential private governments in Section 2. Section 3 discusses past theory on private government and outlines an extension of the Helsley and Strange model. Section 4 explains the empirical methodology, and Section 5 the data. Section 6 presents the analysis. Section 7 concludes.

## 2. A brief look at residential private governments

This section describes the phenomenon of residential private government in the US and addresses its relevance in local public finance. A private government is an organization of private individuals, usually bound by geography, empowered by public authority to act as a government in taxation, service provision and regulation enforcement. In a residential private government, the individuals are homeowners, and the government is the homeowners' association.<sup>1</sup> As a form of collective decision-making, the homeowners' association draws similarities with the club, the private firm and the local government. However, as it incorporates particular elements from these forms, it has evolved into a distinct institution worthy of closer examination.

In general, a homeowners' association manages property that is owned in common and charges fees for its upkeep. Homeowners who buy property in the development must become members in the association, which establishes and enforces restrictions governing land use. Homeowners' associations allow for self-government; their governing board consists mostly of elected homeowners.<sup>2</sup> Governing boards sometimes contract with

<sup>1</sup> These are also sometimes known as *community associations* (CAs). Another term, used by California law, that encompasses the governing association and the member households is *common interest developments* (CIDs). These terms are often used interchangeably.

<sup>2</sup> When a development is newly created, local authorities usually allow the developer to have representatives on the board. As more and more properties in the development are sold, homeowners gradually replace the developer's representatives on the board.

professional management companies to oversee day-to-day issues, but the ultimate authority lies with the association. The vast majority of homeowners' associations are incorporated.<sup>3</sup>

There are three main types of residential developments with homeowners' associations: planned developments, condominiums and cooperatives. The type that has attracted the most controversy is the planned development (PD), which typically consists of detached or semi-detached houses. The homeowner owns the house and the lot. The developer designs the entire community, including streets, parks, security and other common property, and then charges homeowners monthly assessments for the services provided.<sup>4</sup>

This paper focuses on PDs for three reasons. First, planned developments are more likely to provide the wide range of services typical of local governments, and so they are the most likely to be perceived as an alternative to public government. Second, planned developments are the fastest-growing type of private government. Gordon (2004) claims that sales in planned developments represented 40 percent of new home sales in California in the 1990s. Finally, legal precedents, where associations have consistently used their powers to enforce regulations and fee payment, reinforce the notion of the planned development as a government.<sup>5</sup>

The services that homeowners' associations in planned developments provide vary substantially, and they can be simple or lavish, usually depending on the size of the community.<sup>6</sup> A survey of 627 US homeowners' associations by Hawkins et al. (1997) underlies how broad the range of privately-provided services can be. Over 60% of the associations surveyed provided between seven and ten services. The most common services provided deal with the provision and upkeep of

common areas: landscaping (92% of surveyed respondents said they provided it), trash removal (80%) and pools (58%). Security is also popular (46%) and can range from patrols to gates; access may also be restricted through private streets. In addition, Hawkins et al. find that many associations provide infrastructure, such as water (78%), sewers (75%) and street lights (64%). These services clearly overlap those provided by the public municipal government, and the next section describes how the interaction between public and private governments could affect local spending in these jurisdictions.

### 3. Theoretical framework

The theoretical framework that this paper builds upon is based on Helsley and Strange (1998, 2000), the principal models of private government. In these models, public and private government services are treated as perfect substitutes in consumption; as a result, private and public government spending are strategic substitutes. The public government provides less of the public service in equilibrium in response to a private government. Helsley and Strange refer to this result as "strategic downloading."

The strategic downloading result bolsters popular claims that private governments are usurping authority previously held by local government. Roland (1998) and Johnston and Johnston-Dodds (2002) examine laws that regulate homeowners' associations in California and conclude that their governance structure resembles both business enterprises and municipal governments.<sup>7</sup> This transfer of public authority, and the similarity that private governments bear to local institutions, may feed back to a deterioration in the public system, as Roland argues: "These affluent communities provide not only amenities like tennis courts, but also better public services like garbage collection and security. Members of the CID communities then vote down taxes needed by local governments to provide services to the broader community." Indeed, Anderson (1996) notes that some homeowners' associations have been particularly vocal in demanding reimbursement for public services that they provide for themselves. Ben Lambert, an attorney for the Community Associations Institute in New Jersey (quoted in Klein, 1995), argues that "if homeowners do not burden local governments with needs for services,

<sup>3</sup> Chulak (2004) estimates that 99% of California homeowners' associations are incorporated.

<sup>4</sup> Generally, all homeowners pay the same fee. The 2001 American Housing Survey (2001) reports that the median monthly assessment is \$25 per unit for all private governments. Thus, large associations, consisting of hundreds or thousands of households, may have considerable budgets.

<sup>5</sup> See Reichman (1976) for some of the legal history behind PDs. The other two main types of common interest development are condominiums, where a set of units are attached to each other, and cooperatives, where homeowners do not own their unit but have an exclusive right to occupy it. Finally, there are homeowners' associations in some mobile home parks and timeshare communities, but their numbers are relatively small.

<sup>6</sup> An example of a very large planned development is Leisure World, a community of 12,738 housing units for older adults, in Laguna Woods, California. This community offers, among other services, its own shuttle system, golf course and library.

<sup>7</sup> In fact McKenzie (1994) argues that such broad powers mean that "CIDs currently engage in many activities that would be prohibited if they were viewed by the courts as the equivalent of local governments."

then they should not be paying for those services.” This view may push locals to the point of leaving the city altogether. In a recent example, a coalition of nearly every homeowners’ association in the San Fernando Valley headed a campaign to remove the Valley, an area of 1.3 million people, from the City of Los Angeles.<sup>8</sup> The most common complaint was that Valley residents, who were more likely to live in PDs than the rest of the city, paid more taxes than they were receiving back in services. The debate culminated in a secession referendum in 2002. While the referendum was defeated, it drew attention to the growing power of the homeowners’ associations and their influence on local politics.

On the other hand, there is a possibility that private governments may increase public expenditure. There may be complementarities in the provision of services such that members of private governments, through their participation in the voting process, demand more output from the public government. Gordon (2004) notes some evidence that voters who live in planned developments are more politically active and are more likely to vote in state elections. In such a situation, it may be welfare-enhancing for local governments to welcome the formation of private governments. However, the models of Helsley and Strange do not admit strategic complementarity; this paper provides a simple extension to allow this possibility.

To outline this extension, assume public and private government provided services enter in a sub-utility function  $v(g^{\text{pub}}, g^{\text{priv}})$ , where  $g^{\text{pub}}$  represents public government provision,  $g^{\text{priv}}$  represents private government provision and  $v(\cdot)$  is increasing and strictly concave.<sup>9</sup> The more general formulation admits complementarity in consumption.<sup>10</sup> In equilibrium, the cross-partials of  $v$  determine the sign of the reaction functions, the key comparative static that says how the governments respond to each other. If the cross-partial  $v_{12}$  is positive (negative), public and private government spending are strategic complements (substitutes).<sup>11</sup>

<sup>8</sup> More on the coalition can be found at <http://www.valleyvote.net/lafo/index.html>.

<sup>9</sup> In contrast, Helsley and Strange (1998, 2000) assume perfect substitutes in consumption:  $v(g^{\text{pub}} + g^{\text{priv}})$ .

<sup>10</sup> For example,  $v(\cdot)$  may represent the utility from “security,” so that the public governments provides police spending while the private government provides a gate and patrols. Then if the gate or private security forces increases the marginal effectiveness of police, public and private governments may be complements in consumption.

<sup>11</sup> The subscripts denote the arguments of a partial derivative. Helsley and Strange (1998, 2000) assume that  $v_{12} = -1$ , and so public and private spending are always strategic substitutes. If both reaction functions are downward sloping, there exists a unique Nash equilib-

Anecdotal examples of strategic substitution are common. For instance, Roland (1998) notes that the city of Fremont has stopped building swimming pools and requires new planned developments to provide their own. Strategic substitution also arises if the local police does not send as many patrols to areas served by homeowners’ associations, especially if they are already protected by gates. On the other hand, strategic complements may arise from positive spillovers from one government to the other. For instance, police effectiveness may be enhanced if private associations detain suspicious persons or share information. Alternatively, complementarity could come about from a reallocation of residents’ demands. For example, if a large proportion of voters are very concerned about crime, they may demand more local police spending, even while they live in gated communities.

#### 4. Empirical specification

The theoretical framework above is ambiguous on the response of public governments to private governments and so motivates an empirical analysis. The basis of empirical work is the estimation of demand functions for municipal public services in the style of Bergstrom and Goodman (1972) and Borchering and Deacon (1972). Subsequent research recognizes the need to account for strategic action on the part of local authorities. Brueckner (1998), for instance, tests whether cities strategically implement growth controls in response to neighboring cities’ policies. Brueckner (2003) surveys studies that consider other local choices in similar strategic models. Most agree that local governments can and do act strategically. However, previous studies are virtually all cross-sectional analyses, so there is no way to examine questions such as the pattern of growth controls enactment, the effect of long-standing versus recently-enacted measures and other dynamic issues.

The literature also lacks empirical studies of homeowners’ associations as a key issue is the lack of data. Because they are private entities, there is no regulatory agency to compile statistics. It is even unclear exactly how many homeowners’ associations exist in the United States. However, as these associations become much more commonplace and politically visible, various authors are contributing to the empirical literature.

rium. This is not necessarily true if the reaction functions are upward sloping; a unique Nash equilibrium in this case can be ensured by assuming the appropriate condition on the relative magnitudes of the slopes of the reaction functions. For brevity, the theoretical model is not worked out in this paper. However, it is available on request.

These, notably McKenzie (1998) and Gordon (2004), deal mainly with the effect of homeowners' associations on voter behavior, rather than local government behavior.

This paper addresses these gaps in the literature. The analysis focuses on local public expenditure, determined by the following equation:

$$\ln g_{it}^{\text{pub}} = \beta g_{it}^{\text{priv}} + \delta X_{it} + d_i + d_t + d_{rt} + \epsilon_{it}, \quad (1)$$

where  $i$  indexes cities,<sup>12</sup>  $r$  indexes regions and  $t$  indexes years. The dependent variable is  $g_{it}^{\text{pub}}$ , local public expenditure per capita. The explanatory variable of interest is  $g_{it}^{\text{priv}}$ , the measure of private government activity. The null hypothesis is the absence of interaction of private government on local spending:  $\beta = 0$ . If the null is rejected, then the question is whether  $\beta$  is positive (negative), consistent with strategic complements (substitutes).  $X_{it}$  are covariates that affect the level of local public spending. Section 5 describes these variables in detail.

Three sets of dummy variables control for unmeasured effects. The  $d_i$  is the city fixed effect that absorbs permanent heterogeneity at the city level. This might come from geographic amenities, infrastructure, the efficiency of local bureaucracy or historical idiosyncrasies, which may lead to cities having permanently low or high levels of public expenditure. Next,  $d_t$  is a time dummy for each year from 1971 to 1999, which picks up the time-varying trend in the error that is the same for all cities in the state. This may come from business and investment cycles, election cycles and the effects of statewide budgetary limitation initiatives. Finally, it is appropriate to consider regional effects as well to account for metropolitan-wide shocks to public spending. The  $d_{rt}$  is a set of region-year interaction dummies that absorb region-specific, time-varying heterogeneity. Shocks of this type may arise from large scale natural disasters, crime trends, regional property value shocks and regional economic shocks. For instance, a notable regional economic shock is the technology boom that hit municipalities in the Silicon Valley in the 1990s. The region is defined by the metropolitan statistical area (MSA) in which city  $i$  is located.

Thus, identification is based on changes over time in private government proliferation within a city. A key assumption in a fixed-effects estimation is that  $g_{it}^{\text{priv}}$  is uncorrelated with  $\epsilon_{it}$ . Therefore, a threat to identification

would be a city-specific, time-varying shock to local expenditure that is correlated with private government formation.<sup>13</sup> Another threat to identification is the simultaneity of public and private government provision levels. The basis for this problem is that the theoretical papers of Helsley and Strange model public and private governments as being jointly determined. Section 5.3 discusses how instrumental variables are used to deal with the endogeneity problem.

## 5. Data

### 5.1. Public government variables

The dependent variable used is local public government expenditure, which comes from the Annual Survey of Governments, administered by the Census Bureau. Not every city in California is surveyed annually. The sample consists of the 110 cities that report thirty years of data from 1970 to 1999. They represent a quarter of the state's cities, yet they account for a substantial percentage of the urban population.<sup>14</sup> The survey's methodology implies that the cities in the sample are larger than the average city in California. Whether city size differences could result in a sample selection problem is discussed in detail in the next section.

The principal measure of local public expenditure is log per capita real direct general expenditures.<sup>15</sup> This includes current operating expenditures, construction and capital outlays. This variable does not include utilities or payments to other governments.<sup>16</sup> The latter part

<sup>13</sup> Rising levels of crime in a city, for instance, may spur increased police spending by the public government, while at the same time raise the demand for gated or patrolled private communities. The estimation of (1) may indicate a spurious positive effect of private government on police spending. To give another example, the election of a "pro-development" council might try to attract residential development by lowering development fees, encouraging private government formation, and lowering taxes, necessitating cuts in expenditure. In this case, the estimation of (1) will result in a spurious negative coefficient on  $g^{\text{priv}}$ .

<sup>14</sup> In 1999, the cities in the sample have a combined population of 16,941,390, which is 63% of the state's population in cities. A list of the cities in the sample and the regional metropolitan areas may be obtained from the author.

<sup>15</sup> All dollar values are expressed in 1997 dollars using the GDP deflator.

<sup>16</sup> Not accounting for intergovernmental payments may be a source of mismeasurement. The most substantial payment is to special districts, which provide water, sewerage and other utilities. Including data on special districts would undoubtedly add to a more complete description of public government behavior, but the difficulty in reconciling these with municipal data places it outside the scope of this analysis.

<sup>12</sup> A city is an incorporated entity with an autonomous government. Planned developments in unincorporated areas are excluded from the analysis.

of the analysis looks at eight categories of expenditures on specific services. These are listed in the top panel of Table 2. The motivating question for using categorized expenditures is that to see if the strategic interaction effect more pronounced for some services compared to others. For the category regressions, the dependent variable is  $\log(\text{per capita expenditure} + 1)$  as some cities report zero expenditure for certain categories on occasion.<sup>17</sup>

Examining the trend of local expenditure reveals that despite the popular perception of fiscal restraint, real expenditures per capita have actually been on the rise. Figure 1 shows the mean per capita real expenditure in the eight categories from 1970 to 1999. Mean per capita real total expenditure doubled from \$512 in 1970 to \$1099 in 1999. It did decline from 1979 to 1982, reflecting the immediate impact of Proposition 13 on revenues. However, there is evidence that cities recovered from the bite of Proposition 13 by reallocating revenue sources, with a shift in spending priorities: public safety services such as fire and police experienced an increase in real expenditures, while parks and highways showed little growth.

## 5.2. Private government variable and other covariates

The key explanatory variable is private government activity in a city. Now the ideal measure of  $g^{\text{priv}}$  would be a panel of the combined dollars spent by the PDs in a city, but this data would be virtually impossible to obtain.<sup>18</sup> Instead, as the study is interested in the relative importance of private governments within a city,  $g^{\text{priv}}$  is proxied by the per capita number of housing units in planned developments, which is presumably positively correlated.

An added complication is that there is no census information on the number of housing units in planned developments in a city.<sup>19</sup> This paper turns to a novel source, a database of homeowners' associations in California obtained from the accounting firm of Levy and Company in Oakland. The database lists each of the 37,655 incorporated homeowners' associations in the state as of May 2003 along with some information of the size, location and function.<sup>20</sup> The data are compiled from the Secretary of State of California, which requires

all incorporated homeowners' associations to be identified and basic information provided.<sup>21</sup>

Figure 2 shows the number of associations by year of incorporation and type. Homeowners' associations were virtually unknown up to 1970. There is a gradual increase during the 1970s, but in 1978, the number of new incorporations soared and remained very high for about twelve years.<sup>22</sup> There has been a gradual decline in recent years and a return to incorporation levels resembling those of the mid-1970s. The data also show that PDs were the predominant form of common interest development in California until the early 1970s, after which condominiums then took over as the most common form. For reasons explained in the last section, only PDs enter the panel. There were 3199 PDs in the 110-city sample as of 1999. To create the panel, it is assumed that the incorporation year of each development is the first year that the private government is in operation and providing services. Additionally, the death rate of associations is assumed to be negligible.<sup>23</sup> The panel is then constructed by counting how many associations were in existence in each year in each city.

The next step is to impute the number of PD housing units in each city and year. The data do not report the number of units in each association. Instead, it provides a size category variable, classifying each association into one of twelve sizes. Each development is assumed to have a number of units equal to the median of its size category.<sup>24</sup> Normalizing by population gives the mea-

<sup>17</sup> Supplemental regressions show no qualitative difference if observations with zero spending are removed.

<sup>18</sup> There are no state requirements for PDs to file yearly budgets.

<sup>19</sup> The American Housing Survey does ask about condominium and homeowners' association membership, but the data are at the metropolitan, not municipal level.

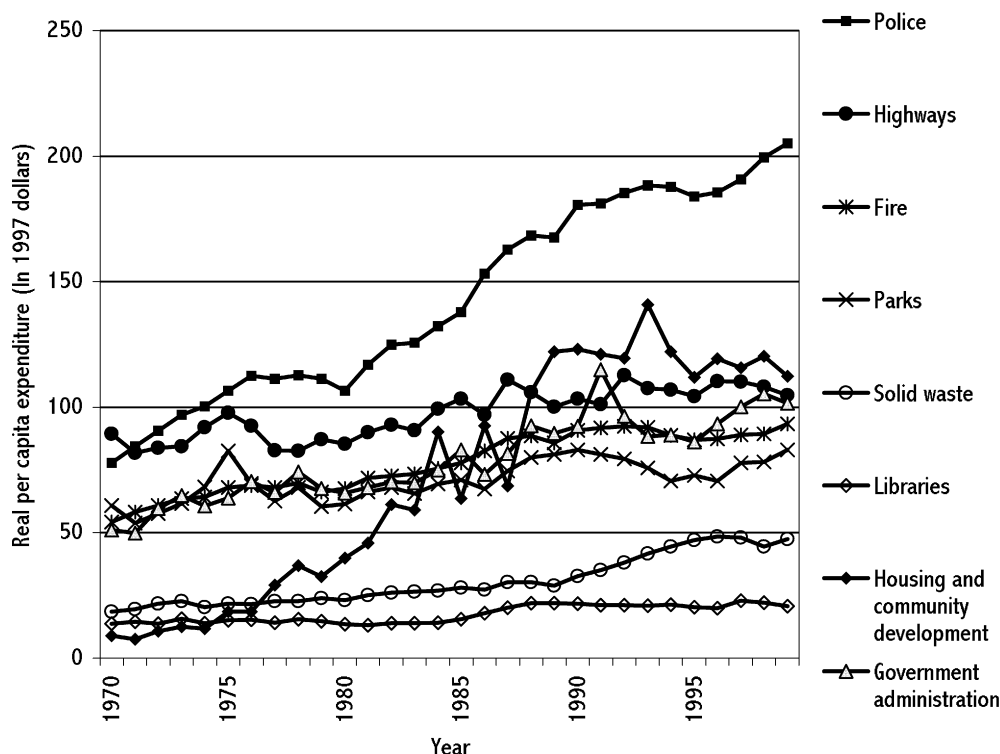
<sup>20</sup> This source is the same as that used by Gordon (2004).

<sup>21</sup> The data report the location of each association and the address of its president, an association member. To ensure quality, observations in which the reported city and president's address do not match are discarded. These instances generally erroneously confuse the president with the management company, which is located outside the city.

<sup>22</sup> Cheung (2007) tries to determine the cause of this increase in incorporations and argues that Proposition 13 could be responsible for encouraging this proliferation.

<sup>23</sup> As the typical PD has 75 houses, destruction is presumably uncommon. In addition, California statutes require that each development maintain a community association to provide services and enforce covenants. Thus, as long as the structure is still inhabited, the private government is still in existence. Informal conversations with the data provider confirmed this.

<sup>24</sup> Comparing these imputed numbers to those of other surveys helps to check the plausibility of the imputation. First, the 1999 American Housing Survey estimates that for the Western states, 6.5% of occupied housing units belong in planned developments. In comparison for that year, the Levy data suggest that there are 377,269 PD units, which works out to 6.06% of the 6,229,316 total housing units in the sample cities. Thus there is a close match between the imputed and actual figures. A referee also questioned whether the imputation ever resulted in a city having more PD units than total housing units; this was never the case.



Source: US Census Bureau, Annual Survey of Governments, 1970–1999.

Fig. 1. Mean categorized expenditure in the 110-city panel.

sure of private government: the number of PD housing units per capita.<sup>25</sup>

The top half of Table 1 summarizes this statistic for the two end years of the panel, 1970 and 1999, as well as over the entire thirty-year period. The 110 cities in the panel exhibit wide variation in the prevalence of private governments. The mean number of planned developments per capita rose from 0.007 to 0.03.<sup>26</sup> The table also summarizes the private government membership rate, the mean of which rose significantly from 5.3% to 8.1%.

To further highlight differences between cities of varying PD levels, the bottom half of Table 1 reports

means of some important variables after sorting the 110 cities into quintiles by their PD measure. Columns 1 and 2 assign cities to quintiles based on their 1970 and 1999 levels; column 3 assigns cities based on the *growth* in PDs from 1970 to 1999. There is a clear overall increase in PD units per capita over time, for all cities. Looking at the population density variable, columns 1 and 2 suggest that denser cities tend to have fewer PD units, while column 3 suggests that denser cities also tend to have lower growth in PD units. This is consistent with evidence that PD growth has been strongest in suburban communities.<sup>27</sup> Note also that the population of cities with the highest growth in PDs is on average lower than cities with the lowest growth. Finally, a suggestive statistic is the average total public expenditures of low versus high PD cities. Column 3 shows that cities in the fifth quintile of PD growth have lower public expenditures than cities in the first quintile. This provides motivating evidence that the growth of PDs influences the pattern of public expenditures.

<sup>25</sup> An alternative measure is the private government rate, the number of PDs units divided by the total number of housing units. As long as there is no substantial difference in family size between PDs and other types of housing, there is little qualitative difference in the estimation. Results using the membership rate are available from the author.

<sup>26</sup> Out of concern for the stationarity of the time series of public and private governments, the panel unit root test given by Levin et al. (2002) with an individual specific mean and time trend was performed. The panel unit root test soundly rejects the null hypothesis of non-stationarity for log real per capita public expenditures: the  $t$  statistic is  $-17.05$ . The unit root is also rejected for the per capita planned development units with a  $t$  of  $-1.82$ , significant at the 5 percent level.

<sup>27</sup> While not explicitly shown in this paper, the highest incidence of planned developments are found in the suburban counties surrounding San Francisco and Los Angeles. The city with the highest incidence of PDs is Auburn, a suburb of Sacramento.

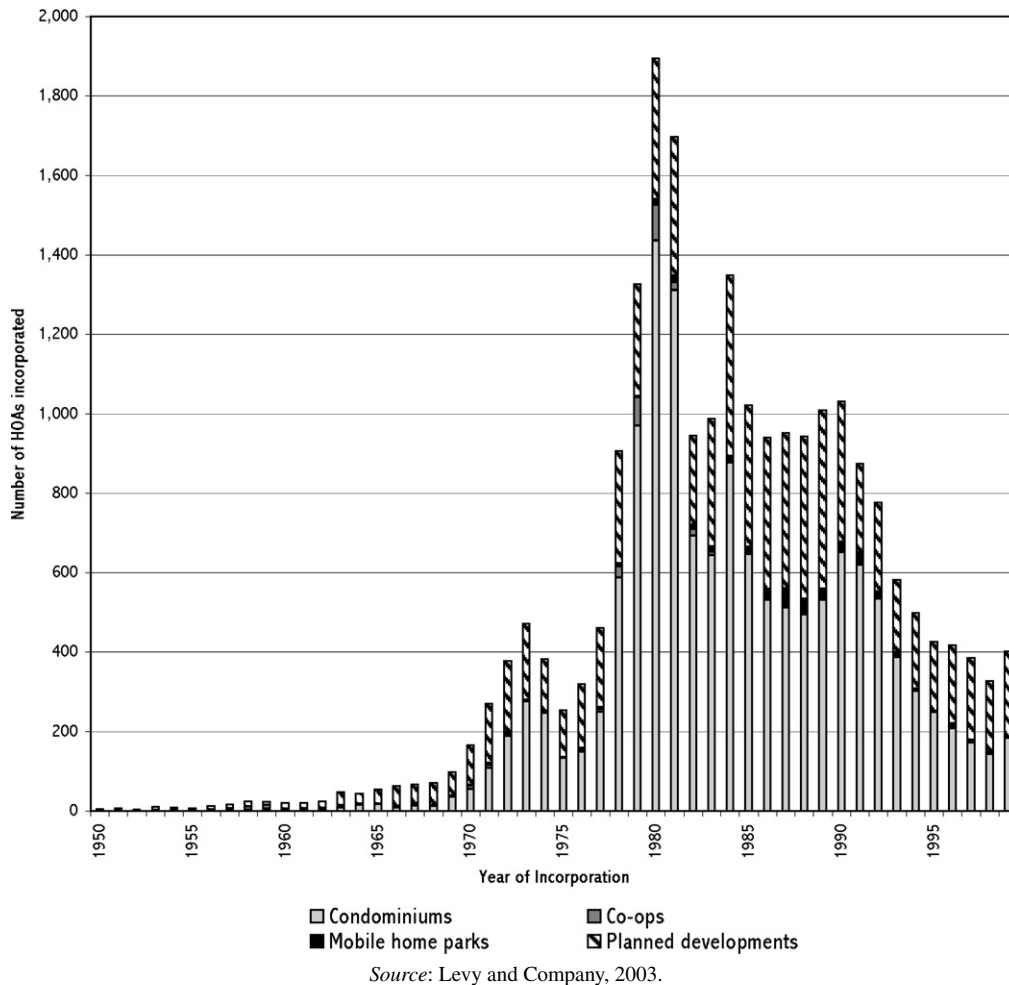


Fig. 2. Growth in HOAs in California—entire state, all types.

Table 1  
Summary statistics and comparison of low and high PD cities

	(1)		(2)		(3)	
	1970 only		1999 only		1970–1999	
<i>All cities:</i>						
Total PD units	382 (817)		3430 (5332)		1900 (3465)	
PD units p.c.	0.007 (0.057)		0.030 (0.091)		0.021 (0.031)	
PD membership rate	2.1% (2.0%)		8.1% (3.7%)		5.3% (7.4%)	
<i>Cities by quintile:</i>	Low PD*	High PD*	Low PD*	High PD*	Low ΔPD**	High ΔPD**
PD units p.c.	0 (0)	0.034 (0.035)	0.002 (0.001)	0.087 (0.049)	0.006 (0.015)	0.054 (0.050)
Population	51,149 (26,830)	68,134 (88,418)	274,384 (763,094)	89,039 (54,367)	101,535 (136,640)	63,711 (40,973)
Pop. density	5.15 (2.64)	3.05 (1.98)	10.30 (4.83)	3.34 (1.42)	8.68 (3.81)	3.06 (1.64)
Land area	11.6 (6.6)	25.2 (27.3)	32.6 (97.7)	30.2 (18.8)	12.2 (9.5)	24.4 (16.2)
Public expenditures p.c. (\$)	452 (339)	603 (307)	1194 (1,161)	1040 (575)	825 (685)	753 (341)

Sample: 110 cities over 30 years. All values are means, followed by standard deviations in parentheses.

Sources: Levy and Company 2003, US Bureau of the Census and the *California Planner's Book of Lists*.

\* Cities are grouped into quintiles according to their level of planned development units per capita in either 1970 or 1999. *Low PD* cities are in the first quintile; *High PD* cities are in the fifth quintile.

\*\* Cities are grouped into quintiles according to their *absolute change* in planned development units per capita between 1970 and 1999. *Low ΔPD* cities are in the first quintile; *High ΔPD* cities are in the fifth quintile.



Table 2  
Summary of variables

Variable	Source	Mean	S.D.	Min	Max
<i>Dependent Variables—Per Capita</i>					
Total general expenditure	(a)	808	578	7	5945
Police expenditure	(a)	140	100	0	1053
Highways and roads expenditure	(a)	95	83	0	1367
Fire expenditure	(a)	76	66	0	543
Parks and recreation expenditure	(a)	69	70	0	1844
Waste disposal expenditure	(a)	30	40	0	342
Libraries expenditure	(a)	17	23	0	379
Housing and community development expenditure	(a)	70	126	0	2407
Government administration expenditure	(a)	78	71	0	1066
<i>Explanatory Variables</i>					
Proportion Black	(b)	0.07	0.11	0.001	0.75
Proportion Hispanic	(b)	0.20	0.17	0	0.91
Proportion Asian	(b)	0.08	0.08	0.001	0.75
Proportion of adults with 4 years of college	(b)	0.09	0.06	0.006	0.32
Proportion 17 and under	(b)	0.29	0.07	0.13	0.48
Proportion 65 and over	(b)	0.10	0.04	0.02	0.26
Proportion reporting welfare income	(b)	0.09	0.04	0.02	0.26
Proportion foreign-born	(b)	0.21	0.10	0.02	0.59
Proportion of housing units owner-occupied	(b)	0.55	0.12	0.19	0.92
Median household income, in thousands	(b)	36.9	9.69	4.5	71.8
Population density (thousands of persons/sq. mi.)	(b,d)	5.3	3.1	0.4	22.7
5-year population growth rate	(b)	0.12	0.19	−0.13	2.93
Per capita county income, in thousands	(b)	23.3	5.3	13.0	59.4
Year dummies					
MSA-year interaction dummies					
Per capita number of PD units	(c)	0.020	0.031	0	0.30
<i>Instruments</i>					
Per capita PD units lagged 15 years	(c)	0.009	0.021	0	0.26
Per capita PD units lagged 20 years	(c)	0.006	0.017	0	0.25
City land area in square miles	(d)	27.6	55.1	1.9	469.3

Sample: 110 cities over 30 years. All dollar values are GDP deflated to 1997 values.

*Sources:*

a = City public expenditures data from the Annual Survey of Governments, US Bureau of the Census.

b = Population and demographic data from the US Census of Population and Housing (1970, 1980, 1990). Yearly population data also from the California Department of Finance, Demographic Research Unit (2003).

c = Homeowners' associations data from Levy and Company (2003).

d = Land area data from the US Census of Population and Housing (1970, 1980, 1990), the *County and City Data Book* (1975), the US Census Boundary and Annexation Survey (1976–1979) (US Census Bureau, 1980) and *The California Planner's Book of Lists* (1981, 1984, 1985, 1995–1999). If the area for a certain year is missing, it is assumed that area is that of the closest past year with data.

Finally, the model also includes covariates commonly encountered in empirical studies of local spending. These are listed in the middle of Table 2. The variables control for extraneous factors that may drive both public expenditures and private government activity; for instance, if population growth in a city occurs mostly in PDs.<sup>28</sup> Also, in addition to the dummy variables used to control for unobserved time-varying effects, a possibly

more precise alternative is to use the county per capita income instead of, or in addition to, the MSA dummies.

### 5.3. Identification

Private government prevalence may not be exogenous to public expenditures, as there are reasons that public provision can affect private government activity as well. One possibility is that homeowners, frustrated by the deterioration of local services, demand associations that provide additional services. Johnston and Johnston-Dodds (2002) suggest a supply-driven source of endogeneity. Budget-constrained local authorities try

<sup>28</sup> This example was raised by an anonymous referee. More contemporaneous measures of population growth (one-year and two-year) were also used with little difference in qualitative results.

to cut spending by unloading the provision of infrastructure on the developer, who then sets up a private government to pay for it. To account for the simultaneity and endogeneity, instrumental variables are needed that affect private government formation but not public spending. Two types of variables serve as instruments, lagged private government values and city land area.

First, private government is instrumented with its lagged values fifteen and twenty years ago.<sup>29</sup> The justifying assumption is that past values of private government proliferation in the city help explain the current values of private government but do not directly affect current levels of public spending.<sup>30</sup> The instrument assumes there is an underlying factor about a city such that cities that had fast rates of growth in private government membership in the past are likely to have fast rates of growth in private government membership today. This can be institutional, taste-driven or developer-driven. Another justification for this instrument is the “contagion” effect: the growth of private governments in a city may spur faster growth of private governments in newer subdivisions in the city. As motivation, Helsley and Strange (1999) modeled this effect in their study of how gated communities affect the spatial distribution of crime. They show that developers may respond to existing gated communities by creating even more secure communities of their own; this leads to an explosion of gating in an area. Thus lagged values of private government in a city are a good predictor of current private government values.

It is also necessary that private development decisions taken in the past will influence present public spending only through the creation of more private governments. If there is any persistence in local public expenditures, it cannot be as long as the lag in the PD measure. As municipal councils would have turned over at least several times in fifteen years, this is likely defensible.<sup>31</sup> Another potential problem of the instruments is that past private government membership may be corre-

lated with present public spending through entrenched voter behavior. Members of private governments set up in the past have had years to vote for tightening local expenditures, and present-day municipal budgets may reflect the fiscally conservatism of these voters. However, Gordon (2003) provides evidence from analysis of electoral data that once controlling for the self-selection into neighborhoods with planned developments, private government membership does not translate into more conservative voter behavior in statewide elections.

The other set of instruments for private government reflects land area changes. Land area is an appropriate instrument because first, the annexation of new land is correlated with the establishment of private governments. A pattern of city annexations is generally indicative of residential development. Between 1970 and 1999, almost every city in the panel changed in land area. Most boundary changes result from the annexation of undeveloped land.<sup>32</sup> Land area changes in turn reflect the feasibility of and taste for increased residential development. As PDs tend to require large tracts, cities that border on unincorporated land have more “room to grow.” Cities also tend to have the demand for residential development in order to undertake the annexation process: generally, suburban developers initiate a large proportion of annexations.<sup>33</sup> Increased development activity is then, in turn, strongly responsible for the growth of private governments. Roland (1998) notes that developers responded to the rising cost of land by combining smaller lots with common open areas and marketing them as a PD. This also coincided with changes in the building industry, where large-scale corporate builders with the capital to construct large PDs started to dominate.<sup>34</sup>

In addition, to be a valid instrument, land area changes must be uncorrelated with shocks to public spending. This is likely to be the case because land area

<sup>29</sup> For example, the number of PD units in 1970 is instrumented with the number of PD units in 1955 and 1950; the number in 1971 is instrumented with the number in 1956 and 1951; and so on. The private government variable is measured back to 1950, so that all thirty years of the panel can be used.

<sup>30</sup> The use of the lagged endogenous variable in instrumental variables estimation has a long history in econometrics. See, for instance, Villas-Boas and Winer (1999) and Aronsson et al. (2000).

<sup>31</sup> To further guard against the long persistence of expenditures, the categories chosen for the dependent variables in the analysis tend to be those that have a high degree of current, as opposed to capital, expenditures. Later in the paper, the issue of current versus capital spending is discussed in more detail.

<sup>32</sup> Epple and Romer (1989) note that annexations make up 98% of all boundary changes in their survey.

<sup>33</sup> California reality reflects this argument. Developers often spearhead annexation campaigns by petitioning the city they wish to join. This request must receive approval from the county Local Area Formation Commission (LAFCO). The LAFCO assesses the environmental and economic impact of extending city boundaries before granting approval; thus, boundary changes are usually justified by demand for development. An exploration of minutes from LAFCO meetings confirms that petitions for annexation are mostly initiated by landowners and developers. See Austin (1999) for a further empirical example. Fleischmann (1986) corroborates this view with historical evidence that developers use annexation as a way to shift development costs to local governments.

<sup>34</sup> Indeed, McKenzie (1998) shows that developer driven action can explain much of the variance in private government popularity.

changes tend to be incrementally small and should not result in large increases in per capita public expenditure.<sup>35</sup>

The last row of Table 1 gives some descriptive statistics on land area.<sup>36</sup> Cities vary widely in size, from two square miles for Fortuna to 470 square miles for Los Angeles. There has been an average increase in size of 40.5% over the period 1970–1999. However, comparison with single-year growth rates demonstrates that area growth is incremental and consistent with developer-driven demand. The mean single-year change is only 0.3 square miles. The mean is pulled down by years in which cities do not change in area. For only those years in which a city experienced a change, the mean change is 1.7 square miles, and the median change is 0.35 square miles. This pattern of heavy but incremental annexation activity suggests that residential development is the primary driving force behind land area changes and private government growth.

## 6. Analysis

The first step is to consider a model of local public spending using all of the explanatory variables except for measures of private government. This acts as a gauge of the quality of the demographic and public expenditure data. Column (1) of Table 3 reports these regression results.<sup>37</sup> The  $R^2$  suggests a relatively good fit. A few covariates of interest are discussed here. Population density has a strong negative coefficient, which suggests that there is a spreading of the fixed costs of services among a dense population. The income elasticity of local spending, evaluated at the mean, is 0.26. This is consistent with other papers, which find an income elasticity less than one. The coefficients on the other demographic variables generally fall in line with traditional studies of local government expenditure.

The next step includes private government as an explanatory variable. Columns (2) through (5) of Table 3 report the OLS and IV estimation results for a number of specifications. The specifications differ depending on whether a set of region-year dummies is included. For the 2SLS regressions, the coefficients on the first-stage instruments are also reported.<sup>38</sup> The instruments are correlated with the endogenous private government variable and are jointly statistically significant. The Cragg–Donald  $F$  statistic is high enough to guard against the weak instrument problem, per Stock and Yogo (2005). Finally, a Sargan overidentification test of the instruments does not reject the null hypothesis that the instruments are uncorrelated with the error term in the local government equation, which gives some confidence to the overall set of instruments.<sup>39</sup>

The estimations indicate a significant, negative interaction effect, consistent with the view that public governments see private government as a strategic substitute. The magnitudes of the IV estimates are larger than the OLS ones, suggesting that not accounting for the endogeneity of private government can bias the public response downward.<sup>40</sup> Elasticities of public expenditure with respect to private government can be calculated by multiplying by the PD measure. For example, column (5), the preferred specification of the table, suggests that for a city with the mean of 0.02 PD units per capita, the elasticity is  $-0.151$ . That is, a 10% increase in the prevalence of PDs in a city<sup>41</sup> will on average decrease public expenditures by 1.51%. This result is consistent with the model prediction of Helsley and Strange (2000), where the slope of the public government's reaction function lies somewhere between  $-1$  and  $0$ , implying that strategic downloading is occurring at a less than one-for-one rate.

### 6.1. IV regressions on expenditure categories

Finding public sector responses to private government leads to the question: what is the mechanism that generates the interaction? In addition to strategic substitution, the following mechanisms could be at work:

<sup>35</sup> Another way to bolster the argument is to see if in those years where land was annexed but the number of PDs was unchanged, per capita expenditures grew. Fixed-effects regressions of this type (not reported here) showed that there was no relationship between land area changes and per capita spending. The author thanks an anonymous referee for suggesting this test. Also, assuming that the lagged PD units instruments are exogenous to current public spending, it is possible to perform an overidentification test for the exogeneity of the land area instrument. This is done in the Analysis section.

<sup>36</sup> The land area variable is potentially subject to measurement error, as it is difficult to obtain yearly land area numbers. A combination of sources is used; see the footnote in Table 2.

<sup>37</sup> A Hausman test suggests that the appropriate error structure is fixed-effects rather random-effects. In this and all following tables, standard errors are robust and clustered at the city, per Schaffer and Stillman (2007).

<sup>38</sup> Estimation was also performed with different combinations of lags, ranging from ten to twenty years. These give qualitatively similar results. Tables only report the best-fitting combination of fifteen and twenty year lags.

<sup>39</sup> The  $p$ -value is generally around 0.3.

<sup>40</sup> Also, a Hausman test supports the use of a fixed-effect IV model versus a fixed-effect OLS model.

<sup>41</sup> A 10% increase is slightly less than the average one-year rate of increase in per capita PD units in the sample.

Table 3

Estimation results—selected covariates. Private government measured by planned developments

	OLS			2SLS	
	(1)	(2)	(3)	(4)	(5)
Per capita PD units		−1.266 (0.788)	−2.163** (0.775)	−4.526* (1.813)	−7.548** (2.376)
% Black	1.007 (0.698)	1.314* (0.623)	1.027 (0.688)	0.967* (0.438)	0.611 (0.433)
% Asian	0.011 (0.201)	0.055 (0.222)	0.017 (0.196)	0.084 (0.212)	0.069 (0.191)
% Hispanic	0.580† (0.330)	0.701* (0.344)	0.560† (0.327)	0.356 (0.288)	0.173 (0.297)
% 17 and younger	−1.228† (0.683)	−1.320* (0.629)	−1.348† (0.691)	−1.521* (0.648)	−1.308† (0.693)
% 65 and older	−0.365 (0.958)	0.149 (0.899)	−0.368 (0.947)	−0.455 (0.762)	−0.540 (0.759)
% Owner-occupied homes	1.145* (0.471)	1.364** (0.451)	1.254* (0.483)	1.424** (0.370)	1.379** (0.394)
Median hhld. income	0.007** (0.002)	0.007** (0.002)	0.008** (0.002)	0.002 (0.003)	0.006* (0.003)
Population density	−0.037† (0.019)	−0.029† (0.016)	−0.038* (0.019)	−0.013 (0.012)	−0.023 (0.015)
5-Year pop. growth	0.046 (0.058)	0.047 (0.053)	0.051 (0.060)	0.013 (0.046)	−0.000 (0.061)
County income p.c.	−0.008 (0.007)	0.004 (0.005)	−0.008 (0.006)	0.006 (0.004)	−0.008 (0.006)
<i>Estimated coefficients on first-stage instruments:</i>					
15-yr lag PD units				0.195** (0.028)	0.162** (0.041)
20-yr lag PD units				0.068 (0.057)	0.033 (0.078)
Land area				0.0001 (0.0001)	0.0001 (0.0001)
Partial $R^2$ of excluded instruments				0.11	0.06
First-stage $F$				26.64	7.82
Cragg–Donald $F$				123.3	63.5
Region-time dummies	Yes	No	Yes	No	Yes
$R^2$ within	0.65	0.61	0.65	0.61	0.65

Dependent variable: Log per capita real public expenditure. Robust standard errors, clustered at the city level, in parentheses. All specifications include year dummies and observe 110 cities over 30 years. For the IV specifications, the private government variable is instrumented with 15- and 20-year lagged private government measures and land area of city.

\* Significance at the 5% level.

\*\* Idem, 1%.

† Idem, 10%.

- *Competing governments*: PDs may act as a check on the spending of local governments. Public governments recognize the growing number of homeowners' associations as competitive, rival governments. This forces them to adjust expenditures downward. This has parallels to the Leviathan literature, where competing municipalities better reflect the demands of median voters.
- *Political activism*: Voters in private governments may be able to better exercise lobbying power by concentrating politically active homeowners onto

association boards. Edward Blakely (as noted in Lang and Danielsen, 1997) states that "it's easier to organize these people in 269 housing units through their community association than it is to go door to door and try to organize people in any other place." Associations often encourage their members to vote as a bloc on municipal matters that affect members and non-members. PD members may then be less likely to favor spending on items that benefit primarily those who live outside the community, such as redistributive spending.

- *Efficiency*: Public governments may recognize that some types of local services are actually private goods, in which case an efficiency argument may justify the private sector's provision of supplementary services. Governments may want to focus their efforts providing public services with more "socially beneficial" characteristics.
- *Cooperative bargaining*: Public and private governments may interact with each other, but not necessarily in a non-cooperative setting. Bargaining often arises in the construction stage of a PD. Municipal officials may require private developers to install municipal infrastructure in the housing development. In return, the developers can set up a homeowners' association to finance the expenses.

Because different types of expenditures have different characteristics, examining private government's impact on separate categories can help determine which mechanisms are more likely. This section considers eight expenditure categories as dependent variables. Columns (1) through (4) of Table 4 report the OLS and IV results. The preferred specification is (4).

The estimations suggest a distinction between two classes of services, which seems to be based on the substitutability between private and public providers. This is consistent with the efficiency mechanism: public governments reduce their spending in services for which private governments provide close substitutes. Public expenditure decreases in local spending occur where substitutability is likely the highest: parks, housing and community development, police and waste disposal.<sup>42</sup> Waste disposal and recreation facilities have strong private good characteristics: once a homeowners' association picks up members' garbage or provides them with a swimming pool, there is less of a need for the public government to provide these services to these residents. It is interesting that a negative sign appears on both public safety services, police and fire protection. The negative coefficient on police indicates that private services such as patrols and gates have met with some public response. On the other hand, as most PDs do not provide their own fire fighting, the negative coefficient on fire is

more of a mystery.<sup>43</sup> The results seem to run counter to the claim in Gordon (2003) that voters in planned communities might support increased spending on public safety services while rejecting spending on redistributive and duplicative services.

PDs have no significant effect on public road spending in any specification. The most plausible explanation is that there is no private substitute for public roadways, especially those outside the homeowners' association. In addition, the absence of strategic downloading here may be partly due to the spending on durable infrastructure. If expenditures primarily pay for capital and equipment, it might be hard to reallocate spending away from this category even when private government is relieving some of the budget.<sup>44</sup>

The effect of private government on government administrative spending is also not significant in the preferred specification. If homeowners' associations are a way to check on the overspending of local governments, then members would likely support tightening the budgets of municipal bureaucracy.<sup>45</sup> However, there is only weak evidence to support this competing governments mechanism. A likely reason is that government administration clearly has public good characteristics that make it difficult for private governments to provide a substitute.

Finally, data on California condominiums allow for a check of the substitutability mechanism. Condominiums are as common as PDs in California,<sup>46</sup> but condominium-provided services are clearly less substi-

<sup>42</sup> It is important to keep in mind that the estimates give net effects on public spending in these categories. For instance, finding a negative effect on parks and recreation spending does not preclude complementary behavior for certain line items in the park budget. It is argued, however, that in general, the categories with significant net negative effects are those that provide services that are private goods in consumption.

<sup>43</sup> One possible explanation for the negative coefficient on fire is that fire expenditures tend to be negatively correlated with the age and quality of the housing stock, newer houses being under much stricter construction codes. (See Duncombe (1992), for instance.) So the negative coefficient could be picking up the fact that houses in PDs are newer, rather than reflecting downloading of fire protection responsibility. This point should be tempered, however, with the observation that a large part of fire expenditures is devoted to code enforcement. Planned developments tend to handle this themselves, so the negative coefficient on fire could reflect downloading of enforcement expenditures as opposed to downloading of actual fire-fighting.

<sup>44</sup> In additional regressions, not presented in this paper, it is shown that indeed, the level of private government has no effect on local capital expenditures, while causing a significant decrease in current expenditures. This suggests that current spending is much more manipulable than capital spending and provides further support for a strategic substitution interpretation of the downloading result.

<sup>45</sup> Many critics of private government see this as a sign of the deterioration in trust of government. Stabile (2000) states, "The exclusivity of CAs [community associations] may induce their members to evade public service to a larger community. The money needed to pay for such exclusivity can increase the costs of CAs."

<sup>46</sup> In 1999, the mean city in the 110-city sample had 0.029 condominium units per capita, compared to 0.03 PD units per capita.

Table 4

Estimation results for individual expenditure categories. Private government measured by planned developments

Dependent variable	Reported coefficient: Per capita PD units			
	OLS		2SLS	
	(1)	(2)	(3)	(4)
All expenditures	−1.264 (0.788)	−2.163** (0.775)	−4.526* (1.813)	−7.548** (2.376)
Police	−0.300† (0.152)	−0.282† (0.149)	−1.444** (0.559)	−2.098** (0.691)
Highways & Roads	−0.114 (0.132)	−0.011 (0.127)	0.021 (0.340)	−0.124 (0.563)
Fire	−0.078 (0.087)	−0.081 (0.095)	−0.553** (0.197)	−0.786* (0.311)
Parks & Recreation	−0.179 (0.125)	−0.271* (0.127)	−0.848* (0.360)	−1.228** (0.611)
Solid waste disposal	−0.094 (0.113)	−0.093 (0.116)	−0.938** (0.288)	−1.583** (0.487)
Libraries	−0.059 (0.047)	−0.038 (0.046)	−0.288† (0.259)	−0.194 (0.26)
Housing & Community development	−0.493* (0.205)	−0.438† (0.238)	−1.448* (0.599)	−1.448* (0.959)
Government administration	−0.298† (0.168)	−0.303* (0.137)	−0.808† (0.428)	−0.451 (0.639)
Region-time dummies	No	Yes	No	Yes

Dependent variable: Log per capita real public expenditure on various categories. Robust standard errors, clustered at the city level, in parentheses. The private government variable is instrumented with 15- and 20-year lagged private government measures and land area of city. All specifications include year dummies and observe 110 cities over 30 years.

\* Significance at the 5% level.

\*\* Idem, 1%.

† Idem, 10%.

tutable than PD-provided services. When OLS and IV regressions are run with private government measured by condominium units per capita, there is no evidence of public downloading of total expenditures, or in any specific category of spending, in the face of condominium activity.<sup>47</sup> Hence, while in law, condominiums and planned developments have equivalent standings as private governments, in practice it is the substitutability of planned development services for public services that generates strategic substitution.

## 6.2. Sample selection and the effect of city size

The results in the last section show some selectivity in the types of services cities are choosing to offload to private governments, but they may not be representative of all cities in the state. This is because the Annual Survey

of Governments oversamples large cities.<sup>48</sup> Does city size play a role in the downloading of public services? Larger cities may be more likely to exhibit strategic substitution because they tend to be more heterogeneous in demand for public services. This may magnify the efficiency and the political activism motivations, which increase the likelihood that private governments will arise.<sup>49</sup> Larger cities also offer a larger range of services and more discretionary items in their budgets, so that they may respond more readily than smaller cities to the growth of private governments. On the other hand, smaller cities may be more receptive to the demands of residents and developers and hence more likely to respond to private governments. In this case, sampling larger cities may underestimate the true impact of private governments on local spending.

<sup>47</sup> The sole exception is that, at the 5% level, there is a drop in waste disposal spending with condominium prevalence. Rather than reflecting genuine downloading, this might indicate that the higher densities of condominiums produce economies of scale in garbage pickup. All regression results are available from the author.

<sup>48</sup> The mean population for cities in the sample is 129,745 over the period from 1970 to 1999, while it is 44,554 for all cities in California.

<sup>49</sup> For instance, Brooks (2007) gives evidence that heterogeneity in the population can encourage the formation of business improvement districts, the analogue to the homeowners' association in a commercial setting.

Table 5

2SLS estimation results for individual expenditure categories—Census of governments sample. Private government measured by planned developments

Dependent variable	Reported coefficient: Per capita PD units Census of Governments sample			
	All cities (1)	Small cities (< 15,000) (2)	Medium cities (15,000–75,000) (3)	Large cities (≥ 75,000) (4)
All expenditures	–2.106 (2.110)	–2.079 (1.799)	–0.679 (2.193)	–23.424** (7.988)
Police	0.452 (0.287)	0.379† (0.231)	–0.461 (0.349)	–2.264* (1.069)
Highways & Roads	–0.265 (0.196)	–0.307 (0.209)	0.575 (0.451)	–0.747 (1.238)
Fire	0.367* (0.187)	0.297* (0.119)	0.014 (0.198)	–0.987* (0.442)
Parks & Recreation	–2.728** (0.843)	–2.596** (0.636)	–0.182 (0.254)	–2.901* (1.322)
Solid waste disposal	–0.047 (0.046)	–0.062 (0.044)	–0.320 (0.247)	–1.019 (0.976)
Libraries	–0.015 (0.044)	–0.002 (0.034)	–0.184 (0.172)	–0.762** (0.223)
Housing & Community development	–1.478** (0.478)	–1.369** (0.364)	0.645 (0.706)	–1.166 (1.956)
Government administration	–0.382 (0.414)	–0.361 (0.334)	–0.641* (0.305)	–7.147** (1.748)
Region-time dummies	Yes	Yes	Yes	Yes
No. of cities	403	208	157	38
No. of years observed	6	6	6	6

Robust standard errors, clustered at the city level, in parentheses. All specifications include year dummies. The private government variable is instrumented with 15- and 20-year lagged private government measures and land area of city.

\* Significance at the 5% level.

\*\* Idem, 1%.

† Idem, 10%.

To address city size in this section, the panel is changed to consist only of the six Census of Governments years: 1972, 1977, 1982, 1987, 1992 and 1997. All US cities report in these years, so this increases the sample from 110 to 403.<sup>50</sup> The results from the IV regressions on this sample are summarized in column (1) of Table 5. The panel with 403 cities shows an insignificant negative effect of private government on total expenditures, counter to the previous section. This may be attributed to the short length of the panel, but it also suggests that the choice of cities in the sample matters. When the dependent variables are individual categories of spending, some categories have similar results to the 110-city panel: parks and housing development spend-

ing have a statistically significant negative coefficient at 1 percent, and there is no downloading of road spending, libraries or government administration. However, there are two surprising differences using the Census panel. First, there is no longer reduction in waste disposal or police expenditures. Second, fire spending and private governments seem to be strategic *complements* at the 5 percent level.

To shed further light on these results, the 403 cities are divided into three groups: “small” (less than 15,000 population as of 1970), “medium” (between 15,000 and 75,000) and “large” (more than 75,000).<sup>51</sup> Columns (2) through (4) of Table 5 report the results.

The downloading of total public expenditures is observed only for large cities. This is consistent with the

<sup>50</sup> Besides increasing sample size, running this shorter panel also addresses a concern raised by Bertrand et al. (2004) that long data series, such as the 30-year panel, with positively serially correlated treatment effects may lead to underestimated standard errors. The author acknowledges an anonymous referee for raising this concern. Clustering the standard errors by city also helps in this regard.

<sup>51</sup> The cutoff between small and medium cities is chosen because 15,000 is just over the median 1972 population in the sample. The cutoff between medium and large cities is chosen because 75,000 is roughly the 90th percentile of city population sizes.

fact that the 110-city panel oversamples large cities. Specifications with categories of expenditures reveal other differences between cities of different sizes. The effect of private government on police spending is positive for small cities, insignificant for medium cities and negative for large cities. In smaller cities, private government members may want increased police spending because of the public good benefits that it confers on all residents. Members may find it difficult to cut spending on a small police force without a marked loss of service. In larger cities, however, greater heterogeneity leads to increased fragmentation of the population; the level of private security services enjoyed by residents of planned developments make police redundant in those neighborhoods, and so may make targeted reductions in policing easier.<sup>52</sup> This motivation may also explain the negative coefficient on libraries for large cities and the lack of significance for small cities. On the other hand, downloading of parks and housing development is still observed for smaller cities. In these cases, the private nature of the services provided seems to bring about downloading.

In summary, the results from the alternative panel shows that it is important to account for the heterogeneity in city size in the ability to download public services to private governments. Smaller cities may have less opportunity to strategically substitute certain services. Indeed, the economies of scale and the public good benefits of safety services (police and fire) may induce strategic complementarity of public and private government in smaller cities. As cities get larger, strategic substitution seems to be the norm as public services resemble private goods, and the efficiency motivation for downloading takes over.

## 7. Conclusion

Residential private governments take public authority and transfer it to an association of homeowners. This paper examined whether local governments reacted to the increased prevalence of private governments by altering provision levels. A panel of California cities from 1970 through 1999 is used to test the hypothesis. The analysis finds that downloading occurs, consistent with public and private government activities being strategic substitutes. For a 10% increase in per capita planned development units in a city, local expenditures fall 1.5%.

When local expenditures are split up into categories, private government activity produces a downloading effect for those categories with a high degree of substitutability between public and private providers. However, city size seems to be critical to what type of downloading occurs. Smaller cities seem to benefit from the public good aspect of local services and are less likely to engage in expenditure reductions.

What is the context of these results in the face of existing trends in public finance? Two observations point to their significance and to further questions. First, downloading of public expenditures due to private government is occurring even in an era of overall increasing public spending. Future research could focus on understanding more fully the political impact of these associations. Second, not only are private governments becoming the norm in new developments, they are larger and provide more services. This is especially true in suburban communities. As the influence of public finance wanes and that of private governments increases, a further research question may be to examine the competition and interaction between private governments within a community.

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<sup>52</sup> This similar pattern is observed for fire expenditures as well. As with policing, the positive sign for small cities may be due to the public good aspect of fire protection. The negative sign for large cities is presumably due to the same explanation given in the last section.



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