Are PILOTs Property Taxes for Nonprofits?

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ABSTRACT

Nonprofit charitable organizations are exempt from most taxes, including local property taxes, but U.S. cities and towns increasingly request that nonprofits make payments in lieu of taxes (known as PILOTs). Strictly speaking, PILOTs are voluntary, though nonprofits may feel pressure to make them, particularly in high-tax communities. Evidence from Massachusetts indicates that PILOT rates, measured as ratios of payments to the value of local tax-exempt property, are higher in towns with higher property tax rates: a one percent higher property tax rate is associated with a 0.2 percent higher PILOT rate. PILOTs appear to discourage nonprofit activity: a one percent higher PILOT rate is associated with 0.8 percent reduced real property ownership by local nonprofits, 0.2 percent reduced total assets, and 0.2 percent lower revenues of local nonprofits. These patterns are consistent with voluntary PILOTs acting in a manner similar to low-rate, compulsory real estate taxes.

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1. Introduction

Charitable nonprofit organizations are generally exempt from federal, state, and local taxes. Since nonprofits typically generate little in the way of net income, the benefits of income tax exemptions are small relative to other benefits of tax-exempt status, notably including exemptions from local property taxes (Gentry and Penrod, 2000).[1] A tax-exempt nonprofit organization that locates in a town may deliver valuable services, provide employment, and attract visitors and tax-paying residents, but its ownership of local real estate lowers the property tax base and thereby reduces resources otherwise available to town governments. Property tax exemptions thereby can distress cash-strapped towns and cities with significant numbers of nonprofits.

In recent years, local governments increasingly have asked nonprofit organizations to make payments in lieu of taxes, known as PILOTs. Some nonprofits comply with these requests and others do not. Although as a legal matter PILOTs are voluntary – state property tax exemptions for charitable nonprofits are often guaranteed by statute or state constitutions – in practice they may not exhibit all of the characteristics of truly voluntary transfers. Nonprofits benefit along with others from robust fiscal conditions in their states and localities, and some nonprofits have collaborated with municipalities to develop PILOT programs. But many nonprofits would not voluntarily divert resources from their exempt purposes to governmental purposes – indeed it is questionable whether charities laws permit them to do so – in the absence of suasion by local governments. Unhappy governments can penalize noncomplying nonprofits informally by limiting access to local public services, refusing to relieve burdensome local regulation, or challenging tax exemptions on the basis of whether nonprofits properly pursue their exempt purposes. In such environments nonprofits may be pressured to accede to local requests for PILOTs.

[1] Following convention, we use the term nonprofit to mean tax-exempt charities. Although most nonprofit entities are exempt from federal and state taxes, not all nonprofits benefit from tax exemptions. The Internal Revenue Code grants federal tax exemptions to the subset of nonprofits that have charitable purposes and adhere to other requirements. The list of purposes includes "religious, charitable, scientific, testing for public safety, literary, or educational purposes, or to foster national or international amateur sports competition (but only if no part of its activities involve the provision of athletic facilities or equipment), or for the prevention of cruelty to children or animals…." (Internal Revenue Code §501(c)(3)). State requirements for tax exemption vary. Some follow the same requirements as the Internal Revenue Code; however, the definition of charity under state constitutional and statutory provisions is often more stringent than the requirement for federal exemption.

This paper examines the determinants of PILOTs and the effect of PILOTs on nonprofit activity. Since nonprofits are not required to disclose PILOTs on any government filing, the available data consist of government financial disclosures identifying PILOT receipts by town. Uniquely, the state of Massachusetts reports data on PILOT receipts by its local jurisdictions, which the study analyzes to identify factors associated with PILOTs and their effects on the nonprofit sector.

The results indicate that PILOT receipts by Massachusetts communities are positively correlated with local property tax rates: a local property tax rate one percent higher is associated with a 0.2 percent higher PILOT rate, constructed as the ratio of payments to the value of local tax-exempt property. This pattern suggests that PILOTs function as informal, low-rate substitutes for property taxes to which taxable landowners would ordinarily be subject, and raises the possibility that PILOTs might have other attributes of property taxes, including that they could discourage nonprofit activity, particularly any activity associated with holding tax-exempt property. The evidence from Internal Revenue Service Form 990 filings by Massachusetts nonprofits is consistent with this interpretation of PILOTs, as higher PILOT rates are associated with reduced nonprofit assets and revenues, and most dramatically, reduced real property holdings.

Section 2 of the paper reviews the limited available evidence of the national scope of PILOTs and their effects on the nonprofit sector. Section 3 presents a model of factors that influence the magnitude of PILOTs. Section 4 describes the Massachusetts PILOT data, and section 5 presents empirical estimates of the factors determining PILOTs and the effects of the resulting payments on nonprofit activity. Section 6 concludes.

2. PILOTs in Practice

Whether a legal entity is a nonprofit and whether it qualifies for tax exemption are related, but distinct, legal questions. Creating a nonprofit is a ministerial matter governed by state statutory and common law. Obtaining tax exemption requires more steps, including application to the Internal Revenue Service to obtain federal income tax exemption and other

benefits, and application to various state and local tax authorities to obtain state and local income, property, and other tax exemptions. Because many tax-exempt nonprofits, such as those that are most likely to make PILOTs, do not earn significant profits, the benefits they derive from income tax-exemption are limited; however, they may benefit a great deal from the tax deductibility of donations, property tax exemptions, and other benefits such as the ability to issue tax-exempt debt (Horwitz, forthcoming 2016).

States and localities exempt certain categories of nonprofits, especially charities, from taxation, thereby encouraging greater nonprofit activity (Hansmann, 1987). Researchers have advanced several theories to explain why these nonprofits should receive tax exemptions (Simon et al. 2006), a common one being that tax exemption is a subsidy offered to nonprofits to encourage and reward them for providing services that the government would otherwise need to provide. Another theory is that nonprofits do not have taxable income, which under federal law arises from activities for personal gain (Bittker and Rahdert, 1976). These theories do not specifically address why local and state governments might prefer nonprofit to for-profit activities, and some local and state governments grant individual for-profit firms ad hoc tax exemptions for locating within their borders (Felix and Hines, 2013). But the blanket nonprofit tax exemption reflects broad differences between nonprofits and for-profits in the extent to which they provide services that communities value and are willing to subsidize (Hines et al., 2010).

As a practical matter, states typically exempt nonprofits from taxation based on the categories of services they provide, although they exhibit a range of approaches. In Massachusetts, nonprofits that are exempt from federal taxation under Internal Revenue Code §501 are also exempt from Massachusetts excise (income) taxes (Massachusetts General Laws Annotated, 2015). The board of assessors in each Massachusetts municipality grants exemption from local property taxes according to state statutes and administers those exemptions. Roughly speaking, the property of religious entities (Massachusetts General Laws Annotated, 2013a) and charities "established for literary, benevolent, charitable, or temperance purposes," and operated as such, are granted local property and sales tax exemptions (Massachusetts General Laws Annotated, 2013a). Other categories of nonprofits that are not charities, such as country clubs, may be exempt from property taxes under other statutes, such as those that use tax exemptions to

protect open spaces (Massachusetts General Laws Annotated, 2013b).[2] PILOTs provide a mechanism for returning to local governments some of these revenues foregone due to exemptions.

PILOTs have a long lineage, particularly in Massachusetts, where the Boston PILOT program began in 1925 (Brody, 2010). Harvard University and the Massachusetts Institute of Technology, both tax-exempt, have made voluntary payments to the city of Cambridge since 1928. Although there are no comprehensive data on numbers of PILOTs or PILOT agreements nationally, there is some evidence that the implementation of PILOTs is on the rise (Langley et al., 2012).[3] For example, Boston introduced a new PILOTs program in 2011 in which the city requests payments from charities with property valued at more than $15 million with plans that, after an implementation period, these charities will make PILOTs equal to 25 percent of the full amount a property owner would owe if the property were taxable; in addition, participating charities may receive up to a 50 percent credit toward their PILOTs for providing value in the form of community benefits (Rakow, 2013). In fiscal year 2013 (July 1, 2012 – June 30, 2013), Boston received $23.2 million in cash PILOTs out of $28.2 million requested; in fiscal year 2011, Boston received $15.2 million (City of Boston, 2013).

Most recently, the Governor of Maine proposed a budget plan that would reduce corporate and individual income taxes, repeal the estate tax, and eliminate state payments to municipalities; municipalities would have some of these funds replaced by adhering to a requirement to tax nonprofits, excluding churches and government-owned tax-exempt entities, at fifty percent of the normal tax rate on assessed value over $500,000 in property (Halper, 2015; Levitz, 2015). This proposal would require municipalities to include large nonprofits as part of their tax bases, and would be accompanied by withdrawal of state funds.

Most PILOTs represent transfers from nonprofits to the relevant government authority, and they can range greatly in size. In 2005, Harvard University agreed to a 50-year arrangement

[2] Importantly, to benefit from a tax exemption nonprofits must own their real property and the property is tax exempt only to the extent that it is occupied by the organization or another exempt charity.

[3] Leland (2002) reports the results of March 1998 surveys of municipal finance directors and community leaders in 73 cities, representing the 50 largest cities in the United States plus the largest cities in states that did not include one of the top 50. Reliable information for 51 of these cities indicates that only seven solicited PILOTs in 1998, and

with Cambridge, under which it would pay $2.4 million to Cambridge in 2006, and increase that amount by roughly three percent each year; MIT signed a similar 40-year agreement in 2004, making a base payment of $1.5 million in 2005, with a 2.5 percent annual increase (Tartakoff, 2005).

Some PILOTs are made from one level of government to another as compensation for foregone taxes from public and charitable land. For example, Connecticut reimburses its municipalities for foregone taxes on state-owned land, including 100% reimbursement for correctional facility land, some designated Mashantucket Pequot tribal land, and for any town in which more than 50 percent of all property in the town is state-owned real property; 65% for the Connecticut Valley Hospital facility; and 45% for all other property (Connecticut Office of Policy & Management, 2014; Connecticut General Statutes Annotated, 2015a) and nonprofit-owned property (up to 77% for private, nonprofit hospitals and colleges) (Connecticut General Statutes Annotated, 2015b). Massachusetts does not make such payments; for example, in 1997 the Massachusetts legislature declined to pass a bill providing municipalities PILOTs for property owned by nonprofit hospitals and institutions of higher education (Massachusetts H.B. 624, 1997).

State and local governments offer several justifications for their PILOT demands, the primary one being the need for revenue. Removing property from the tax rolls is particularly consequential given the importance of property taxes for state and local revenue. In 2010 property taxes accounted for 35 percent of state and local tax revenues, and 18 percent of all state and local revenues (Urban Institute Tax Policy Center Database) nationwide; in contrast, state and local individual and corporate income taxes together accounted for only 16 percent of state and local tax revenues. Given this reliance on property taxes, removing charitable land from the property tax base leaves local governments short on funds, which affects expenditures and shifts additional financial burden onto other taxpayers (Deitrick and Briem, 2007). For example, in fiscal year 2013, 13.3 percent of the total property value of Andover, Massachusetts was tax exempt (Town of Andover, 2013, pg. 2). According to estimates based on Ohio Department of Taxation data, "[n]onprofit, government, tax-abated property accounted for 20.2 percent of the

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among these only Boston solicited PILOTs from a wide range of nonprofit organizations (for example, Boston collected PILOTs from 38 organizations; Indianapolis only one). PILOTs have increased significantly since then.

real property in Cuyahoga County in Tax Year 2012," and 44.9 percent of real property in Cleveland (Schiller and Hileman, 2013).

Moreover, reliance on property taxes makes it unsurprising that there are substantial estimated foregone taxes. One estimate of foregone taxes from charitable property tax exemptions ranges from $8 to $13 billion annually in 1997, or 1.3-2.1 percent of total U.S. nonprofit revenue (Cordes et al., 2002). Similarly, Cordes et al. (2002) estimates that nonprofit property tax exemptions in Philadelphia equal 6.2 percent of total nonprofit revenue. A Massachusetts Department of Revenue Survey reported that in 2003 "the value of all exempt property, governmental, religious, educational and charitable, was more than $87 billion," or about twelve percent of total property valued by municipalities (Massachusetts Department of Revenue, 2003, p. 4). More specifically, the reported value of all tax-exempt educational and charitable properties was more than $22 billion, or approximately three percent of the total property value of the reporting communities. The same source estimates forgone property taxes of $505.8 million, or 5.8 percent of the total projected levy of Massachusetts communities in Fiscal Year 2003. And Cordes et al. (2002) estimates that for the more than 150,000 U.S. nonprofits with greater than $500,000 of real property in 1997, the annual tax exemption was worth an average of 19 percent of their total revenues.

It is, however, far from certain that these valuations represent the amounts governments would obtain in property taxes if tax-exempt nonprofits were taxed on, or reduced, their property holdings. Taxpayers face different incentives to hold property than do nonprofits. Moreover, to the degree that nonprofits provide desirable goods or services that are not readily provided by for-profit alternatives, then non-taxable government agencies might need to expand their local property holdings to replace the activities of nonprofits; alternatively, governments could find themselves offering tax incentives to for-profits to replace tax-exempt nonprofits.

One of the practical reasons to consider taxing nonprofits is that governments need revenues. In addition, some scholars would justify taxing nonprofits on the basis that it is inequitable to offer tax exemptions to nonprofits that provide benefits to those who live elsewhere, such as an urban hospital that provides services to suburban patients (Pomp, 2004; Rokoff, 1973). Pomp (2004) notes that Connecticut makes payments to municipalities to offset this apparent injustice.

There are different ways to characterize PILOT payments. Some PILOTs take the form of payments for services such as police or fire protection. Others are characterized as simple donations, made for example to help a suffering locality get through a tough time, or investments intended to make the locality more attractive and thereby improve the environment for the nonprofit. And some PILOTs are made to forestall government actions that would impose costs on nonprofits. These different characterizations have legal and perceptual effects that may affect how willingly a nonprofit makes a payment.

PILOTs are typically negotiated on an ad hoc basis, raising the problem that similar charities are treated differently (Brody et al., 2012). This case-by-case negotiation makes it tempting for localities to turn what are voluntary payments into semi-coerced payments. For example, although under current policy all Massachusetts charities are asked to make PILOTs, towns have incentives to concentrate their collection efforts on charities that have disproportionately high costs of moving, such as those that have local licenses (e.g., medical organizations), large property holdings and long-standing relationships (e.g., universities), and location-specific charitable purposes (e.g., community foundations). Charities have complained to courts that tax authorities use PILOTs unfairly, threatening organizations in impermissible ways, such as with challenges to their otherwise-valid tax exemptions or denials of building permits if charities did not make financial payments or payments in kind to the authority. In the 1940s, for example, the local school districts and township agreed to withdraw their challenges to the proposed nonprofit incorporation of the Valley Forge Military Academy Foundation if the Academy agreed to make PILOTs in the amount the Academy would have ordinarily made in property taxes absent the exemption. (Radnor Township v. Valley Forge, 1970). Many years later, when the local government units sued the Academy for attempting to cease payments, the court found for the school, explaining that a taxing body may not collect taxes by contract and a government may not engage in selling or bartering its right to oppose an organization seeking nonprofit status.

There are many more recent examples of localities pressuring nonprofits for voluntary payments. In one case, the plaintiff church complained that the town supervisor and commissioners threatened to reject a request for a parking lot permit if the church did not make a PILOT or donate a fire truck (Fortress Bible Church v. Feiner, 2010). In another case, tax-

exempt hospitals alleged that the government units were attempting to coerce or force tax-exempt member hospitals to make payments in lieu of taxes by "indicat[ing] that those [hospitals] which [did] not agree to such payments and/or agreement 'in lieu of taxes' [would] have their tax exempt status challenged, [would] be likely to run into difficulties in obtaining zoning approvals, and [would] not be offered the opportunity to provide services to the taxing authority." (Hospital Council v. City of Pittsburgh, 1991). In 2000, Northwestern University filed a complaint against Evanston, Illinois alleging that the city imposed a historical district ordinance on the university in retaliation for refusing to make PILOTs (Northwestern University v. City of Evanston, 2001).

Much of the previous empirical research on PILOTs is descriptive. In 1998, Leland conducted a survey of public officials in 73 large cities, and identified PILOTs in only seven cities and six states of the 51 respondents (Leland 2005). More recently, Kenyon and Langley (2010) and Langley et al. (2012) report evidence of PILOTs and draw inferences about the characteristics of localities that receive them. Using media accounts, government reports, other sources, and a survey of 599 cities and towns with the largest nonprofit sectors (171 respondents), Langley et al. (2012) report that 218 localities in 28 states received PILOTs. They find that PILOTs are concentrated in the northeastern part of the United States, with Massachusetts and Pennsylvania communities accounting for more than half of the PILOT recipients they identify. Universities and hospitals provide 92 percent of the measured PILOT revenues, which is sensible given their considerable financial resources, though this may partly reflect the survey method.

3. Determination and Effects of PILOTs

In the absence of external pressure nonprofit organizations are unlikely to make PILOTs: despite their interest in community welfare, nonprofits generally have much greater need for resources than funds available to satisfy those needs. Consequently, towns that seek PILOTs must offer nonprofits valuable services in return, persuade nonprofits of the importance of making such payments, or suggest the possibility of costly regulatory or other measures if they fail to provide PILOTs. Payments received under threat of a worse alternative have much of the

character of compulsory taxes, with the important difference that PILOTs are individually negotiated.

It is useful to consider PILOTs in a bargaining setting that recognizes the alternatives to negotiated agreement available to towns and nonprofit organizations. If a nonprofit is dissatisfied with making the PILOT that the town demands, then it can move elsewhere or discontinue its operations; and if a nonprofit locates in a town but refuses to make a PILOT, then the town may be able to make the tax-exempt nonprofit's situation very difficult. Nonprofit *j* obtains value v_{ij} from locating in town *i* rather than its next best alternative, where v_{ij} is measured in dollar terms, so that if the nonprofit were required to make a PILOT equal to v_{ij} it would be indifferent to locating in town *i*. The town obtains service benefits of ϕ_{ij} from having nonprofit *j* locate there, hence would be willing to pay up to ϕ_{ij} to attract or retain the nonprofit.

One of the complications of having a nonprofit within its tax jurisdiction from the standpoint of the town is that nonprofit *j* by locating in town *i* is likely to reduce property tax collections by taking ownership of property that would otherwise be taxable. Denote nonprofit *j*'s otherwise-taxable property in town *i* by k_{ij}, and let the parameter γ_{ij} represent the degree of crowd-out. If all of a nonprofit's property otherwise would have been owned by a taxpaying entity, then $\gamma_{ij} = 1$; if the nonprofit's presence does not change the town's tax base, then $\gamma_{ij} = 0$; and many other values of γ_{ij} are possible, including those that lie outside the $[0,1]$ range, if the nonprofit somehow greatly encourages or discourages taxable entities to hold property in town. (The parameter ϕ_{ij} capturing town *i*'s valuation of services provided by the nonprofit should be similarly measured net of the town's valuation of any for-profit activity crowded out by nonprofit *j*.) With a property tax rate of τ_i, the presence of nonprofit *j* causes town *i* to lose property tax revenues of $\gamma_{ij}\tau_i k_{ij}$. Consequently, the net surplus that town *i* enjoys from the presence of nonprofit *j* is $\phi_{ij} - \gamma_{ij}\tau_i k_{ij}$.

In many circumstances there is an opportunity for both the town and the nonprofit to benefit from having the nonprofit locate in the town. The combined surplus of the nonprofit and the town is:

(1) $$v_{ij} + \phi_{ij} - \gamma_{ij}\tau_i k_{ij}\,.$$

We consider a simple Nash bargaining situation in which the town and nonprofit share this surplus equally, the product of both parties threatening to eliminate the other's surplus if there is no agreement. Equal division of surplus entails nonprofit *j* making a PILOT, p_{ij}, to town *i*, where p_{ij} is given by:

(2) $$p_{ij} = \frac{\left(v_{ij} - \phi_{ij}\right) + \gamma_{ij}\tau_i k_{ij}}{2}\,.$$

This expression for p_{ij} indicates that in a bargaining setting PILOTs are larger if the town is a particularly valuable location for the nonprofit, and smaller to the extent that the town values services provided by the nonprofit. The second term in the numerator of the fraction on the right side of equation (2) reflects that property tax reductions associated with a nonprofit increase the size of the equilibrium PILOT.

If the aggregate surplus produced by nonprofit *j* locating in town *i* (as given by expression 1) is negative, then there is no value of p_{ij} at which both the nonprofit and the town benefit, and presumably either the town will prevent the nonprofit from locating there or the nonprofit will choose to go elsewhere. If expression (1) is positive but $v_{ij} < 0$, then the town would have to offer some kind of a subsidy in order to induce the nonprofit to locate there. Since the nonprofit is tax exempt, it a tax reduction would not help it, so if it is infeasible to offer other forms of subsidy, $v_{ij} < 0$ implies that nonprofit *j* will choose not to locate in town *i*.

The $\left(v_{ij} - \phi_{ij}\right)$ term in the numerator of the right side of equation (2) is the difference between nonprofit *j*'s valuation of locating in town *i* and the town *i*'s valuation of the services that nonprofit *j* brings. This is likely a function of both town and nonprofit characteristics, including, but not limited to, the size of the nonprofit's operations. Scaling this difference by the nonprofit's property ownership, and making it a linear function of town

characteristics, produces $\left(v_{ij} - \phi_{ij}\right) = k_{ij}\beta_1 x_i$, in which x_i is a vector of town characteristics and β_1 is a vector of parameters to be estimated. Making this substitution in equation (2) produces:

(3) $$p_{ij} = \frac{1}{2}\left(\beta_1 x_i + \gamma_{ij}\tau_i\right)k_{ij}.$$

If $\gamma_{ij} = \overline{\gamma}, \forall i, j$, then summing both sides of equation (3) across all nonprofits *j* for which $v_{ij} \geq 0$ and $v_{ij} + \phi_{ij} - \gamma_{ij}\tau_i k_{ij} \geq 0$ produces:

(4) $$\overline{p}_i = \frac{1}{2}\beta_1 x_i + \frac{1}{2}\overline{\gamma}\tau_i.$$

In equation (4), $\overline{p}_i \equiv \sum_j p_{ij} \Big/ \sum_j k_{ij}$ is the average PILOT rate for town *i*, measured as the ratio of aggregate PILOT revenues to local property owned by nonprofits, in which the summations include all nonprofits *j* for which $v_{ij} \geq 0$ and $v_{ij} + \phi_{ij} - \gamma_{ij}\tau_i k_{ij} \geq 0$.

Equation (4) implies that, for values of $\overline{\gamma} > 0$, average PILOT rates should be positively correlated with property tax rates, reflecting that nonprofits and towns share the cost of diverting otherwise-taxable property from the tax rolls. Furthermore, equation (3) implies that nonprofit organizations in towns with high PILOT rates have incentives to economize on their ownership of otherwise-taxable real property, since equilibrium PILOT payments increase with k_{ij}. Finally, higher PILOT rates should discourage nonprofit activity to the extent that they reflect higher property tax rates, low town valuations of nonprofit activity (relative to tax revenue), or town errors in calculating PILOT demands.

The model implies that, all other things equal, local jurisdictions with higher property tax rates are more willing than others to demand higher PILOTs at the expense of losing nonprofit activity. Since property tax rates and PILOT demands are jointly determined, the model should not be interpreted to deliver the effect of property taxes on PILOTs. As a practical matter, however, property tax collections greatly exceed PILOT receipts, and property tax rates reflect local revenue needs, the elasticity of the local property tax base with respect to property tax rates, and possibly other factors – hence one can interpret the effect of property taxes on PILOTs as the

impact of these factors together with the consequences of the property tax mechanism that towns use to collect most of their revenue. A town's valuation of nonprofit services also influences its desired PILOT demands, but to the extent that these valuations are independent of factors that influence property tax rates they should not influence the effect of property tax rates on PILOTs.

4. PILOTs Data

Massachusetts communities are particularly successful in obtaining PILOTs from their local nonprofits (Kenyon and Langley, 2010), and the Massachusetts Department of Revenue since 1995 has identified PILOT receipts of each of its 351 local jurisdictions as part of the state's annual financial reports.[4] These financial reports also include information on local property tax levies, assessed values of taxable and tax-exempt properties, and demographic and economic characteristics of local Massachusetts jurisdictions that are collected by Massachusetts state agencies from information reported in the 2000 Census. The demographic variables include total town population, race (African-American and Hispanic populations), and education (numbers of adult residents with high school degrees but no college education, some college education, and college graduates). The economic variables include the town unemployment rate in 2000, sizes of youth (under 20) and aged (over 65) populations, numbers of over-65 residents who live alone and in poverty, numbers of households with annual incomes below $10,000, and numbers of households with incomes above $50,000.

Data on local nonprofit organizations, including their locations and financial information, are based on Internal Revenue Service Form 990 filings assembled by Guidestar and the National Center for Charitable Statistics at the Urban Institute. Financial variables include the total assets of a nonprofit organization, fixed assets (the sum of land, buildings, and equipment; this information is available only since 1998), and total annual revenues. To avoid having the results unduly affected by the financial crash of 2008 and subsequent recession, the analysis is restricted

[4] PILOT receipts, property taxes, land values, property tax referenda results, and other characteristics of Massachusetts communities are available on the Department of Revenue web site, http://www.mass.gov/dor/local-officials/municipal-data-and-financial-management/data-bank-reports/. Additional demographic and economic information on Massachusetts communities are reported on the state Health and Human Services web site,

to 1995-2007. The data provided by Guidestar and the NCCS were aggregated at the municipality level (based on a nonprofit's location as indicated on its Form 990 filling) for Massachusetts jurisdictions for which Massachusetts Department of Revenue data were available.

There are some limitations of these data. First, neither the Massachusetts data nor the Form 990 filings include information on PILOTs by individual nonprofits, so all of the analysis must be conducted at the town level. Second, the Massachusetts data concern PILOT collections, not requests, and therefore omit any information on PILOTs that towns demand but are not paid because nonprofits respond by locating elsewhere. Third, the data cover only Massachusetts, which may limit the generalizability of the results. However, Massachusetts is a particularly good state to study, as it has a long history of negotiating PILOT agreements, and appears to be one of the top PILOT-receiving states. As PILOTs spread around the country, it is valuable to understand developments in a place where PILOTs have long been established. Moreover, city and town governments are particularly strong in New England, where school districts and other government bodies that rely on local tax receipts are organized at the town level. In other states, where there are unincorporated areas and townships, county governments conduct these functions and are governing equivalents of Massachusetts towns. Therefore, the fiscal issues confronting Massachusetts towns might be treated as roughly equivalent to those facing counties elsewhere, and Massachusetts offers considerable variation, since there are more Massachusetts towns (351) than counties in any other state (e.g., Texas, the state with the greatest number of counties, has only 254).

Fourth, there are challenges in matching nonprofits to Massachusetts towns. Since a nonprofit may own property and have activities in more than its home jurisdiction, the use of Form 990 data to attribute nonprofit activity to a locality has the potential to introduce measurement error into the classification of the location of nonprofit activity. Another issue is that the data coverage is incomplete, as religious nonprofits, those with annual gross revenues below $25,000, and certain other categories of nonprofits are not required to file Form 990, nor are all the Form 990s submitted to the IRS available in the Guidestar and NCSS data base.

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http://www.mass.gov/eohhs/researcher/community-health/masschip/census-2000-1990-socio-demographic-trends.html.

Partly as a consequence, there are no Form 990 filings for a small portion of these Massachusetts towns (e.g., 23 out of the 351 towns have no Form 990 filings in 1997), which are treated in the following analysis as though they have no nonprofit assets, despite Massachusetts Department of Revenue data indicating that there are positive nonprofit property holdings and in some cases PILOTs. Notwithstanding these limitations, the data afford a reasonably accurate depiction of the distribution of nonprofit activity within Massachusetts.

5. PILOT Experiences in Massachusetts

Table 1 presents descriptive statistics for the sample of Massachusetts communities, distinguished by their history of PILOT receipts: columns 1 and 2 of Table 1 present descriptive statistics for the subset of 47 towns without PILOT receipts from 1995-2007 whereas columns 3 and 4 present descriptive statistics for the entire sample of 351 Massachusetts towns. Towns that never received PILOTs have per capita incomes, land areas, and unemployment that are similar to those of the whole sample of Massachusetts communities. Towns receiving PILOTs tend to be more urban, heavily populated, have more diverse populations, and have much higher property tax receipts than other towns. Towns receiving PILOTs have extensive nonprofit activity, though their nonprofits have lower average ratios of fixed assets (land, buildings, and equipment) to total assets than do nonprofits in towns without PILOTs.

It is possible to use the Department of Revenue data to calculate average property tax rates by town, the ratios of property tax receipts to market values of taxable properties; similarly, average PILOT rates by town are ratios of PILOTs to market values of tax-exempt property. By these calculations, PILOT rates are considerably lower than property tax rates. PILOT rates average 0.11 percent over the sample period and are of course zero in the 47 towns without PILOTs, while property tax rates average 1.40 percent over the sample period and are higher in the whole sample than they are in towns without PILOTs.[5]

[5] The Massachusetts Department of Revenue data indicate that property taxes are the largest single revenue source for Massachusetts towns: the sample mean ratio of property taxes to town income is 4.35, whereas the sample mean ratio of state aid to town income is 1.75, and the sample mean ratio of local revenue to town income is 1.30. (Local revenue includes motor vehicle excise taxes, other excise taxes, state government payments for public lands,

The Massachusetts Department of Revenue data can be used to estimate the extent to which towns with higher average property tax rates also have higher average PILOT rates, as implied by the model sketched in Section 3. Figure 1 depicts median 2007 PILOT rates of 10 groups of Massachusetts towns, distinguished by their average property tax rates in 2007, the most recent of the sample years. That is, the leftmost bar in Figure 1 represents the median 2007 PILOT rate of the 35 towns with the lowest property tax rates that year; the rightmost bar is the median PILOT rate of the 35 towns with the highest property tax rates. The figure exhibits a gentle upward slope, and indicates that towns with property tax rates in the three lowest deciles also have the lowest median PILOT rates. The positive association of property tax rates and PILOT rates does not control for other variables, such as town size, that might also influence PILOT rates, but is nonetheless suggestive.

Figure 2 plots median PILOT rates by property tax decile for two equal-sized subsets of Massachusetts communities, distinguished by size: the bars on the left of Figure 2 present data for towns with populations below the median of Massachusetts communities, and the bars on the right of Figure 2 present data for towns with above-median populations. It is evident from the figure that the positive relationship between property tax rates and median PILOT rates is more pronounced for larger communities than it is for smaller communities, though even among small Massachusetts towns it appears to be the case that higher property tax rates are generally associated with higher PILOT rates. One of the difficulties of analyzing PILOT rate data for small towns is that these ratios can be very sensitive to the behavior of small numbers of nonprofits, and the resulting variability in measured PILOT rates can make it difficult to draw clear inferences about the effect of property tax rates even if there is a strong causal effect. This consideration, together with the reality that larger towns have greater economic and fiscal consequences than smaller towns, motivates the use of regressions in which observations are weighted by town populations. Estimated coefficients from regressions using unweighted observations are presented in appendix tables in Fei et al. (2015).

Equation (4) suggests that the determinants of PILOT rates in Massachusetts towns can be estimated the following way:

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investment income, fines and forfeitures, and miscellaneous receipts.) Consequently, there is relatively limited scope for other revenue sources to substitute for property taxes in towns with low property tax rates.

(5) $$b_{it} = \mu\tau_{it} + \theta X_{it} + \varepsilon_{it},$$

in which b_{it} is the PILOT rate in town *i* in year *t*, τ_{it} is the property tax rate in town *i* in year *t*, X_{it} is a vector of observable characteristics (population, income, demographics, and others) of town *i* in year *t*, μ is a parameter to be estimated, and θ is a vector of parameters to be estimated; ε_{it} is the residual. The empirical work in Tables 2, 3 and 5 presents estimates of equation (5) using data for different years and specifications that include different observable variables in the X_{it} vector.

Table 2 presents estimated coefficients from Tobit specifications of equation (5) for 2007, the most recent of the sample years. The dependent variable in these regressions is the ratio of PILOTs to the market value of real property held by nonprofits in each town, which can be referred to as the "PILOT rate." The 0.210 coefficient in column 1 indicates that a one percent higher property tax rate is associated with a 0.21 percent higher PILOT rate. The regression reported in column 2 adds demographic variables to the specification, as result of which the estimated property tax rate coefficient declines to 0.139, though this coefficient increases in magnitude to 0.186 with the inclusion of additional economic variables in the regression reported in column 3.

The regression coefficients reported in Table 2 are consistent with the model's implication that higher property tax rates are associated with higher PILOT rates. The estimated magnitude of the effect, that one percent higher property tax rates are associated with 0.186 percent higher PILOT rates, should be evaluated in the context of average property tax rates that are almost 13 times higher than average PILOT rates. This corresponds to a 2.4 elasticity of PILOT rates with respect to property tax rates, suggesting that PILOT rates are quite sensitive to property rate differences. Property taxes and PILOTs are likewise positively associated and statistically significant in supplemental regressions that add town population as an explanatory variable and in specifications that are unweighted by population.[6]

[6] These regressions are presented in Fei et al. (2015). In other regressions (not reported), lower property tax or PILOT rates were not associated with significantly greater revenue from state aid or local revenues.

The positive association of property tax rates and PILOT rates in 2007 is repeated in other years. Figure 3 presents data on property tax rates and PILOT rates over the 1995-2007 sample period. Towns are distinguished by average property tax rates over that period, and the heights of the bars reflect median 13-year average PILOT rates of towns in each cell. The patterns in Figure 3 are similar to those in Figure 2: among larger Massachusetts towns there is a marked positive association of property tax rates and PILOT rates, whereas among smaller Massachusetts towns the association, while still somewhat positive, is considerably noisier.

Table 3 presents pooled estimates for 1995-2007 of the same equations estimated in Table 2, including that observations are weighted by town population. The specifications reported in Table 3 include year dummies, and the standard errors are clustered by municipality. The results are quite consistent with those for 2007 reported in Table 2. The 0.289 coefficient in column 1 indicates that one percent higher property tax rates are associated with 0.289 percent higher desired PILOT rates, an effect that falls in magnitude to 0.128 with the addition of demographic controls in the regression reported in column 2, and is 0.137 with the further addition of economic controls in the regression reported in column 3. These property tax rate coefficients, while somewhat unstable across specifications, nonetheless are statistically significant and of similar magnitudes to those reported in Table 2.

One of the difficulties in interpreting the estimates reported in Tables 2 and 3 is that property tax rates and PILOT demands are jointly determined by economic and demographic conditions of towns. If important independent variables are omitted from these regressions, then they could induce positive correlations between property tax rates and PILOT rates even in the absence of a causal effect of property tax rates on PILOT demands. Inclusion of additional observable variables, such as local average property values, has little effect on the estimated effect of property tax rates on PILOTs,[7] but it is possible that there remain important omitted variables that are difficult to measure.

One way to address the problem of joint determination of property tax rates and PILOT demands is to estimate a two-stage system in which instrumented values of property tax rates are used as regressors in the second stage. The challenge lies in obtaining a valid first stage

[7] These regressions are presented in supplemental tables available from the authors.

instrument for property tax rates. Town size is a plausible candidate. Analytical studies of tax competition consistently find that equilibrium tax rates are higher in larger jurisdictions, reflecting their greater market power (Bucovetsky, 1991; Haufler and Wooton, 1999; Keen and Konrad, 2013). Furthermore, the international evidence is that larger countries tend to impose higher business tax rates (Hines, 2007). The evidence from Massachusetts is strongly consistent with this pattern, as illustrated by the data reported in Figure 4, which plots median property tax rates in 2007 for groups of Massachusetts towns distinguished by population in 2000, the sample year for which the most reliable population figures are available. It is clear from the figure that property tax rates are generally higher in larger Massachusetts towns.

Table 4 presents estimated coefficients from instrumental variables specifications of the effect of property tax rates on PILOT rates, and in which the log of a town's population in 2000 is an instrument for the property tax rate in the first stage.[8] Columns 1 and 2 present equations estimated on the 2007 cross-sectional data, whereas columns 3 and 4 present results for the pooled 1995-2007 sample. The positive coefficients on log population in regressions explaining property tax rates in columns 1 and 3 are consistent with the pattern depicted in Figure 4, the 0.147 coefficient in column 3 implying that a ten percent greater town population is associated with a 0.0148 higher property tax rate, corresponding to 1.1 percent of the mean property tax rate reported in Table 1.

Column 2 of Table 4 reports the second stage equation estimated on the 2007 data, the 0.235 coefficient implying that one percent higher property tax rates are associated with 0.235 percent higher PILOT rates, a slightly larger effect than that implied by the OLS specification that produced the 0.210 coefficient reported in column 1 of Table 2. Similarly, the 0.213 coefficient in column 4 of Table 4 implies that, in the pooled 1995-2007 data, one percent higher property tax rates are associated with 0.213 percent higher PILOT rates, a somewhat smaller effect than the OLS estimate of 0.289 reported in column 1 of Table 3.

Although it is reassuring that the instrumental variables estimates reported in Table 4 resemble the OLS estimates reported in Tables 2 and 3 and that the large F statistics for the first

[8] These regressions omit the demographic and economic control variables that are used in the regressions reported in columns 2 and 3 of Tables 2 and 3, reflecting the need for a parsimonious specification given the limited variation

stage equations reported in columns 1 and 3 do not raise concerns about weak identification, it is noteworthy that the use of town population as an instrument for the property tax rate relies on the exclusion restriction that population does not directly affect PILOT rates. The model presented in section 3 is consistent with this restriction, but it is also possible that larger towns with some degree of market power over taxpaying entities also have some degree of market power over nonprofits, and are thereby able to impose higher PILOT rates along with higher property tax rates. Consequently, the estimates reported in columns 2 and 4 of Table 4 reflect direct effects of property tax rates only to the extent that town size does not directly affect PILOT rates.

The model sketched in section 3 implies that towns with higher property tax rates will have higher PILOT rates, under the assumption that towns and nonprofits have equal bargaining power and therefore share equally the potential surplus from nonprofit location in a town. It is difficult to obtain fully convincing measures of bargaining power, but municipal experience with property tax referenda offers one measure. Massachusetts limits the extent to which municipalities can increase property tax rates each year, requiring local referenda for certain rate increases. Over the 1995-2007 period, 141 of the 351 Massachusetts communities never had any property tax override referenda; 54 had one or more referenda all of which failed; 55 had one or more referenda all of which passed; and 101 had multiple referenda, some of which passed and some of which failed. Consistent failure to pass property tax referenda is a sign that voters do not support town administrators who propose these referenda, and may reflect more generally a weakness of town administrators that might empower nonprofits in negotiations over PILOTs. If so, then towns with failed referenda might have lower PILOT rates.

Figure 5 compares the 1995-2007 property tax override referendum experiences of Massachusetts towns with high and low PILOT rates in 2007. Two groups of towns are considered: those that had one or more referenda, all of which failed, and those that never had referenda. In both cases there was no property tax override, which would presumably have influenced property tax rates and arguably also PILOT rates, so this potential channel of influence is the same for all of the observations. As Figure 5 illustrates, towns in which voters

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on which the instrumenting strategy relies. Use of contemporaneous population in place of 2000 population produces results that are almost identical to those appearing in Table 4.

consistently defeat property tax referenda had lower PILOT rates in 2007 than did towns that did not have any property tax referenda from 1995-2007.

Table 5 presents estimated coefficients from population-weighted regressions using 2007 data for the sample of 195 towns that either had referenda from 1995-2007 that all failed, or else never had referenda during that time period. The specifications are similar to those in the regressions presented in Table 2, the only difference being the inclusion of a dummy variable indicating that a town never had property tax override referenda. The estimated property tax rate coefficients are very similar to those reported in Table 2, and the estimated effect of the absence of failed referenda is positive in all specifications (albeit of marginal statistical significance in the regression reported in column 2). The 0.0442 coefficient in column 3 indicates that PILOT rates are significantly higher in towns that never had referenda than in towns with referenda that failed, the difference corresponding to about 41 percent of average PILOT rates for the whole sample as reported in Table 1. This suggests that towns with weaker governments are less able to make strong PILOT demands, though it is difficult to rule out that omitted variables might influence both PILOT rates and referendum outcomes, which would dampen the power of the test offered by the regressions presented in Table 5.

The Massachusetts data also afford some indication of the effect of PILOTs on nonprofit activity. Given the low average PILOT rate reported in Table 1, it is unclear to what extent PILOTs in Massachusetts are economically significant for the nonprofit community. Figure 6 presents ratios of nonprofit fixed asset holdings to nonprofit total assets for 10 groups of Massachusetts towns, distinguished by size of town in 2000 and average PILOT rates from 1998-2007; only towns with some nonprofit activity during this period are included in the data used to construct the figure. The patterns of the bars depicted in the figure suggest that ratios of fixed asset holdings to total assets decline with PILOT rates, which is consistent with incentives created by PILOTs for nonprofits to economize on property holdings that trigger PILOT obligations.[9] In the short run this effect is presumably limited to nonprofits with relatively small costs of moving or adjusting the scales of their operations, though over time PILOTs may have

[9] The pattern in Figure 6 is also consistent with PILOT obligations being increasing functions of nonprofit non-fixed asset holdings, which would induce a negative correlation between measured PILOT rates and ratios of fixed to total assets. While this possibility is not an implication of the model in section 3, it is nonetheless difficult to rule out,

significantly larger effects on real property holdings to the extent that they influence initial location choices.

Table 6 presents estimated coefficients from OLS regressions explaining nonprofit assets, revenues, and real property holdings in Massachusetts towns. The regressions reported in columns 3-6 use data for 1995-2007, while the regressions reported in columns 1-2 and 7-8, which use information on real property holdings that start only in 1998, use data for 1998-2005. The observations are pooled, and are weighted by population; the specifications include year dummies and cluster standard errors by municipality. All of the specifications include town population and median household income (in 1999) as control variables; regressions reported in even-numbered columns add the same demographic and economic control variables used in Tables 2-4.

Columns 1-2 of Table 6 report estimated coefficients from regressions in which the dependent variable is the log of aggregate nonprofit fixed asset holdings. The -0.801 coefficient in column 1 indicates that a one percent higher PILOT rate is associated with a 0.8 percent reduction in nonprofit property holding over the sample period. This regression also includes as independent variables the log of local population and the log of per capita household income in 1999, both of which have positive and significant associations with nonprofit fixed assets. The magnitude of the estimated PILOT rate coefficient falls to -0.662 in the column 2 regression in which additional demographic and economic control variables are included, but remains statistically significant.

The large magnitudes of the estimated PILOT rate effects in the regressions reported in columns 1-2 of Table 6 are consistent with PILOTs significantly influencing nonprofit property holdings, but also raise the possibility that variable construction may influence the estimated coefficients. The PILOT rate is the ratio of PILOT receipts to nonprofit property holdings, so classical measurement error in nonprofit property holdings generates a negative correlation between the measured PILOT rate and nonprofit property. In evaluating the likely role that the resulting bias might play in this regression, it is noteworthy that the data used in constructing the dependent variable in the regressions reported in columns 1-2 (Form 990 data from nonprofit

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and may affect the interpretation of the strength of the pattern in Figure 6 and the coefficient magnitudes in the

filings) differ from the data used to construct PILOT rates (Massachusetts Department of Revenue data on local property assessments). While this difference addresses part of the potential for bias it does not address all of it, since unexplained differences in true nonprofit property holdings that somehow do not translate directly into differences in PILOTs will affect both measures.

Columns 3-4 of Table 6 report estimated coefficients from regressions in which the dependent variable is the log of total nonprofit assets. The -0.211 coefficient in column 3 indicates that nonprofits in towns with higher PILOT rates have fewer assets, though this effect is between one-quarter and one-third as strong as the effect of PILOTs on fixed asset holdings. The -0.0741 coefficient in the regression reported in column 4 that includes additional demographic and economic controls is considerably smaller in magnitude and not statistically significant.

Columns 5-6 of Table 6 report estimated coefficients from regressions in which the dependent variable is the log of nonprofit revenue. The -0.204 coefficient in column 5 indicates that one percent higher PILOT rates are associated with 0.2 percent lower nonprofit revenue, an effect that declines significantly in magnitude to 0.08 percent, and becomes statistically insignificant, in the column 6 regression that includes additional control variables. From the evidence presented in columns 3-6 of Table 6 it appears that higher PILOT rates are generally associated with reduced nonprofit activity as reflected in asset holdings and total revenue, but that this effect is considerably weaker than the effect of PILOTs on fixed asset holdings.

The regressions presented in columns 7 and 8 of Table 6 estimate the effect of PILOT rates on ratios of fixed assets to total assets. These regressions omit observations from towns with no nonprofit activity. The -0.661 coefficient in column 7 indicates that fixed asset holdings decline significantly as a fraction of total assets as PILOT rates increase. Inclusion of additional control variables in the regression reported in column 8 has little effect on this estimated association.

Consequently, it appears that one of the primary effects of higher PILOT rates is to change the nature of nonprofit activity in a jurisdiction, moving it away from the use of property

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related regressions reported in columns 7-8 of Table 6.

that would otherwise be subject to taxation. In the process, higher PILOT rates also appear to discourage nonprofit activity in general, suggesting that despite their low average rates (compared to property taxes) PILOTs are significant to the nonprofit community. These regressions do not distinguish whether these effects take the form of changing the places in which nonprofit organizations choose to locate, changing the local activities of nonprofits that remain despite higher PILOT rates, or changing the rates at which nonprofits are formed and dissolved, though presumably PILOTs affect all of these.

6. Conclusion

The Massachusetts evidence is consistent with a model in which municipalities make PILOT demands that are increasing functions of local property tax rates, reflecting their valuation of services provided by nonprofits and the costs that nonprofits impose by reducing the local tax base. These PILOT demands have effects similar to those of property and other taxes in discouraging nonprofit activity, particularly real property holdings of nonprofit organizations. Since PILOTs are individually negotiated and nominally voluntary, it is striking that they would have such effects. This pattern implies that nonprofits are sufficiently concerned about the cost of current and future PILOT burdens that they adjust their behavior in response.

These tax-like features of PILOTs raise the possibility that, despite their voluntary nature, PILOT payments may share many of the distributional and efficiency characteristics of property taxes, including the impact of fiscal competition. Governments eager to attract nonprofit activity might limit, or avoid making, PILOT demands, much in the way that local governments compete over tax rates (Wilson, 1986; Zodrow and Mieszkowski, 1986; Bucovetsky, 1991; Hoyt, 1991; Wilson and Wildasin, 2004) and in offering business development incentives (Bartik, 1991; Anderson and Wassmer, 1995; Fisher and Peters, 1998; Man, 1999; Gibson, 2003; Felix and Hines, 2013). There has been mixed evidence of the effect of enterprise zones, property tax abatements, and other tax-related incentives on business location decisions and economic development (Papke, 1994; Boarnet and Bogart, 1996; Dye and Merriman, 2000; O'Keefe, 2004; Hanson, 2009; Neumark and Kolko, 2010), though more recent evidence that preferential tax

treatment significantly increases economic activity (Busso et al., 2013; Rohlin et al., 2014) is consistent with nonprofits being attracted to locations that make fewer PILOT demands.

In other cases governments might actively seek to discourage certain nonprofits from locating in their towns, notwithstanding the potentially valuable nature of the services they provide, if towns feel that there are negative local externalities associated with hosting the nonprofits or attracting the people they serve. This suggests that there can be equilibria with jurisdictions competing to impose high PILOT rates on certain types of nonprofits.

In an era of strained public finances it is understandable that towns might seek payments from nonprofits that are otherwise exempt from local property taxes. In doing so it is important for towns to be aware of the possible consequences of PILOTs for the nature and volume of local nonprofit activity, and the extent to which nonprofits respond to PILOTs much in the way that taxable entities respond to real estate taxes. Given the fiscal challenges that many U.S. towns face, there are likely to be growing calls for PILOTs, and growing resistance from nonprofit organizations. This process has the potential to reshape the country's nonprofit landscape, as the location of nonprofit activity is increasingly influenced by local demands for PILOTs.

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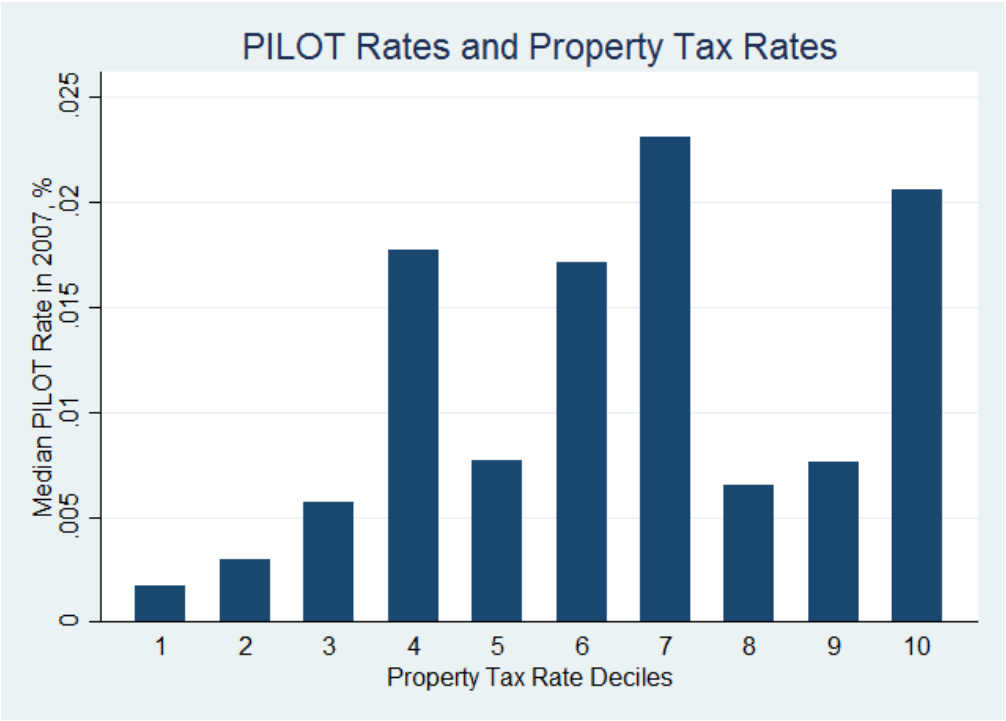
Figure 1

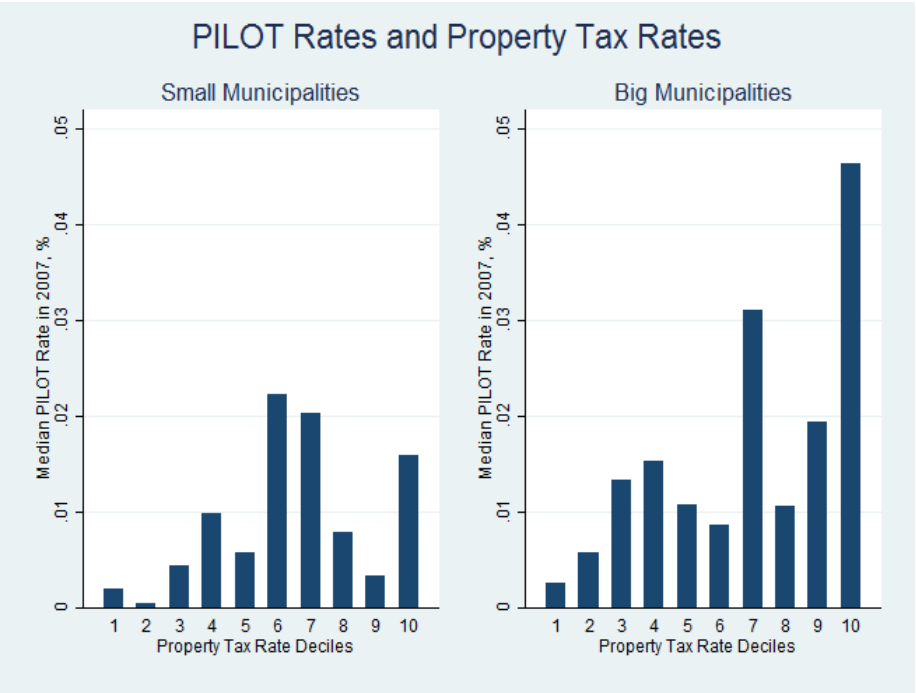
PILOT Rates and Property Tax Rates (2007)



Note to Figure 1: The figure presents median 2007 PILOT rates for 10 groups of Massachusetts towns, distinguished by their average property tax rates in 2007. A town's PILOT rate is the ratio of its PILOT receipts to the market value of nonprofit property; its average property tax rate is the ratio of property tax collections to the market value of taxable property. Towns in the first property tax decile from the left have the lowest property tax rates, whereas those in the tenth property tax decile have the highest property tax rates. The heights of the bars depict the median PILOT rates of towns in each group.

Figure 2

PILOT and Property Tax Rates by Municipality Size (2007)



Note to Figure 2: The figure presents median 2007 PILOT rates for 20 groups of Massachusetts towns, distinguished by size of town in 2000 and average property tax rates in 2007. The left figure depicts data for Massachusetts towns with below-median populations; the right figure depicts data for Massachusetts towns with above-median populations. A town's PILOT rate is the ratio of its PILOT receipts to the market value of nonprofit property; its average property tax rate is the ratio of property tax collections to the market value of taxable property. Towns in the first property tax decile from the left in each of the two graphs have the lowest property tax rates, whereas those in the tenth property tax decile have the highest property tax rates. The heights of the bars depict the median PILOT rates of towns in each group.

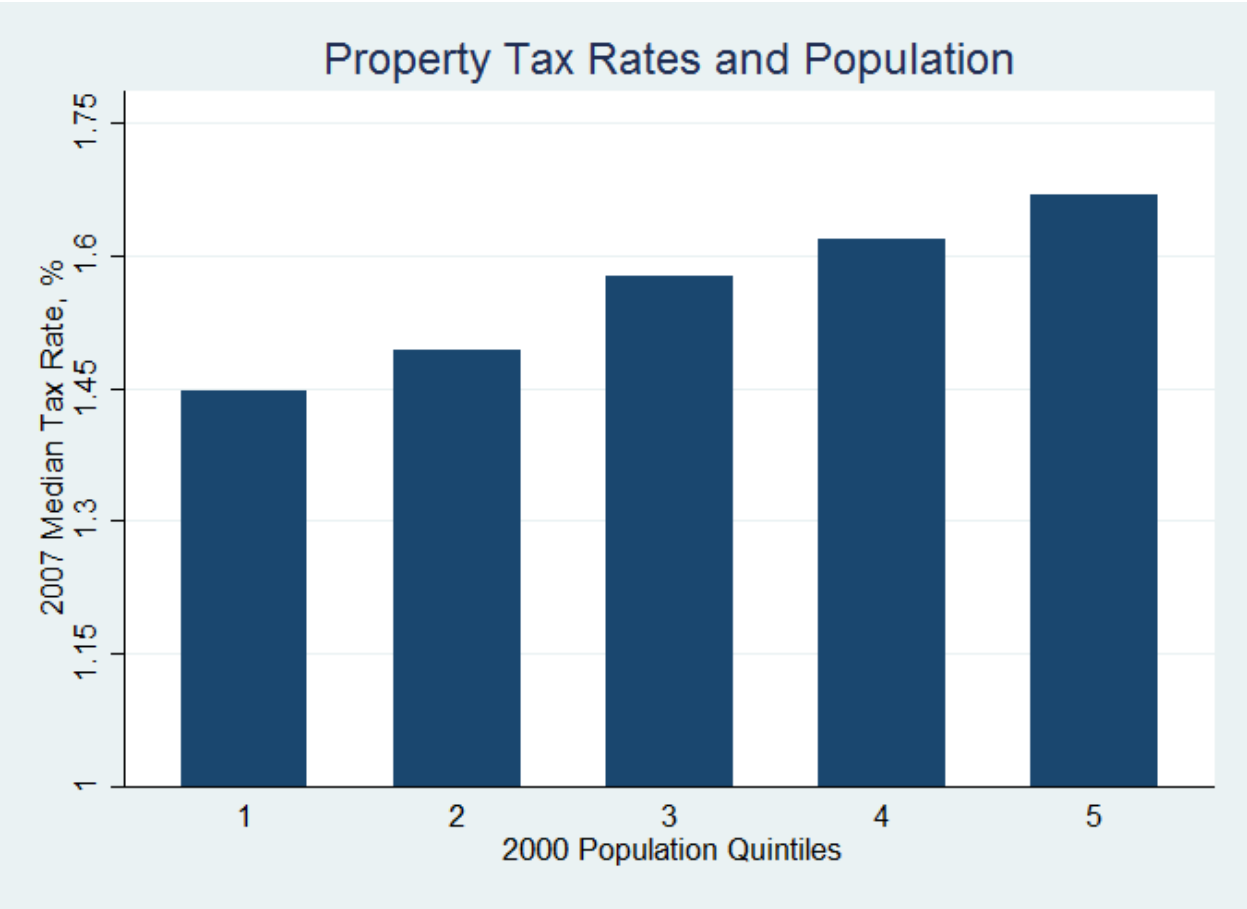
Figure 3

PILOT and Property Tax Rates by Municipality Size (1995-2007)

Note to Figure 3: The figure presents median PILOT rates for 20 groups of Massachusetts towns, distinguished by size of town in 2000 and average property tax rates from 1995-2007. The left figure depicts data for Massachusetts towns with below-median populations in 2000; the right figure depicts data for Massachusetts towns with above-median populations. A town's average PILOT rate is the average over the 13-year sample of its annual ratios of PILOT receipts to market values of nonprofit property; its average property tax rate is the 13-year average ratio of its property tax collections to the market value of its taxable property. Towns in the first property tax decile from the left in each of the two graphs have the lowest property tax rates, whereas those in the tenth property tax decile have the highest property tax rates. The heights of the bars depict the median PILOT rates (13-year averages) of towns in each group.

Figure 4

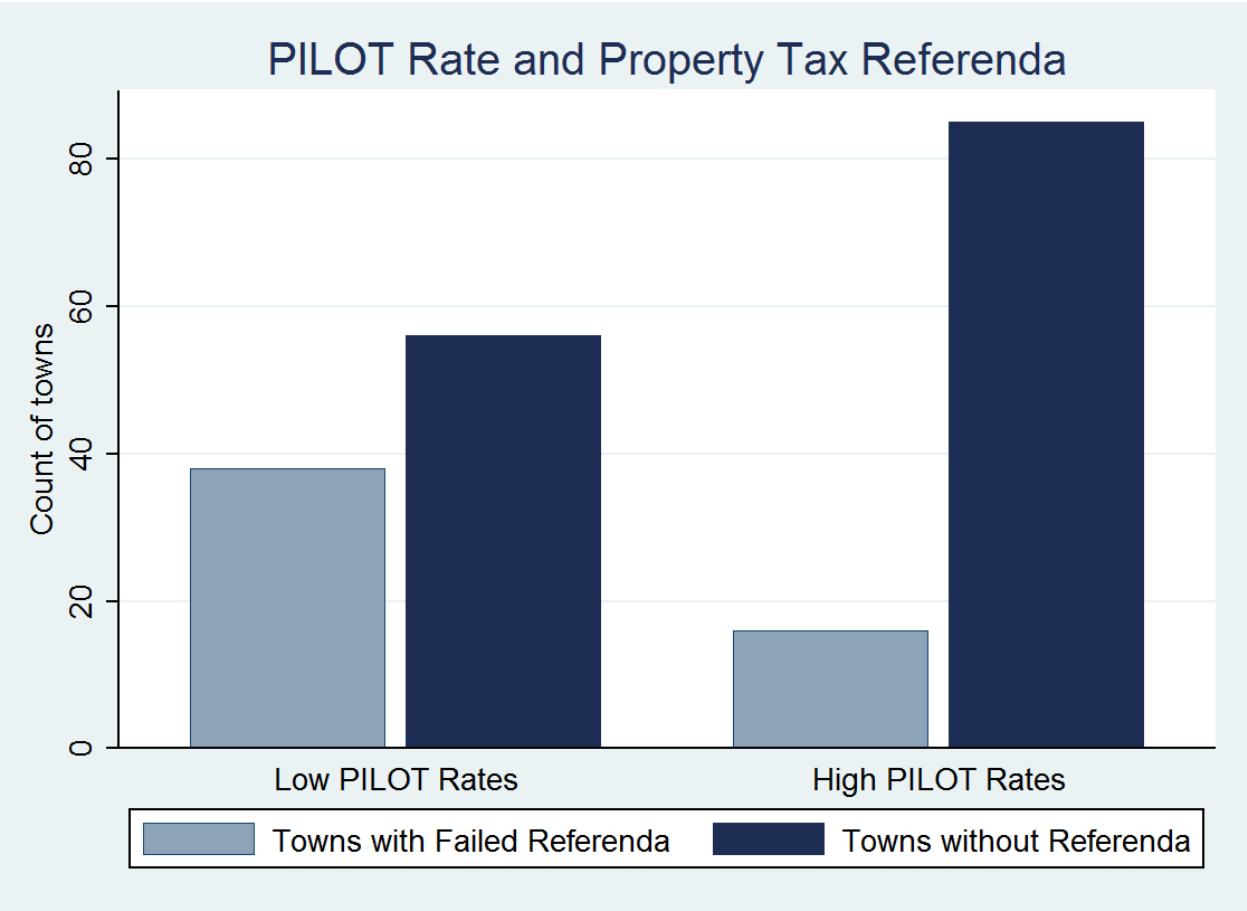
Property Tax Rates by Municipality Size (2007)



Note to Figure 4: The figure presents median 2007 property tax rates for five groups of Massachusetts towns, distinguished by population in 2000. A town's average property tax rate is the ratio of property tax collections to the market value of taxable property. Towns in the first property tax quintile have the lowest property tax rates, whereas those in the fifth property tax quintile have the highest property tax rates. The heights of the bars depict the median property tax rates of towns in each group.

Figure 5

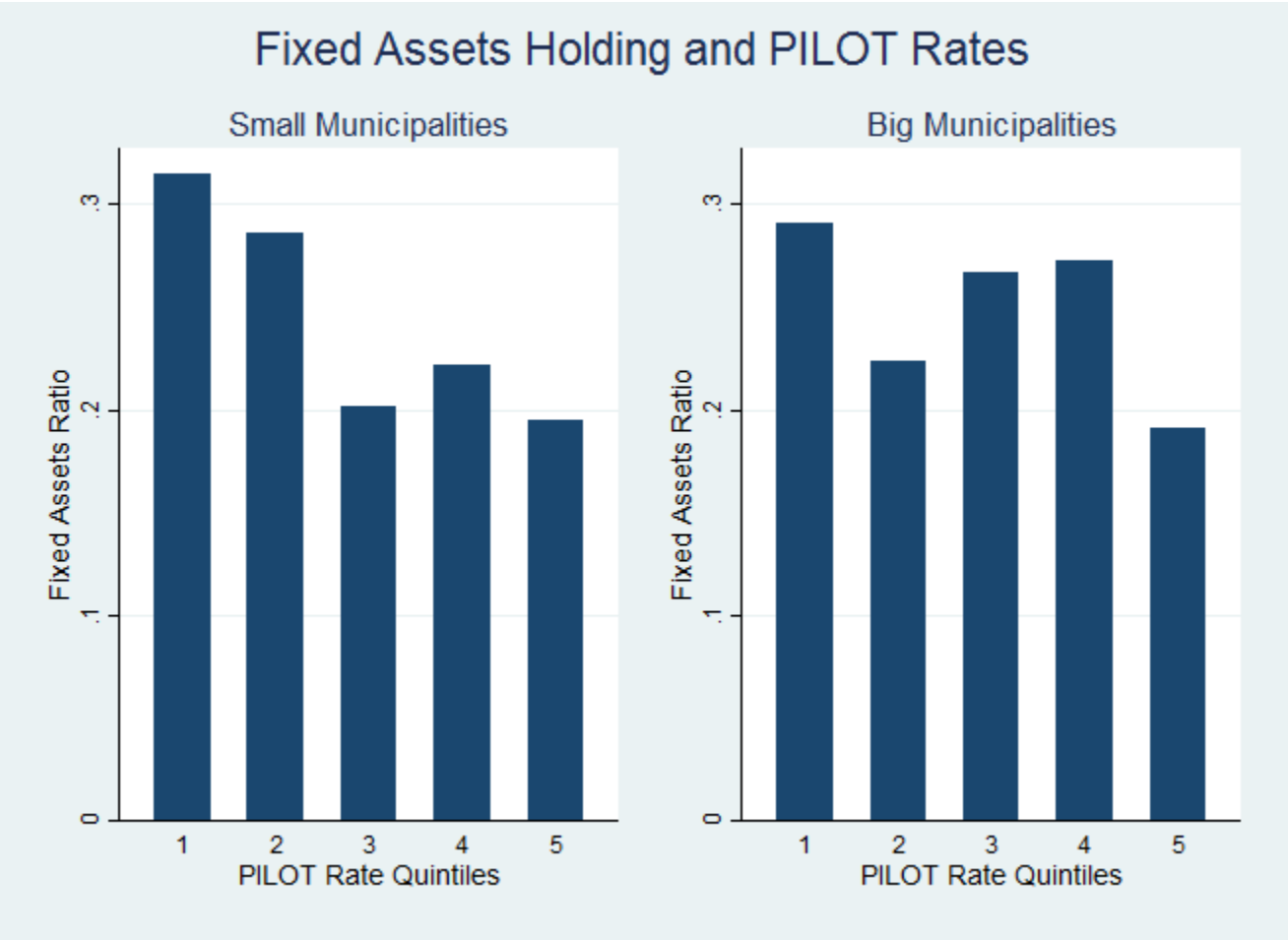
PILOT Rates and Property Tax Referenda (2007)



Note to Figure 5: The figure reports numbers of towns in groups distinguished by average PILOT rates in 2007 and property tax referendum experience from 1995-2007. The two left bars depict towns with below-median PILOT rates, in which the median is calculated based on all 351 Massachusetts towns; the right figure depicts towns with above-median PILOT rates. A town's PILOT rate is the ratio of its PILOT receipts to the market value of nonprofit property. The heights of the lightly shaded bars depict numbers of towns in each group that had property tax referenda that all failed during 1995-2007; the heights of the darkly shaded bars depict numbers of towns that had no property tax referenda at all during 1995-2007.

Figure 6

Fixed Asset Ratios and PILOT Rates by Municipality Size (1998-2007)



Note to Figure 6: The figure presents ratios of nonprofit fixed asset holdings to nonprofit total assets for 10 groups of Massachusetts towns, distinguished by size of town in 2000 and average PILOT rates from 1998-2007. The left figure depicts data for Massachusetts towns with below-median populations in 2000; the right figure depicts data for Massachusetts towns with above-median populations. A town's average PILOT rate is the average from 1998-2007 of its annual ratios of PILOT receipts to market values of nonprofit property. Towns in the first PILOT quintile from the left in each of the two graphs have the lowest PILOT rates, whereas those in the fifth PILOT quintile have the highest PILOT rates. The heights of the bars depict the median fixed-asset ratios (10-year averages) of towns in each group. Towns without any nonprofit activity from 1998-2007 are omitted from these data.

Table 1:

Descriptive Statistics, Massachusetts Towns without PILOTs and All Towns (1995-2007)

	No PILOTs		All Towns	
Number of Towns	47		351	
	Mean	S.d.	Mean	S.d.
Property and Payments				
PILOT Receipts, in $ m	0	0	0.258	2.073
PILOT Rate, in %	0	0	0.109	0.420
Property Taxes, in $ m	12.822	14.043	25.239	62.341
Property Tax Rate, in %	1.289	0.399	1.402	0.382
% Property Owned by Nonprofits	7.518	3.694	9.914	6.321
Nonprofit Activities				
Total Assets, in $ m	31.028	73.254	374.025	3645.842
Total Revenue, in $ m	15.923	42.665	151.475	1282.39
Fixed Assets, in $ m	8.731	19.271	67.602	502.173
Share of Fixed Assets in Total Assets, in %	32.040	24.738	27.162	21.733
Municipality Characteristics				
Population	8,374	9,390	17,957	36,502
Median Household Income	73,712	25,792	73,782	23,499
Per Capita Income	35,116	11,903	34,455	10,985
City Status (1 if City, 0 if Town)	0.064	0.245	0.157	0.364
Land Area, in sq miles	23.606	10.967	22.336	12.431
Public Road Mileage, in miles	79.734	53.639	103.230	82.433
Demographic Variables				
% of White Population	97.422	2.855	93.868	8.684
% of Black Population	0.754	0.906	1.664	3.042
% of Hispanic Population	1.096	1.560	2.554	5.472
% of High School Graduates	28.843	9.355	28.007	8.460
% of Some College	27.017	6.483	26.148	5.049
% of College Graduates	33.438	15.579	34.515	15.574
Economic Variables				
Unemployment Rate	7.902	2.632	7.831	2.629
% of People under 20	24.058	4.103	24.342	4.173
% of People over 65, Living Alone and in Poverty	0.537	0.410	0.554	0.369
% of People over 65	0.133	0.042	0.134	0.044
% of Households with Income < $10K	5.551	3.370	6.014	3.361
% of Households with Income > $50K	54.145	15.453	55.304	13.256

Note to Table 1: The table presents means and standard deviations of variables used in the regressions presented in Tables 2-5 and Appendix Tables 1-2. The first two columns present

means and standard deviations of the regression variables for the 47 towns that never collected PILOTs from 1995-2007, whereas the third and fourth columns present means and standard deviations of the regression variables for the whole sample of 351 Massachusetts towns. "PILOT receipts, in $ m" is aggregate town PILOT receipts in millions of real 2005 dollars (calculated using the Implicit Price Deflator of State and Local Government Expenditures and Gross Investment provided by the Bureau of Economic Analysis). "PILOT rate" is the ratio of town PILOT receipts to the market value of its nonprofit property, expressed as a percentage. "property taxes, in $ m" is aggregate town property tax receipts in millions of real 2005 dollars. "Property tax rate" is the ratio of town property tax receipts to the market value of its taxable property, expressed as a percentage. "% of property owned by nonprofits" is the ratio of the market value of property owned by nonprofits to the sum of the market value of nonprofit property plus the market value of taxable property. "Total Assets, in $ m" is total assets (in 2005 dollars) reported on Form 990 by nonprofit organizations located in a town; "Total Revenue, in $ m" is total revenue (in 2005 dollars) of the same nonprofit organizations as reported on Form 990; "Fixed Assets, in $ m" is the sum of the market values of land, building, and equipment owned by local nonprofits as reported on Form 990; and "Share of Fixed Assets in Total Assets, in %" is the product of 100 and the ratio of Fixed Assets to Total Assets. "Population" is annual town population; "Median household income" and "Per capita income" are based on data from 2000 census and correspond to calendar year 1999; "City status" takes the value 1 for cities 0 for towns, and "Land area" is measured in square miles, both of these variables corresponding to 2000; and "Public road mileage" is measured in linear miles and reported every year. All of the "Demographic variables and "Economic variables" are Census figures for 2000, with the exception of the town unemployment rate, which is reported every year; they are all expressed as percentages. "% of white population" is the ratio of a town's white population in 2000 to its total population in 2000; "% of black population" is the ratio of a town's black population in 2000 to its total population in 2000; "% of Hispanic population" is the ratio of a town's Hispanic population in 2000 to its total population in 2000; "% of high school graduates" is the ratio of a town's residents in 2000 who graduated from high school but did not attend college to its total population in 2000; "% of some college" is the ratio of a town's residents in 2000 who attended college but did not graduate to its total population in 2000; and "% of college graduates" is the ratio of a town's residents in 2000 who graduated from college to its total population in 2000. "% of people under 20" is the ratio of a town's residents in 2000 younger than 20 to its total population in 2000; "% of people over 65, living alone and in poverty" is the ratio of a town's residents in 2000 younger over 65 and with incomes below the poverty line to its total population in 2000; "% of people over 65" is the ratio of a town's residents in 2000 over 65 to its total population in 2000; "% of households with income < $10K" is the ratio of the number of households with total household incomes below $10,000 in 2000 to the total number of households in 2000; "% of households with income > $50K" is the ratio of the number of households with total household incomes above $50,000 in 2000 to the total number of households in 2000.

Table 2:

Determinants of PILOT Rates (2007)

	(1)	(2)	(3)
Property Tax Rate, in %	0.210***	0.139***	0.186***
	(0.0547)	(0.0449)	(0.0704)
% of White Population		0.00192	0.00138
		(0.00210)	(0.00234)
% of Black Population		0.00437*	0.00578*
		(0.00251)	(0.00337)
% of Hispanic Population		0.00501**	0.00630**
		(0.00243)	(0.00314)
% of High School Graduates		0.000947	-0.00201
		(0.00253)	(0.00434)
% of Some College		-0.000966	-0.00371
		(0.00307)	(0.00557)
% of College Graduates		0.000410	-0.00165
		(0.00142)	(0.00319)
Unemployment Rate			0.0145
			(0.0158)
% of People under 20			-0.00533
			(0.00451)
% of People over 65			0.156
			(0.314)
% of People over 65, Living Alone and in Poverty			-0.00484
			(0.0553)
% of Households with Income < $10K			-0.0117
			(0.0146)
% of Households with Income > $50K			0.000543
			(0.00226)
Constant	-0.182***	-0.335	-0.0290
	(0.0590)	(0.230)	(0.461)
Observations	351	350	350
Pseudo R-squared	0.169	0.235	0.270
F-stat	14.68	7.978	7.500

Note to Table 2: The table presents estimated coefficients from Tobit regressions in which the dependent variable is the ratio of town PILOT receipts in 2007 to the market value of its nonprofit property in 2007, expressed as a percentage. Observations are weighted by town population. Among the independent variables, the town property tax rate and town unemployment rate are all 2007 values; all other variables correspond to 2000.

Table 3:

Determinants of PILOT Rates (1995-2007)

	(1)	(2)	(3)
Property Tax Rate, in %	0.289***	0.128**	0.137**
	(0.109)	(0.0572)	(0.0576)
Demographic Controls	N	Y	Y
Economic Controls	N	N	Y
Year dummies	Y	Y	Y
Observations	4,547	4,534	4,534
Pseudo R-squared	0.0673	0.103	0.112
F-stat	2.280	2.315	2.104

Note to Table 3: The table presents estimated coefficients from Tobit regressions in which the dependent variable is the ratio of town PILOT receipts to the market value of its nonprofit property, expressed as a percentage. The sample includes observations from 1995-2007. Observations are weighted by town population, and standard errors are clustered by municipality. All of the regressions include year dummy variables; the regression reported in column 2 includes the six "Demographic Variables" listed in Table 1; and the regression reported in column 3 includes the six "Demographic Variables" listed in Table 1 plus the six "Economic Variables" listed in Table 1. Among the independent variables, the town property tax rate and town unemployment rate are all contemporaneous values; all other variables correspond to 2000.

Table 4:

Determinants of PILOT Rates, IV Regressions

	2007 Cross Section		Pooled 1995-2007	
	(1)	(2)	(3)	(4)
	First-Stage	Second-Stage	First-Stage	Second-Stage
Log (Population)	0.0900***		0.147***	
	(0.0170)		(0.0159)	
Property Tax Rate, in %		0.235***		0.213**
		(0.0746)		(0.106)
Year dummies	N	N	Y	Y
Observations	351	351	4547	4547
Unadjusted R-squared	0.1624		0.5018	
Pseudo R-squared		0.071		0.080
Weak IV F-stat	27.93		86.40	

Note to Table 4: The table presents estimated coefficients from first- and second-stage instrumental variables specifications in which the dependent variable in the second stage is the ratio of town PILOT receipts to the market value of its nonprofit property, expressed as a percentage. The log of town population in 2000 serves as an instrument for the property tax rate in the first stage equation. Observations are weighted by town population, and standard errors are clustered by municipality for columns 3 and 4. The sample in the regressions reported in columns 1 and 2 consists of observations for 2007, whereas the sample in the regressions reported in columns 3 and 4 includes observations from 1995-2007. Columns 1 and 3 report first stage equations, and columns 2 and 4 report second stage equations. The regressions reported in columns 3 and 4 include year dummy variables. The weak IV F statistic is the Kleibergen-Paap Wald rk F statistic, a heteroskedastistic-and-cluster-robust weak identification test statistic.

Table 5:

2007 PILOT Rates and Tax Referenda Outcomes

	(1)	(2)	(3)
Property Tax Rate, in %	0.200***	0.136**	0.188**
	(0.0647)	(0.0583)	(0.0877)
Dummy (No Referendum)	0.0572**	0.0503*	0.0442**
	(0.0231)	(0.0257)	(0.0223)
% of White Population		0.00382	0.00162
		(0.00256)	(0.00310)
% of Black Population		0.00577**	0.00800*
		(0.00282)	(0.00445)
% of Hispanic Population		0.00701**	0.00790*
		(0.00279)	(0.00414)
% of High School Graduates		-0.00150	-0.00336
		(0.00296)	(0.00537)
% of Some College		0.00109	-0.00403
		(0.00375)	(0.00709)
% of College Graduates		0.000693	-0.00150
		(0.00157)	(0.00385)
Unemployment Rate			0.0196
			(0.0202)
% of People under 20			-0.00217
			(0.00631)
% of People over 65			1.082**
			(0.505)
% of People over 65, Living Alone in Poverty			0.0388
			(0.0679)
% of Households with Income < $10K			-0.0163
			(0.0194)
% of Households with Income > $50K			0.00293
			(0.00268)
Constant	-0.206**	-0.532*	-0.396
	(0.0747)	(0.270)	(0.602)
Observations	195	195	195
Pseudo R-squared	0.276	0.371	0.492
F-stat	7.740	6.270	8.716

Note to Table 5: The table presents estimated coefficients from Tobit regressions in which the dependent variable is the ratio of town PILOT receipts in 2007 to the market value of its nonprofit property in 2007, expressed as a percentage. The sample includes only those towns that either never had a property tax referendum from 1995-2007, or else had property tax referenda that failed. Observations are weighted by town population. The "Dummy (No Referendum)" variable takes the value 1 for towns without a property tax referendum from 1995-2007, and is zero for towns with property tax referendums that failed. Among the independent variables, the town property tax rate and town unemployment rate are all 2007 values; all other variables correspond to 2000.

Table 6:

Effects of PILOT Rates on Nonprofit Activity (1995-2007)

Dependent Variables	log(Fixed Assets)		log(Total Assets)		log(Total Revenue)		log(Fixed Assets Ratio)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PILOT rate (in %)	-0.801***	-0.662***	-0.211**	-0.0741	-0.204**	-0.0826	-0.661***	-0.622***
	(0.237)	(0.193)	(0.103)	(0.0867)	(0.0926)	(0.0765)	(0.191)	(0.177)
Log(population)	2.654***	2.467***	2.420***	2.103***	2.353***	2.169***	0.311***	0.530***
	(0.0607)	(0.0636)	(0.0287)	(0.0397)	(0.0332)	(0.0381)	(0.0499)	(0.0488)
Log household income (1999)	0.745***	6.401***	1.154***	4.048***	0.552***	4.357***	-0.384***	2.684***
	(0.164)	(1.163)	(0.107)	(0.648)	(0.100)	(0.628)	(0.0872)	(0.787)
Constant	-19.55***	-71.69***	-20.02***	-47.38***	-12.94***	-50.44***	-0.937	-31.28***
	(2.198)	(11.63)	(1.378)	(6.496)	(1.332)	(6.352)	(1.293)	(7.854)
Year dummies	Y	Y	Y	Y	Y	Y	Y	Y
Demographic+Economic Controls	N	Y	N	Y	N	Y	N	Y
Observations	3,502	3,492	4,547	4,534	4,544	4,531	3,181	3,171
R-squared	0.510	0.607	0.615	0.709	0.650	0.723	0.052	0.104
F-stat	185.7	199.3	603.1	433.2	428.7	445.4	9.288	16.62

Note to Table 6: The table reports estimated coefficients from OLS regressions. The dependent variable in the regressions reported in columns 1-2 is the natural log of one plus total nonprofit fixed assets (the sum of land, buildings, and equipment) in a town; the dependent variable in the regressions reported in columns 3-4 is the natural log of one plus total nonprofit assets in a town; the dependent variable in the regressions reported in columns 5-6 is the natural log of one plus total nonprofit revenues in a town; and the

dependent variable in the regressions reported in columns 7-8 is the natural log of the ratio of nonprofit fixed assets to nonprofit total assets. The sample used in the regressions reported in columns 3-6 includes observations from 1995-2007. The sample used in the regressions reported in columns 1-2 and 7-8 includes observations from 1998-2007, though observations from towns without any nonprofit activity in a year are excluded from the regressions reported in columns 7-8. Observations are weighted by town population, and standard errors are clustered by municipality. All of the regressions include year dummy variables; the regression reported in even-numbered columns include the six "Demographic Variables" listed in Table 1 plus the six "Economic Variables" listed in Table 1. Among the independent variables, the town PILOT rate, town population, and town unemployment rate are all contemporaneous values; all other variables correspond to 2000.