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Impact of Tax and Expenditure Limits on Local Government Use of Tax-supported Debt

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Abstract

This study seeks to broaden our understanding of the impact tax and expenditure limits (TELs) have had on local governments. We chose to focus on local government use of tax-supported debt as TELs are limits on the property tax base and related revenues, two essential components used to determine a government's legal authority to issue tax-supported debt and its fiscal capacity to maintain long-term solvency. Using county-level data, our analysis finds TELs have a negative impact on local government use of tax-supported debt, especially if the government is subject to a limitation on assessed valuation or the property tax levy.

Keywords

debt, tax and expenditure limits (TELs), debt limits

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Although several tax and expenditure limits (or TELs) were passed before California's *Peoples Initiative to Limit Property Taxation* (the Jarvis–Gann Amendment Article XIII A; commonly referred to as Proposition 13), it is generally acknowledged that Proposition 13 began the modern tax revolt. Support for measures like Proposition 13 grew in response to a growing antitax sentiment that began in the mid-1970s. To date, virtually every state has placed a limit on their local government's ability to impose new or higher taxes (Mullins and Wallin 2004; Anderson 2006). TEL measures continue to be popular to this day. For instance, Indiana amended its TEL measure in 2010 following a series of court ordered and statutorily mandated reassessments (Thaiprasert, Faulk, and Hicks 2010). In 2012, Governor Cuomo of New York signed a law that set growth of property tax revenues at the rate of inflation or 2 percent, whichever was less.

While the existing literature has extensively explored TEL impact on taxing and spending authority of local governments, scholars have yet to explore TEL impact on local government use of tax-supported debt. The relationship between TELs and local government use of tax-supported debt warrants consideration as TELs are limits on the property tax base and related revenues—two essential components used to determine a local government's legal authority to issue and finance tax-supported debt.

Theoretically, TELs could have a negative impact on a government's capacity to issue tax-supported debt as the amount of general tax dollars and/or the taxable base would be subject to TEL provisions. This hypothesis is supported with data from the Census Bureau that shows a precipitous decline in use of tax-supported debt following the adoption of TELs (figure 1).[1] However, when these rules constrain a government's taxing or spending authority, public officials could substitute current period pay-as-you-go (or pay-go) capital spending with long-term debt (or pay-as-you-use). In this instance, the government would report a lower tax burden but a higher debt burden (Bahl and Duncombe 1993; Clingermayer and Wood 1995). These causal mechanisms have neither been conceptually differentiated nor empirically tested in this literature.

Our analysis finds TELs do in fact have a sizable negative impact on local government use of tax-supported debt. Moreover, technical features of TELs provide further insight: limits on assessed valuation and property tax levy limits have the largest negative impact on local government use of tax-supported debt. In contrast, general revenue or expenditure limits do not have a significant impact on the level or use of tax-supported debt. Surprisingly, governments subject to rate limits reported higher debt burdens, suggesting that limits on property tax rate alone are not binding—though,

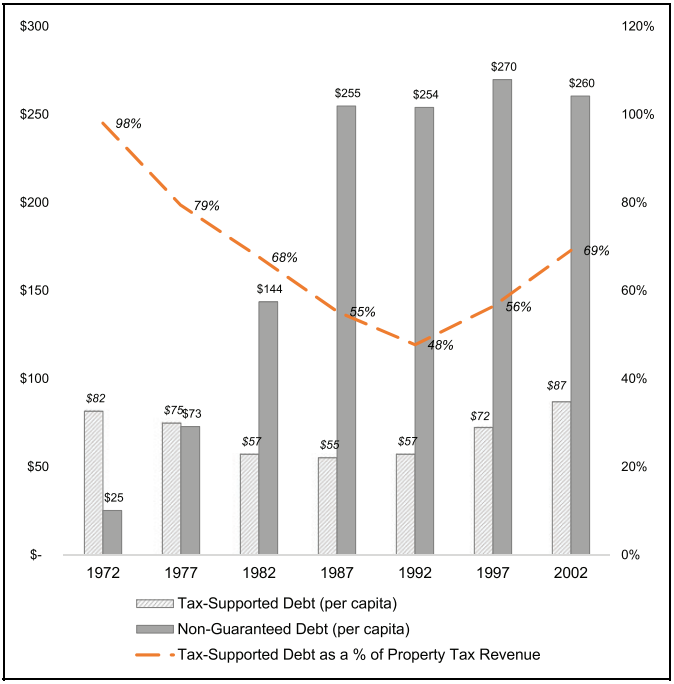

Figure 1. Trend in tax-supported debt (census years only).

when combined with limits on assessed value, they do have a significant negative effect on local government use of tax-supported debt.

Impact of TELs on Tax-supported Debt

Virtually, every state has placed a limit on their local government's ability to tax or spend (Mullins and Wallin 2004; Anderson 2006). TELs include limits on property tax rates, assessed values, property tax levy, general revenues, and/or expenditures. Studies have found TELs have had little effect on the overall size of the state and local public sector (Mullins and Joyce, 1996; Shadbegian 1999; Sun 2014). They did, however, have a significant impact on revenue composition. Evidence shows that the widespread adoption of TELs resulted in an increased reliance on user charges and fees (Shadbegian 1999; Skidmore 1999; Bradbury, Mayer, and Case 2001; Hoene 2004; Dye, McGuire, and McMillen 2005; McCubbins and Moule 2010; Jung and Bae 2011; Sun 2014) and widespread creation of

special districts (Bennett and DiLorenzo 1982; McCabe 2000; Bowler and Donovan 2004; Carr 2006; Zhang 2016). There has also been a significant loss in fiscal autonomy and an expanded role for the states (Skidmore 1999; Sokolow 2000; Saxton, Hoene, and Erie 2001; Thompson and Green 2004). Although empirical work using local government data is limited, evidence suggests that local governments subject to TEL restrictions are more likely to have a lower rating and, as a result, report higher interest costs on related bonded obligations (Poterba and Rueben 2001; Wagner 2004; Johnson and Kriz 2005; Benson and Marks 2010; Moldogaziev, Kioko, and Hildreth Forthcoming).

Our work is motivated in part by Bennett and DiLorenzo's (1982) study on the use of debt by off-budget entities (OBEs, also known as special districts). Their work highlights the growth in the number of OBEs and their use of nonguaranteed debt, particularly in states that had recently imposed TELs. There are similar themes in Mullins, Hayes, and Smith (2014). They find "TELs are associated with shifts in the proportion of non-guaranteed debt as a component of total debt burden" (p. 36). They further argue TELs forced governments to find alternative financial resources to satisfy demand for services. They note that while the debt service exemption in TEL provisions makes the use of debt financing more probable, tax-supported debt also faces its own constraints (e.g., debt affordability, voter-approval requirements, and legal debt limits). As a result of a wide variety of factors, nonguaranteed debt and nonbonded obligations became a primary source of financing. Our work is also related to Clingermayer and Wood (1995) and Bahl and Duncombe (1993)—two seminal pieces that show state-level TELs may have incentivized the use of long-term debt.

However, unlike prior work, we empirically examine the impact TELs had on local government use of tax-supported debt. We choose to focus on tax-supported debt as TELs are limits primarily on the property tax base and related revenues, two essential components used to determine a government's legal authority to issue tax-supported debt and its long-term solvency position. Our analysis is therefore a test of an *indirect* effect of TELs on local government use of tax-supported debt.

Theoretically, TELs may have either a positive or a negative effect on a government's choice to utilize tax-supported debt. First, TELs could constrain the issuer's ability to borrow, as the amount of general tax dollars available to meet principal and interest payments would be subject to the TEL provision. As we noted earlier, TEL provisions would constrain a government's taxing and/or spending authority either directly (e.g., a limit

on property tax levy, total revenues, or total expenditures) or indirectly (e.g., a limit on assessed valuation); either of which would have a negative impact on a government's ability to issue (i.e., tax-supported debt as a percent of assessed valuation) or finance (i.e., debt service as a percent of property tax levy) its obligations.[2] However, when TEL laws constrain a government's revenue and/or spending authority, a borrowing instrument could be used as a substitute to expand on current resources available for spending (Denison, Hackbart, and Moody 2006; Standard and Poor's 2008). For example, governments could substitute current period pay-as-you-go capital spending with pay-as-you-use financing, resulting in higher debt burdens all the while maintaining spending at or below the legal limits. Anecdotal evidence suggests local governments in California and Massachusetts have used debt to make up for lost revenues (Standard and Poor's 2008). Bahl and Duncombe (1993) provide empirical evidence that shows that the adoption of state-level TELs led to increased use of tax-supported debt. This could reflect the fact that debt service payments are not subject to TEL restrictions (Skidmore 1999; Mullins and Wallin 2004; Amiel, Deller, and Stallman 2009; Kioko 2011).

Empirical Models and Data

To test our hypothesis, we use county-level data from 1970 through 2004.[4] County governments have long been important administrative arms of state governments, responsible for essential services including public assistance, law enforcement, court systems, voter registration, and so on (Benton et al. 2007). They have also been assigned discretion over the administration of essential programs, evolved to provide a wider menu of services that were traditionally the responsibility of smaller governments, and have become de facto coordinators of regional planning and economic development initiatives (Lobao and Kraybill 2005; Benton et al. 2007). Given changes in their roles over time, county governments offer an interesting environment to test the impact of TELs on local government debt burdens. We specified our model as follows:

$$F = f(L, D, S),$$

where F represents a government's tax-supported debt excluding any short-term notes or warrants.[5] L includes our fiscal stringency measures (i.e., TELs, debt limits, and voter approval requirements on tax-supported debt). D includes measures of demand for capital improvements while S controls

for the level of tax-supported debt outstanding at the state level. Descriptive statistics are reported in table 1. Our data were limited to 2004, the last year the Census Bureau collected data on tax-supported debt. To control for changes in price, all dollar values have been deflated—with 1983 as the base year.

Outcome Variable: Tax-supported Debt

The use of debt has been justified by the principle of intergenerational equity (or pay-use principle) that each individual should bear their share of costs related to public improvements. The public finance literature considers tax-supported debt as debt guaranteed with the taxing authority of the government. The "*full-faith and credit*" guarantee associated with unlimited tax-supported debt implies that a government will levy new or higher taxes to meet principal and interest payments as they come due. For local governments, the property tax base is the primary source of such a guarantee. It is important to note there is no explicit guarantee that full faith and credit debt would be repaid should the issuer became insolvent (Moody's 2012; Moldogaziev, Kioko, and Hildreth Forthcoming). Notwithstanding, the term "full-faith and credit" does point to the extreme nature of the pledge that taxpayers are making when government's issue tax-supported debt.

Key Explanatory Variables: Limits on Taxing, Spending, and Borrowing Authority

Virtually, every state has placed limits on their local government's taxing authority.[6] Local-level TELs include limits on overall property tax rates, specific property tax rates, assessed value, property tax levy, general government revenues, and/or general government expenditures.[7] We examine the impact of the TEL structure on local government use of tax-supported debt. As noted in Rose (2010), "... the main lesson from the literature is that the devil is in the details—an institution's effectiveness often depends critically on its specific legal provisions" (p. 808).

We hypothesize that differences in TELs provisions would have a substantive impact on a government's ability to use tax-supported debt. For example, limits on property tax rates alone would not affect local government use of tax-supported debt, as governments often circumvent rate limits by changing assessed values or by diversifying their revenues. Limits on assessed valuation have the potential to compress a municipality's

Table 1. Descriptive Statistics and Sources of Data.

Variable Name	Mean	Q1	Median	Q3	Standard Deviation	Source of Data
Dependent variables						
Tax-supported debt (per capita)	78.51	0	18.70	94.80	146.5	Census Bureau
County-level TELs[a]						
Overall property tax rate TEL	0.189	0	0	0	0.392	Mullins and Wallin (2004)
Specific property tax rate TEL	0.552	0	1	1	0.497	
Property tax assessment TEL	0.0958	0	0	0	0.294	
Property tax levy TEL	0.390	0	0	1	0.488	
General revenue cap TEL	0.0284	0	0	0	0.166	
General expenditure cap TEL	0.0373	0	0	0	0.190	
Composite county-level TELs[b]						
Overall TEL	0.789	1	1	1	0.408	Mullins and Wallin (2004)
Property tax TEL	0.768	1	1	1	0.423	
Binding TEL	0.788	1	1	1	0.269	
Institutional limits on local debt (indicator)						
Debt limit	0.904	1	1	1	0.295	
Voter approval	0.600	0	1	1	0.490	Kioko (2008)
Demand variables						
Population	100,806	14,503	32,001	80,107	304,472	Census Bureau
Population density	150.5	20.67	47.92	116.3	433.1	
Population share white	0.894	0.858	0.959	0.989	0.144	
Population share African American	0.0853	0.00194	0.0168	0.102	0.139	
Population share other	0.0211	0.00306	0.00688	0.0182	0.0543	
Population share <19 years	0.317	0.285	0.310	0.345	0.0458	

(continued)

Table 1. (continued)

Variable Name	Mean	Q1	Median	Q3	Standard Deviation	Source of Data
Population share >20 years and <64 years	0.549	0.521	0.549	0.577	0.0405	
Population share >65 years	0.134	0.106	0.131	0.157	0.0412	
Income per capita	11,598	9,579	11,224	13,070	3,077	
State tax-supported debt (per capita)	182.9	5.259	120.8	280.8	238.3	
Employment	52,808	6,070	14,018	37,470	17,4401	Bureau of Economic Analysis

Note: Unit of analysis is county government. Our sample was limited to counties responding the annual survey administered by the Census Bureau at least seventeen of the thirty-five years. The sample included 69,855 observations (more than 91 percent of the original data set). Data have been deflated by CPI Index with 1983 as the base year. TEL = tax and expenditure limit.

[a]Although we mainly use the data reported in Mullins and Wallin (2004), we coded Nassau County (New York) and local government TELs in Illinois based on publicly available data. For example, we relied on data from the Illinois Department of Revenue to code property tax limits for Illinois county governments (http://tax.illinois.gov/localgovernment/PropertyTax/PTELLcounties.pdf).

[b]Composite TELs are developed and calculated by authors based on individual county-level TELs. Specifically, (1) property tax TEL = 1 if overall property tax rate TEL = 1, or specific property tax rate TEL, or property tax assessment TEL = 1, or property tax levy TEL = 1; (2) TELs = 1 if TELs on property tax = 1 or general revenue cap TEL = 1 or general expenditure cap TEL = 1; and (3) binding TELs = 1 if overall property tax rate TEL = 1 and property tax assessment TEL = 1, or specific property tax rate TEL = 1 and property tax assessment TEL = 1.

borrowing authority, particularly in jurisdictions where growth in fair market value far exceeds that allowed in the TEL law. Although empirical evidence shows local governments have diversified their revenues following the adoption of TELs, the property tax base and related revenues remain the primary source of repayment and guarantees. We therefore expect limits on property tax levy to have a negative impact on local government use of tax-supported debt, in spite of changes in revenues.

To test our hypothesis, we created a series of test variables that capture structural differences in TELs. In order to capture the average effect, we first use an indicator variable if the county was subject to any of the six TELs. We then differentiated general revenue and general expenditure TELs from TELs that are specific to the property tax (i.e., property tax rate limits, assessed valuation limits, and property tax levy limits). The former are restrictions on overall taxing and spending authority of a government, while the latter are TEL specific to property taxes or components thereof. Following Mullins and Wallin (2004), we also created a "binding" TEL variable that would capture governments subject to a property tax rate limit as well as a limit on assessed values. We believe that binding TELs constrain a government's ability to issue tax-supported debt (e.g., a percent of assessed valuation), as well as its capacity to service its long-term obligations (e.g., debt service as a percent of property tax revenues) and that the effect would be different from that of a property tax levy limit.[8]

In addition to TELs, local governments also are subject to debt limits and/or voter approval requirements. McEachern (1978) and Farnham (1985) found debt burdens were lower when local governments were subject to debt limit. Although there is no evidence to suggest a voter approval requirement is an effective constraint (Farnham 1985), we expect local governments subject to debt referenda requirement will report significantly lower tax-supported debt burdens. This statement is consistent with studies on the impact of voter approval requirements on borrowing at the state level (Nice 1991; Kiewiet and Szakaly 1996).

Other Explanatory Variables

We included in our specification the following proxy measures for the taxable base and demand for public services. Per capita income is our proxy measure for the taxable base. We expect higher incomes would result in higher property values and, correspondingly, a larger taxable base. Governments experiencing a high rate of growth in personal income (and taxable values of property) have a greater ability to expand current period operating

and capital spending without violating TEL provisions. By the same token, higher employment levels are expected to increase the demand for capital spending. Economic theory has also shown that there are economies of scale in service provision. Therefore, while population growth would lead to higher demand for services and, that correspondingly, higher debt burdens, we expect the level of debt to decrease in more densely populated areas. We hypothesize that counties reporting a larger share of their population below the age of nineteen would likely have lower tax burdens—reflecting the possible competition between school districts and general purpose governments. It is difficult to predict the relationship between the share of population above the age of sixty-five and local government use of debt. On the one hand, areas reporting a higher proportion of seniors could report a lower debt burden given their demand for locally financed capital improvements. However, this voting population could also support local government use of debt if it addresses intergenerational equity to their benefit (Ellis and Schansberg 1999). Other demographic measures like racial heterogeneities are included, although we do not have a priori expectation.

Finally, Wallis and Weingast (2006) found debt burdens at the local level were significantly higher following the adoption of state-level debt limits. Kiewiet and Szakaly (1996) also found states that explicitly prohibit use of tax-supported debt report higher local government debt burdens relative to states without any such restrictions. In other words, states were more likely to push down the responsibility for services, and related use of debt, to local governments if they were also subject to a debt limit. Given the potential for an intergovernmental substitution effect, we include as a control variable, tax-supported debt reported by each state. We expect the relationship to be inverse.

Empirical Strategies and Results

Tobit Model Specification and the McDonald and Moffitt's Decomposition Framework

In making estimations based on the above-described sample, we are confronted with the following methodological challenges. First, approximately 38 percent of our observations did not report any outstanding tax-supported debt. These governments were expressing a preference for no tax-supported debt (and in some instances no long-term debt obligations). In other words, capital improvements were financed via alternative means, including pay-as-you-go, intergovernmental loans, nonguaranteed debt, or nonbonded

obligations including lease agreements. As a consequence, our data were left censored. To address censoring, we estimate Tobit models as follows:

$$y_{it}^{*} = x_{it}\beta + \varepsilon_{it}, \tag{1}$$

$$y_{it} = \max(0, y_{it}^{*}), \tag{2}$$

where in equation (1), $\varepsilon_{it} \sim N(0,\sigma 2)$ and y_{it}^{*} is a latent variable that satisfies the classical linear model assumptions. Equation (2) implies that the observed variable y_{it} equals y_{it}^{*} when ≥ 0, but $y_{it} = 0$ when $y_{it}^{*} < 0$. In other words, y_{it}^{*} is only observed for values greater than 0 and censored otherwise (Wooldridge 2002).

The interpretation of coefficients in a Tobit model differs substantively from those in an ordinary least squares (OLS) model. Tobit coefficients represent their effects on the latent variable y_{it}^{*}. Given the artificial construct of the latent variable, emphasis should not be placed on its interpretation. In other words, the goal should be to explore the impact of our policy variable on y_{it} and not the artificial construct y_{it}^{*}. To that end, we followed McDonald and Moffitt's (1980) decomposition framework that allows us to disaggregate the total marginal effect, $\frac{\delta E(y)}{\delta x_k}$, into the weighted sum of two types of marginal effects revealing, first, how x_k affects the probability of y being above zero, namely, $\frac{\delta P(y^{*}>0)}{\delta x_k}$, and second, how x_k affects the conditional mean of y, if it is already above zero, namely, $\frac{\delta E(y|y^{*}>0)}{\delta x_k}$ (McDonald and Moffitt 1980):

$$\frac{\delta E(y)}{\delta x_k} = E(y|y^{*} > 0) \times \frac{\delta P(y^{*} > 0)}{\delta x_k} + E(y^{*} > 0) \times \frac{\delta E(y|y^{*} > 0)}{\delta x_k}. \tag{3}$$

Simply put, the decomposed results allow us to interpret the government's choice on whether or not to issue tax-supported debt, and where $y_t > 0$, the decomposed measures allow us to interpret the government's policy choice on the level of tax-supported debt. As Tobit models rely crucially on the normality assumption of regression errors, we employ the log form of the outstanding long-term tax-supported debt as the real dependent variable in regressions (Cameron and Trivedi 2009).[9]

Results

Results from our baseline Tobit model are reported in table 2. The *F*-test for overall significance suggests that the explanatory power of the models is statistically significant (p value < .001). Coefficients present the expected

Table 2. Baseline Model.

	Tobit Model 1			Tobit Model 2		
Dependent Variable	Decomposition Results			Decomposition Results		
Ln(Tax-supported Debt Per Capita)	Model 1	Probability	Conditional	Model 1	Probability	Conditional
Overall TEL	−0.224***	−0.0242***	−0.111***	−0.466***	−0.0520***	−0.214***
	(0.0341)	(.00367)	(.0171)	(0.0695)	(.0077)	(.0327)
Debt limit	−0.631***	−0.0660***	−0.322***	−0.433**	−0.0480**	−0.200**
	(0.1800)	(.0179)	(.0960)	(0.1730)	(.0187)	(.0822)
Voter approval requirement	−1.114***	−0.119***	−0.555***	−0.914***	−0.102***	−0.416***
	(0.1100)	(.0116)	(.0562)	(0.1030)	(.0114)	(.0481)
Personal income per capita (ln)	0.523***	0.0571***	0.255***	0.26500	0.03000	0.11900
	(0.1000)	(.0110)	(.0489)	(0.1860)	(.0211)	(.0833)
Employment (ln)	0.139	0.0152	0.068	0.399**	0.0452**	0.178**
	(0.1020)	(.0111)	(.0497)	(0.1630)	(.0185)	(.0731)
Population (ln)	0.624***	0.0682***	0.304***	0.366**	0.0414**	0.164**
	(0.1080)	(.01180)	(.0527)	(0.1660)	(.0188)	(.0744)
Population density	−8.79E-06	−9.61E-07	−4.29E-06	4.87E-05	5.52E-06	2.18E-05
	(0.00012)	(.00001)	(.00006)	(0.0001)	(.0000)	(.0001)
Population share: African American	0.0421***	0.00460***	0.0206***	0.0435***	0.00493***	0.0195***
	(0.00310)	(.00034)	(.00152)	(0.0033)	(.0004)	(.0015)
Population share: Other	−0.0312***	−0.00341***	−0.0152***	−0.0247***	−0.00280***	−0.0110***
	(0.00623)	(.00068)	(.00304)	(0.0077)	(.0009)	(.0035)
Population share: <19 years	0.0511***	0.00559***	0.0250***	0.0471***	0.00534***	0.0211***
	(0.00536)	(.00059)	(.00262)	(0.0092)	(.0011)	(.0041)

Population share: >65 years	−0.0400***	−0.00437***	−0.0195***	−0.0496***	−0.00562***	−0.0222***
	(0.00832)	(.00091)	(.00407)	(0.0127)	(.0014)	(.0057)
State tax-supported debt per capita	−0.000409***	−4.47e-05***	−0.0002***	−0.000380***	−4.31e-05***	−0.000170***
	(0.00007)	(.00001)	(.00003)	(0.0001)	(.0000)	(.0001)
Constant	−11.01***			−8.459***		
	(1.14100)			(2.0330)		
Prob. > χ^2 (prob. > F)	0.00			0.00		
Total observations	69,855			19,693		

Note: Robust standard errors are in parentheses. TEL = tax and expenditure limit.
*$p < 0$.
**$p < .05$.
***$p < .01$.

signs and a majority are statistically significant. We report results using the McDonald and Moffitt's (1980) decomposition framework. Specifically, in the probability column, we report the cumulative probability of issuing debt. In the conditional column, we report changes in the expected value where $y_{it} > 0$.

Local governments reporting higher per capita income were more likely to issue tax-supported debt (.056) and also reported a higher debt burden (25.5 percent, p value < .001).[10] The positive findings for level of employment (i.e., number of jobs) and income were consistent with expectation. Population growth led to a higher probability of issuing tax-supported debt and higher debt burdens conditional on positive values. Our control variable for economies of scale (population density) is not statistically significant. Models find consistent evidence that counties reporting a larger share of African Americans were more likely to use tax-supported debt and reported slightly higher debt burdens (2.06 percent, p value < .001), while all other racial groups were less likely to issue tax-supported debt and their tax-supported debt burdens were significantly lower (−1.52 percent, p *value* < .001). Counties reporting a larger share of population below the age of nineteen were more likely to issue debt and their debt burdens were higher (2.50 percent, p value < .001). The converse holds if the county reported a larger share of seniors (sixty-five years and older). These governments were more likely to issue less tax-supported debt and reported lower debt burdens (−1.95 percent, p value < .001). Although the findings were statistically significant, the economic effect is small. Relatedly, state use of tax-supported debt does not have a substantive impact on county government use of tax-supported debt (0.02 percent, p value < .001).

Where debt limits and voter approval requirements are present, the associated probabilities of issuing tax-supported debt are lower (−0.066 and −0.119, respectively). Moreover, governments using tax-supported debt reported a substantially lower debt burdens (32.2 percent, p value < .001). As hypothesized, voter approval requirements constrain borrowing authority. Localities subject to a voter referendum reported lower tax-supported debt burdens (55.5 percent, p value < .001). This finding is consistent with studies at the state level even though studies at the local level did not find substantive evidence of this effect (Farnham 1985).

With regard to our policy variable of interest, we included in our initial specification a variable that captures mere presence of any of the six TELs (i.e., overall property tax rate limit, specific property tax rate limit, limit on assessed values, a property tax levy limit, a general revenue cap, or a

general expenditure cap). We find, overall, TELs lowered local government tax-supported debt burden by 11.10 percent (p value < .001).

Since local governments are not required to respond to the survey in noncensus years, our initial analysis is based on an unbalanced panel, specifically governments that responded to the annual survey at least seventeen of the last thirty-five years. To check whether results were vulnerable to selection bias, we estimated the baseline Tobit model using data from approximately 3,000 counties that responded to the survey in census years, that is, data from 1972, 1977, 1982, 1987, 1992, 1997, and 2002. Results reported in table 2 (Tobit Model 2) suggest even stronger negative effects (21.4 percent, p value < .001). We believe consistency in findings reduces the possibility of sample selection bias.[11]

Disentangling Impact of TELs Structure on Tax-supported Debt

In our baseline specification, we focused on whether being subject to a TEL had any impact on local government use of tax-supported debt. In this section, we test which of the TELs has a larger impact on tax-supported debt. For brevity, the results reported in table 3 were limited to the decomposed results, that is, the probability a government will issue tax-supported debt as well as the amount of debt conditional on positive values. The results are also limited to the policy variables of interest. Although we omit the results for all the controls, findings were consistent with those reported in table 2.

In model 3, we disaggregate our overall TEL measure as follows: (1) property tax TELs (i.e., limits on property tax rate, assessed values, or property tax levy), (2) general revenue caps, and (3) general expenditure caps. General revenue and general expenditure caps apply to all revenue sources or overall spending authority, including property tax revenue or related spending. Using the variable of property tax TELs allows us to separate out the limits that are specific to the property tax from those that are on aggregate taxing or spending authority. As expected, conditional on tax-supported debt being in use, local governments subject to property tax TELs report significantly lower debt burdens (−8.6 percent, p value < .001), and their probability of using tax-supported debt is lower (−0.019, p value < .001) as well. Interestingly, general revenue caps or general expenditure caps did not have a statistically significant effect on local government debt burdens.

Table 3. TEL Structure and Local Government Tax-supported Debt.

	Tobit Model 3		Tobit Model 4		Tobit Model 5	
	Decomposition Results		Decomposition Results		Decomposition Results	
TEL Variable	Probability	Conditional	Probability	Conditional	Probability	Conditional
Property tax TEL	−.0190***	−.0862***	—	—	—	—
	(.00396)	(.0182)				
Binding TEL	—	—	−.120***	−.468***	—	—
			(.00607)	(.0211)		
Overall property tax rate TEL	—	—	—	—	.0354***	.165***
					(.0081)	(.0390)
Specific property tax rate TEL	—	—	—	—	.0497***	.222***
					(.0041)	(.0183)
Property tax assessment TEL	—	—	—	—	−.124***	−.488***
					(.0063)	(.0223)
Property tax levy TEL	—	—	−.0631***	−.276***	−.0680***	−.299***
			(.0035)	(.0148)	(.0035)	(.0149)
General revenue TEL	−.0093	−.041	−.0157*	−.0687*	−.0223**	−.0973**
	(.0089)	(.0387)	(.0089)	(.0381)	(.0090)	(.0379)
General expenditure TEL	.00385	.0173	.0340***	.160***	.0127	.0581
	(.0091)	(.0409)	(.0087)	(.0428)	(.0092)	(.0429)

Note: Robust standard errors are in parentheses. For brevity, we report the results for our policy variables only. Results for controls were consistent with those reported in table 2. A description of TEL variables can be found in table 1. TEL = tax and expenditure limit.

*$p < .1$.

**$p < .05$.

***$p < .01$.

In model 4, we further disentangle the property tax TELs into the following TELs: (4) binding property tax TEL (i.e., a rate limit combined with a limit on assessed values) and (5) property tax levy limit. Our analysis finds binding TELs substantially lowered the probability a local government would issue tax-supported debt (0.12, p value < .001). As a result, average debt burdens were also significantly lower (46.8 percent, p value < .001). The property tax levy limits also lower the probability a local government would issue tax-supported debt (−0.06, p value < .001). Debt burdens were also significantly lower, but the magnitude of coefficient was smaller than that of a binding TEL (−27.6 percent, p value < .001). This finding is not surprising as the TEL structure matters. In the case of property tax levy limit, the TEL is specific to the property tax revenue and not the underlying components—that is, property tax rate *or* assessed value. Although in the case of a binding TEL, the TEL is specific to both components—that is, the property tax rate *and* assessed value. When the TEL laws simultaneously limit components fundamental to the property tax levy, the TEL has a larger negative impact on the government's authority to issue tax-supported debt.

In our final specification, we include indicator variables for all six types of TELs. Results show governments subject to a limit on assessed valuation were least likely to use tax-supported debt (−0.124, p value < .001) and the amount of tax-supported debt is significantly lower (−48.8 percent, p value < .001). Of the six TELs, the assessment limit had the largest negative impact. As we noted earlier, TELs on assessed values are limits on the taxable base that is used not only to determine property tax revenue but also how much tax-supported debt a government would be authorized to issue (i.e., assessed values set the foundation for debt limits). As a result, borrowing authority on the basis of assessed valuation is constrained relative to true market value, particularly in areas reporting robust growth in the taxable base. Local government subject to a property tax levy limit or a general revenue limit were found to report lower debt burdens. However, localities subject to *only* rate limits (overall or specific) were more likely to *use* tax-supported debt and reported higher debt burdens (16.5 percent and 22.2 percent, p value < .001), suggesting that limits on property tax rate alone are not binding. We did not find the general expenditure limit had any negative impact on tax-supported debt burdens across all models.

Conclusions

TELs, together with debt limits and voter approval requirements, have substantially changed how local governments use debt. Our study presents

a review of the impact TELs have on local government use of tax-supported debt, with a specific focus on the technical framework of TELs. Our analysis finds that TELs did have a negative effect on local government use of debt. Those effects were largest for governments subject to assessment limits and property tax levy limits—that is limitations on the taxable base or property tax revenues. When facing TELs, public officials seem to prefer annual appropriations, nonguaranteed debt, or nonbonded debt so as to preserve their authority to use their taxing capacity within the TEL framework for operating purposes.

Our findings are substantively different from those in Bahl and Duncombe (1993) and Clingermayer and Wood (1995). First, while the debt service exemption is incorporated in all TELs—state and local—local governments are less opportunistic in their use of the exemption and were more likely to report a lower tax-supported debt burden following the adoption of TELs. Given the direct link between property tax revenues and tax-supported debt, this finding is not surprising. Moreover, the negative effect of TELs on taxing and spending authority of state governments has been shown to be limited at best. Since states are more likely to issue tax-supported debt backed by a wide variety of revenue streams, a number of which may not be subject to the TEL rule, the impact of TELs on these governments is limited. Our study provides empirical evidence that the link between TELs and the taxing authority of a local government has negatively impacted the localities ability or choice to utilize tax-supported debt. Our analysis also finds that effect is largely driven by the structure of the TELs.

The far-reaching influences of TELs on a locality's choice of debt instruments also provide a robust area for future research. For example, do TELs have a similar effect on debt burdens of other municipal governments (e.g., cities, towns, villages, and school districts)? Do TELs have a substantive impact on the type of debt referenda? There has been a wave of tax repeals, so questions about the significance of these repeals on local government use of tax-supported debt are also worthy of examination (e.g., Nguyen-Hoang 2013).

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Notes

1. At the start of the tax-revolt movement, local government use of tax-supported debt was approximately 98 percent of property tax revenues (or US$82 per capita). By 1992, that share had dropped an additional 31 percentage points to 48 percent (or US$57 per capita). Although there have been moderate changes as a result of a robust housing market, local governments continue to rely on nonguaranteed and nonbonded financing instruments as their primary source of capital.
2. Evidence also suggests tax-supported debt likely became more expensive following the adoption of tax and expenditure limits (TELs). This may have discouraged local governments from using tax-supported debt and played a role in their increased use of nonguaranteed debt. What is more, voter awareness of TELs could diminish a local government's proclivity to issue tax-supported debt.
3. Although the exemption was a means to avoid jeopardizing a governments credit rating, the provision unintentionally allows governments to issue even more tax-supported debt without violating the existing TELs provisions (Bahl and Duncombe 1993; Kioko 2011). We are unable to provide a test on the impact of the debt service exemption, as the provision was not adopted as a rule independent of the TEL nor was it motivated by a different set of factors.
4. We excluded counties in Connecticut and Rhode Island, as they exist only for statistical purposes. We also excluded boroughs in Alaska, as the state itself is considered an outlier.
5. We exclude debt payable solely from pledged specific sources, for example, from earnings of revenue producing activities. Given the nature and relevance of the property tax on the revenue structure of local governments and the structure of the TELs, a focus on tax-supported debt is more appropriate. We also prefer to use debt outstanding data and not issuance data due to the lumpy nature of bond issuance, particularly at the local level.
6. See table 5.2 in Mullins (2003), table 2 in Mullins and Wallin (2004), or the extensive TEL data set developed by Amiel, Deller, and Stallman (2009).

7. Full disclosure requirements were not incorporated in our analysis, given that their effects on local governments have been negligible (Duncombe and Yinger 2001).
8. A number of studies have used the Amiel, Deller, and Stallman (2009) index of TEL stringency. Tobit models using the Amiel, Deller, and Stallman (2009) index did not produce substantively different results from those reported in tables 2 and 3. It is important to note the Amiel, Deller, and Stallman (2009) index is constructed to measure overall stringency. Our goal here is to test specific components of TELs. Unfortunately, index does not allow us to test these components. Moreover, our analysis of the index finds it is possible for two governments to report an equivalent index even though mechanics or structural features of the TEL were substantively different.
9. Since ln0 is undefined, governments with no long-term tax-supported debt would be reported as missing values. To avoid losing these observations, we set all censored observations to an amount slightly smaller than the minimum noncensored value as lny.
10. Since the dependent variable is transformed to log form, a coefficient equal to −0.255 indicates a 25.5 percent decline in local government use of tax-supported debt.
11. The internal validity of our estimates could be threatened by an omitted variable bias. Existing studies call into question the assumption that TELs are randomly assigned across states (Poterba and Rueben 1995; Rueben 1997; Shadbegian 1999; Poterba and Rueben 2001; Wagner 2004; Sun 2014). Results from a Two-Stage IV Tobit model (Wooldridge 2002) and a Two-Part Model support our findings that is, TELs significantly lower the amount of tax-supported debt being reported by local governments. TELs also substantively lower the probability the local government will issue tax-supported debt. Results from these analysis are available from the authors upon request.

References

Amiel, Lindsay, Steven Deller, and Judith Stallmann. 2009. "The Construction of a Tax and Expenditure Limitation Index for the U.S." In *Agricultural and Applied Economics Staff Paper Series*. Madison, WI: University of Wisconsin–Madison, Department of Agriculture and Applied Economics.

Anderson, Nathan B. 2006. "Property Tax Limitations: An Interpretative Review." *National Tax Journal* 59:685–94.

Bahl, Roy, and William Duncombe. 1993. "State and Local Debt Burdens in the 1980s: A Study in Contrast." *Public Administration Review* 53:31–40.

Bennett, James, and Thomas J. DiLorenzo. 1982. "Off-budget Activities of Local Government: The Bane of the Tax Revolt." *Public Choice* 39:333–42.

Benson, Earl D., and Barry R. Marks. 2010. "Dueling Revenue Caps and Municipal Bond Yields: The Case of Houston, Texas." *Public Budgeting & Finance* 30: 112–33.

Benton, J. Edwin, Jacqueline Byers, Beverly A. Cigler, Kenneth A. Klase, Donald C. Menzel, Tanis J. Salant, Gregory Streib, James H. Svara, and William L. Waugh. 2007. "Conducting Research on Counties in the 21st Century: A New Agenda and Database Considerations." *Public Administration Review* 67: 968–83.

Bowler, Shaun, and Todd Donovan. 2004. "Evolution in State Governance Structures: Unintended Consequences of State Tax and Expenditure Limitations." *Political Research Quarterly* 59:189–96.

Bradbury, Katharine L., Christopher J. Mayer, and Karl E. Case. 2001. "Property Tax Limits, Local Fiscal Behavior, and Property Values: Evidence from Massachusetts Under Proposition 21/2." *Journal of Public Economics* 80:287–311.

Cameron, Adrian Colin, and Pravin K. Trivedi. 2009. *Microeconometrics Using Stata*, Vol. 5. College Station, TX: Stata Press.

Carr, Jered B. 2006. "Local Government Autonomy and State Reliance on Special District Governments: A Reassessment." *Political Research Quarterly* 59: 481–92.

Clingermayer, James C., and B. Dan Wood. 1995. "Disentangling Patterns of State Debt Financing." *American Political Science Review* 89:108–20.

Denison, Dwight V., Merl M. Hackbart, and Michael Moody. 2006. "State Debt Limits: How Many Are Enough?" *Public Budgeting and Finance* 26:22–39.

Duncombe, William D., and John Yinger. 2001. "Alternative Paths to Property Tax Relief." In *Property Taxation and Local Government Finance*, edited by Wallace E. Oates, 243–94. Cambridge, MA: Lincoln Institute of Land Policy.

Dye, Richard F., Therese J. Mcguire, and Daniel P. McMillen. 2005. "Are Property Tax Limitations More Binding over Time." *National Tax Journal* 58:215–25.

Ellis, M. A., and E. D. Schansberg. 1999. "The Determinants of State Government Debt Financing." *Public Finance Review* 27:571–87.

Farnham, Paul G. 1985. "Re-examining Local Debt Limits: A Disaggregated Analysis." *Southern Economic Journal* 51:1186–201.

Hoene, Christopher. 2004. "Fiscal Structure and the Post-proposition 13 Fiscal Regime in California Cities." *Public Budgeting and Finance* 24:51–72.

Johnson, Craig L., and Kenneth A. Kriz. 2005. "Fiscal Institutions, Credit Ratings and Borrowing Costs." *Public Budgeting and Finance* 25:84–103.

Jung, Changhoon, and Suho Bae. 2011. "Changing Revenue and Expenditure Structure and the Reliance on User Charges and Fees in American Counties, 1972–2002." *The American Review of Public Administration* 41:92–110.

Kiewiet, D. Roderick, and Kristin Szakaly. 1996. "Constitutional Limitations and Borrowing: An Analysis of State Bonded Indebtedness." *Journal of Law, Economics and Organization* 12:62–97.

Kioko, Sharon N. 2008. *Fiscal Institutions and State Government Fiscal Performance*. Bloomington: School of Public and Environmental Affairs, Indiana University.

Kioko, Sharon N. 2011. "Structure of State-level Tax and Expenditure Limits." *Public Budgeting & Finance* 31:43–78.

Lobao, Linda, and David S. Kraybill. 2005. "The Emerging Roles of County Governments in Metropolitan and Nonmetropolitan Areas: Findings from a National Survey." *Economic Development Quarterly* 19:245–59.

McCabe, Barbara Coyle. 2000. "Special-district Formation among the States." *State & Local Government Review* 32:121–31.

McCubbins, Mathew D., and Ellen Moule. 2010. "Making Mountains of Debt out of Molehills: The Pro-cyclical Implications of Tax and Expenditure Limitations." *National Tax Journal* 63:603–22.

McDonald, John F., and Robert A. Moffitt. 1980. "The Uses of Tobit Analysis." *The Review of Economics and Statistics* 62:318–21.

McEachern, William A. 1978. "Collective Decision Rules and Local Debt Choice: A Test of the Median Voter Hypothesis." *National Tax Journal* 31:129–36.

Moldogaziev, Tima T., Sharon N. Kioko, and W. Bartley Hildreth. Forthcoming. "Impact of Bankruptcy Eligibility Requirements and Statutory Liens on Borrowing Costs." *Public Budgeting and Finance*.

Moody's. 2012. *Key Credit Considerations for Municipal Governments in Bankruptcy*. New York: Moody's Investor Service.

Mullins, Daniel. 2003. "Tax and Expenditure Limitations and the Fiscal Response of Local Government: Asymmetric Intra-local Fiscal Effects." *Public Budgeting and Finance* 24:111–47.

Mullins, Daniel, Michael S. Hayes, and Chad Smith. 2014. "The Role of Local Revenue and Expenditure Limitations in Shaping the Composition of Debt and Its Implications." In *Proceedings. Annual Conference on Taxation and Minutes of the Annual Meeting of the National Tax Association* Vol. 105, 105th Annual Conference on Taxation 15–17 November 2012. Washington, DC: National Tax Association, pp. 31–36.

Mullins, Daniel R., and Philip Joyce. 1996. "Tax and Expenditure Limitations and State and Local Fiscal Structure: An Empirical Assessment." *Public Budgeting and Finance* 16:75–101.

Mullins, Daniel R., and Bruce A. Wallin. 2004. "Tax and Expenditure Limitations: Introduction and Overview." *Public Budgeting and Finance* 24:2–15.

Nguyen-Hoang, Phuong. 2013. "Tax Limit Repeal and School Spending." *National Tax Journal* 66:117–48.

Nice, David. 1991. "The Impact of State Policies to Limit Debt Financing." *Publius* 21:69–82.

Poterba, J. M., and Kim S. Rueben. 1995. "The Effect of Property-tax Limits on Wages and Employment in the Local Public Sector." *American Economic Review* 85:384–89.

Poterba, James M., and Kim S. Rueben. 2001. "Fiscal News, State Budget Rules, and Tax-exempt Bond Yields." *Journal of Urban Economics* 50:537–62.

Rose, Shanna. 2010. "Institutions and Fiscal Sustainability." *National Tax Journal* 63:807–38.

Rueben, Kim S. 1997. *The Effect of Tax and Expenditure Limitations on State and Local Governments, Economics*. Boston: Massachusetts Institute of Technology.

Saxton, Gregory D., Christopher W. Hoene, and Steven P Erie. 2001. Fiscal Constraints and the Loss of Home Rule: The Long-Term Impacts of California's Post-proposition 13 Fiscal Regime. *American Review of Public Administration* 32:423–54.

Shadbegian, Ronald J. 1999. "The Effect of Tax and Expenditure Limitations on the Revenue Structure of Local Government, 1962-87." *National Tax Journal* 52: 221–38.

Skidmore, Mark. 1999. "Tax and Expenditure Limitations and the Fiscal Relationships between State and Local Governments." *Public Choice* 99: 77–102.

Sokolow, Alvin D. 2000. "The Changing Property Tax in the West: State Centralization of Local Finances." *Public Budgeting and Finance* 20:85–104.

Standard and Poor's. 2008. *On Prop. 13's 30th Birthday: How Tax Limits Affect Government Finances*. San Francisco, CA: Standard and Poor's.

Sun, Rui. 2014. "Reevaluating the Effect of Tax and Expenditure Limitations: An Instrumental Variable Approach." *Public Finance Review* 42:92–116.

Thaiprasert, Nalitra, Dagney Faulk, and Michael J. Hicks. 2010. *The Economic Effects of Indiana's Property Tax Rate Limits*. Muncie, IN: Center for Business and Economic Research, Ball State University.

Thompson, Fred, and Mark T. Green. 2004. "Vox Populi? Oregon Tax and Expenditure Limitation Initiatives." *Public Budgeting and Finance* 24:73–87.

Wagner, Gary A. 2004. "The Bond Market and Fiscal Institutions: Have Budget Stabilization Funds Reduced Borrowing Costs?" *National Tax Journal* 57: 785–804.

Wallis, John Joseph, and Barry R. Weingast. 2006. "Dysfunctional or Optimal Institutions? State Debt Limitations, the Structure of State and Local Governments, and the Finance of American Infrastructure." In *Fiscal Challenges: An*

Interdisciplinary Approach to Budget Policy, edited by Elizabeth Garret, Elizabeth A. Graddy, and Howell E. Jackson, 331–65. Cambridge, MA: Cambridge University Press.

Wooldridge, Jeffrey M. 2002. *Econometric Analysis of Cross Section and Panel Data*, 2nd ed. Cambridge, MA: MIT Press.

Zhang, Pengju. 2016. *Three Essays on the Links Between Local Government Structural Changes and Public Finance*. Order No. 10165510, Syracuse University. Accessed March 2, 2017. https://search.proquest.com/docview/1832364455? accountid=13626.

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