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FULL ARTICLE

Is there a relationship between TELs and default? Evidence from US municipalities

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Abstract

The economic effects of tax and expenditure limits (TELs) have been often studied in the literature. However, little research has addressed how TELs might influence the propensity for a jurisdiction to default on its obligations. This study specifically fills that void. Overall, the results indicate that while the likelihood of default increases as TELs become more restrictive, the magnitude is not particularly large. Once decomposed, it would appear that property tax limits increase the likelihood, while expenditure limits have the opposite effect, though the latter result is insignificant. The findings are robust to a number of specifications and provide potential policy implications.

KEYWORDS

default, sovereign debt, state and local public finance, tax and expenditure limits

1 | INTRODUCTION

Public-sector fiscal constraints and fiscal constitutions have been an often studied topic within the academic literature. Much of this work has evaluated how it is that various public-sector jurisdictions respond to the implementation and existence of these constraints. These studies have included comparative analyses both internationally and at the state and local level within the US (see Krol, 2007 and Rose, 2010 for extensive literature reviews).

Importantly, since the financial crisis of 2008, there has been a significant resurgence in this literature, especially as a means to evaluate how it is that various jurisdictions behave or are affected by these restrictions when faced with serious fiscal stress. One important set of constraints in particular that has garnered a significant amount of attention, especially as they effect state and local public finances, includes tax and expenditure limits (TELs). At the local level specifically, research suggests that TELs tend to distort overall revenue sources and expenditure structures (Dye & McGuire, 1997; Dye, McGuire, & McMillen, 2005; Lowery, 1983; Shadbegian, 1998), and that they may indeed increase fiscal stress when economic crises emerge (Poterba & Rueben, 1999).[1]

[1]The study by Poterba and Rueben (1999) suggests that TELs, and especially tax limits in particular, tend to increase borrowing costs, which makes servicing debt more difficult.

However, an important yet understudied issue concerns the effect that TELs might have on public-sector default. This paper addresses this particular issue. Specifically, the current analysis evaluates how, if at all, TELs may positively or negatively affect the likelihood of a public-sector default. This is done by employing a dataset of all municipal defaults in the US between 1970 and 2005 along with a unique index of TEL strength and rigidity over that period (to be discussed in greater detail below), as computed by Amiel, Deller, and Stallman (2009). Overall, the results are instructive. Specifically, as local TELs become more limiting they do tend to be associated with higher rates of local government default (which includes county and municipal governments as well as special assessment districts).[2] This is also true for strict property tax limits. Further, strict expenditure limits, while associated with lower rates of default, are not statistically significant. Finally, and importantly, while these results are robust to a number of specifications, they do not appear to be particularly large in magnitude, which may be instructive for policy-makers.

This research is fruitful for several reasons. First, again there has been a resurgence in the literature since the financial crisis of, 2008 to reassess the impact that fiscal constraints might have and how they may help overcome or hamper efforts to deal with budgetary problems especially when associated with economic downturn. These issues specifically culminated in several municipal governments, including Detroit and Michigan, filing for bankruptcy and ultimately defaulting on a number of their debt obligations.

While the number of defaults has not been large, and states do have the discretion to allow local governments to seek federal bankruptcy protection or to intervene directly to further reduce the likelihood of such an event happening, the ramifications of a default can be significant. For instance, a municipal default can trigger ripple effects across other municipalities and private sector firms within the same state through who may favour increased borrowing costs or outright exclusion from credit markets (Halstead, Hegde, & Schmid-Klein, 2004). Additionally, a municipal default, especially if large enough, may result in higher borrowing costs or other difficulties in obtaining credit for the parent state (which was observed during the Detroit bankruptcy) (MarketWatch, 2013).

These possibilities have led a number of states (to be discussed below) to take on a more proactive role in municipal affairs when crisis looms through the use of emergency managers or other more centralized solutions. However, these outcomes can come at the loss of local autonomy and democratic decision-making, which may pose their own set of problems. Further, any austerity measures that such a default might bring on can have dire and devastating consequences for economic growth and development for years to come.[3]

Further, additional research on these matters can help guide policy-makers in properly targeting more time-consistent public policy in general and to better prepare for the adverse effects that can result from economic downturn in general. Finally, an analysis of US municipal governments allows for a number of variables to be controlled for that tend to be much more difficult to account for with cross-country and international comparisons. The remainder of the paper is structured as follows: Section 2 provides a brief review of the literature and some theoretical considerations. Section 3 discusses the data employed and model specification. The results are presented and discussed in Section 4, while Section 5 concludes.

2 | LITERATURE REVIEW

A large body of literature has explored the effect that TELs might have within the public sector on a number of different and important margins. This research is more broadly tied to the effect that fiscal constitutions may and

[2]Special assessments are typically taxes placed on property owners receiving a particular public service, with a special assessment district being the geographic region that such properties encompass. These districts typically come in the form of public utilities or some other municipal service Rosewater (2001 [1983]).

[3]See Peck (2014) in regard to some of the negative consequences that resulted from local austerity measures brought on by the 2008 financial crisis and municipal defaults.

do have on public sector outcomes. The work specifically associated with TELs or similar variants has been explored through both cross-county and international comparisons as well as comparisons within particular countries.

For instance, Hopland (2013) explores the relationship between strict fiscal limits that the Norwegian central government imposed on particular local governments deemed to have been running chronic deficits. The result indicates that such a constraint led to increased revenue surpluses after its introduction, caused by a drastic reduction in expenditures by those municipal governments. Additional international case-study evidence from Denmark suggests that TELs do prevent taxes from typically increasing, but that local governments faced with a TEL also tend to shift revenue sources (Blom-Hansen, Bækgaard, & Serritzlew, 2014).

Additional efforts have assessed the effect that TELs have at the state and local level within the US, with earlier contributions finding little to no evidence that TELs actually had an effect on fiscal outcomes, especially on public expenditures (Abrams & Dougan, 1986; Bails, 1982, 1990; Joyce & Mullins, 1991; Mullins & Joyce, 1996). However, much of this early work tended to incorporate cross-sectional data and did not account for potential endogeneity. Later researchers, who specifically addressed these issues have found stronger effects on fiscal outcomes once TELs are implemented, with the effect somewhat stronger at limiting public expenditures (Bae & Gais, 2007; Bails & Tieslau, 2000; Brooks, Halberstam, & Phillips, 2016; Rueben, 1997; Shadbegian, 1996, 1998).

For instance, Rueben (1997) finds evidence that the existence of a TEL is associated with a two percentage point decrease in general expenditures as a percentage of personal income at the state level. These findings are corroborated by Bails and Tieslau (2000), with their estimates suggesting *per capita* expenditures at the state and local level to be roughly $40 lower on average with the presence of a TEL. Further, Bae and Gais (2007) show that relatively restrictive TELs do tend to lower public expenditures, however, Kousser, McCubbins, and Moule (2008) indicate that the effect that TELs have only seems to hold for a relatively small number of states, with most TELs having little effect at limiting public expenditures. This latter finding is a result of TELs generally being circumvented through various means by public officials.

Additional work, which also considers more nuanced issues suggests that TELs are most effective when political actors are overseen by agents that prefer relatively limited government (Seljan, 2014). This effectiveness also tends to be dependent upon the overall restrictiveness of the particular TEL (Amiel, Deller, Stallmann, & Maher, 2014). Further, there does not appear to be any association with increased economic activity, and in some instances evidence suggests that economic performance is dampened in states where TELs do exist (Stallmann & Deller, 2011).

Further research has also evaluated specifically how it is that TELs might impact municipal governments (Dye & McGuire, 1997; Dye et al., 2005; Mullins & Joyce, 1996; Preston & Ichniowski, 1991; Shadbegian, 1998; Skidmore, 1999), with these studies typically finding that municipal revenues grow at a slower rate with the existence of a TEL. Additionally, Sun (2014) concludes that while property taxes do tend to be significantly lower, this reduction is substituted with increased user charges, sales taxes, and income taxes. Brooks and Phillips (2010) and Revelli (2013) assess how grants from a central authority affect municipal expenditures in the face of certain tax limits. Here, the flypaper effect (i.e. whether or not central authority transfers actually end up being used to fund their intended projects) was much stronger and more pronounced in the face of certain types of tax or expenditure limits.

Mullins (2004) finds evidence that TELs do have a significant effect on educational funding, with the effect disproportionately and negatively impacting lower-income districts. Stallmann (2007) suggests that binding TELs on local governments simply drive those jurisdictions to find alternative revenue sources or turn to special assessment districts as fiscal stress mounts. This evidence is corroborated by Carr and Farmer (2011) who find that stricter TELs are associated with a greater number of special assessment districts in counties. However, adding nuance to this literature, the authors also find a negative effect when analysing the creation of special assessment districts by municipal governments.

Finally, and most pertinent to this current study, a large literature has addressed the relationship between various fiscal constraints, including TELs and bond markets. Here, it may be the case that TELs might negatively affect bond ratings and borrowing costs, especially to the extent that they restrict the ability to raise revenue and thereby meet

debt obligations (Kioko, 2010). However, on the flip side expenditure limits may increase credit ratings and borrowing costs to the extent that they lead to the pursuit of more time-consistent policy.

Empirical work in this vein has typically evaluated the impact that fiscal constraints have on bond ratings and yields, typically at the state level (Johnson & Kriz, 2005; Poterba & Rueben, 1999; Stallmann, Deller, Amiel, & Maher, 2012; Wagner, 2004). In general, these studies tend to find that revenue limits, especially as they become more restrictive, are associated with lower credit ratings, while expenditure limits have the opposite effect.

Overall, the literature does indicate some divergence in outcomes at both the state and local level. Therefore, this current study is an attempt to add to this growing body of literature by considering an under-researched yet highly important question. Specifically, to the extent that TELs do place greater fiscal stress and fiscal burdens on public jurisdictions, especially local jurisdictions, then this should increase the likelihood of default. This would also be true of special assessment districts, if municipal and/or county governments do tend to rely on these entities more when a TEL is present. Clearly, this channel would depend significantly on how a particular TEL is structured. As discussed above there is a clear different between tax limits and expenditure limits. As noted, tax limits tend to impose greater fiscal strains on the public-sector, whereas expenditure limits tend to have the opposite effect. In order to address these distinctions, the current study not only evaluates the overall restrictiveness of municipal TELs, it also decomposes these TELs and evaluates both the tax restrictions and expenditure restrictions. Here it is conjectured that a tax limit will increase the likelihood of default while expenditure limits will have the opposite effect.

Additionally, if local governments turn to alternative revenue sources in the face of a TEL, and if these revenue sources tend to be more volatile especially through the business cycle, then this should also increase the likelihood of default. This may be especially true with greater reliance on user fees and income taxes, especially during economic downturn. Anecdotally it would appear that there has been a tremendous shift away from property taxes as a source of local-government revenue between, 1970 and, 2005, with property taxes accounting for roughly 36 per cent of total local revenues in, 1970 and down to just under 25 per cent in, 2005, while income taxes rose from 0.9 per cent in, 1970 to roughly 1.6 per cent in, 2005.[4]

Further, local governments may also more easily circumvent a TEL with the creation of special assessment districts. These districts typically fund the particular project with revenue bonds and, as a result, face relatively higher borrowing costs, which can also increase the propensity of public sector default. Conversely, if the overall effect of a TEL leads to a reduction or less rapid increase in expenditures, this may create a more stable economic environment and may incentivize the pursuit of more time-consistent public policy. Given the above, the remainder of the paper is devoted to empirically assessing the potential for local TELs to impact this likelihood of local government default.

3 | DATA AND MODEL SPECIFICATION

Data employed in this paper come from a number of sources. The dependent variable is all municipal defaults between, 1970 and, 2005 (Figure 1) that were rated by Moody's Investor's Services (Moody's). This information is provided annually for all municipal bond defaults beginning in, 1970 in the US (Moody's Investor Service, 2015). The information provided by Moody's includes local governments, special assessment districts, counties, and other various local public sector units. Along with providing where the governmental unit is located, the Moody's publication provides the exact date at which a default occurred along with several other characteristics associated with the incident. Figure 1 gives a visual representation of the default episodes over time, while Table 1 includes a breakdown of the total defaults by state over the sample period.

As noted, there are not a particularly large number of defaults in any given year, though in the more recent past there has been an increase in the number of occurrences. This has a resulted in a pronounced positive trend

[4]Estimates based on the authors own calculations using the State & Local Government Finance database compiled by the US Census Bureau.

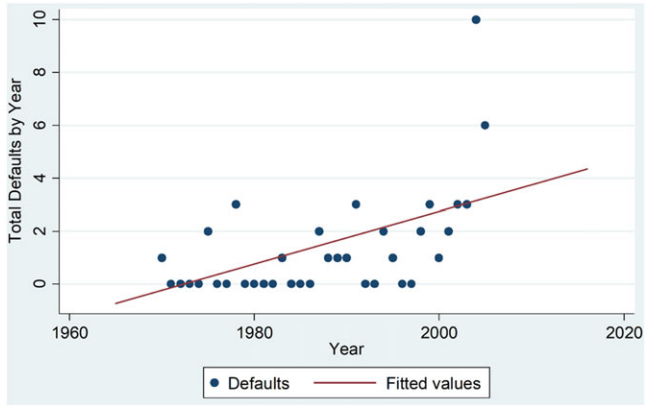

FIGURE 1 Total municipal defaults by year, 1970–2005
Source: Moody's Investor Service (2015).

TABLE 1 Total Municipal Defaults by State 1970–2005

State	Defaults	State	Defaults
Alaska	0	Montana	0
Alabama	1	North Carolina	0
Arkansas	0	North Dakota	1
Arizona	2	Nebraska	2
California	1	New Hampshire	0
Colorado	0	New Jersey	0
Connecticut	1	New Mexico	0
Deleware	0	nevada	0
Florida	1	New York	4
Georgia	1	Ohio	1
Hawaii	0	Oklahoma	0
Iowa	1	Oregon	0
Idaho	0	Pennsylvania	6
Illinois	1	Rhode Island	0
Indiana	1	South Carolina	2
Kansas	0	South dakota	0
Kentucky	1	Tennessee	1
Louisiana	0	Texas	12
Massachusetts	2	Utah	0
Maryland	1	Virginia	1
Maine	0	Vermont	0
Michigan	2	Washington	1
Minnesota	0	Wisconsin	0
Missouri	1	West Virginia	0
Mississippi	0	Wyoming	0

over this period. Further, Table 1 indicates that again, while numerous states did not experience any defaults, there is significant variation with Texas and Pennsylvania being the two states with the highest prevalence of default respectively.

The main independent variable of interest is a tax and expenditure index created by Amiel et al. (2009), which runs from the creation of a particular TEL within a state to 2005. This index expands upon what is typically a dichotomous variable employed in a number of studies to indicate whether or not a state or local government is faced with some form of a TEL. While beneficial in a number of settings, such a method of empirically accounting for the existence of a TEL can leave out a significant amount of nuance that exists within the actual laws governing a particular jurisdiction. Importantly, along with being a unique measure of state and local TELs within the US, it has also been employed in a number of additional studies (Bae & Jung, 2011; Cummins, 2013; Staley, 2015, 2017).

In creating the index, the authors consider six specific characteristics associated with each TEL, which are then given a numerical value for each of these components. As the authors note, total point values can range between '0' and '38' for the local TEL, with larger numbers corresponding to more restrictive TELs.[5] Most important, this dataset also describes the local government unit that is effected by the TEL, whether it be a county, municipality, or special assessment district.[6]

Here I aggregate the defaults up to the state level. In other words, instead of evaluating each default in its own right and including data at the municipal level, I create an independent variable of all municipal defaults within a state *i* at time *t*. This allows for an analysis that can evaluate how a particular municipal TEL within a state may or may not affect the likelihood of a municipal default event occurring.

Given the discrete count nature of the dependent variable and the significant number of no defaults I employ population averaged Poisson regression estimates.[7] The baseline model is specified as follows:

$$pr(Y_{it} = \lambda_{it}|x_{it}) = \frac{e^{-\lambda_{it}}\lambda_{it}^{y_{it}}}{y_{it}!}, \tag{1}$$

where i = 1, 2, ..., 50; t = 1970, 1971, ..., 2005. Here, y_{it} represents the dependent variable included in the model as discussed above, while λ_{it} is the Poisson parameter. The log of this Poisson parameter is specified as follows:

$$\ln\lambda_{it} = \beta' X_{it}, \tag{2}$$

where X_{it} is a vector representing all of the independent variables included within the model. From equations 1 and 2 it is possible to write the log likelihood function (L) as:

$$\ln(L) = \sum_{i=1}^{50}\sum_{t=1970}^{2005}(-\lambda_{it} + y_{it}\ln\lambda_{it} - \ln y_{it}!). \tag{3}$$

From Equation 3 parameter estimates can be obtained, while $\frac{\delta E(y_{it}|X)}{\delta X}$ nets the marginal effects for each of the variables.

Along with this baseline model, I also recode the independent variable into a dummy variable to simply represent whether or not a default occurred in a given state. This is included given the relatively low number of defaults to begin with. Thus, a '1' represents a default occurring in state *i* in year *t* while a '0' represents otherwise. From this, I also incorporate a population averaged probit model into the analysis for robustness. Along with the main independent variable of interest, I also include a number of socio-economic and fiscal control variables as these may also influence the likelihood of a default occurring. The summary statistics for all of the variables included in this paper can be found in Table 2.

[5]For a full description and discussion of this TEL index see Amiel et al. (2009).

[6]Here, only Tennessee and Massachusetts had instances where a defaulting local government unit was not bound by a TEL. There were three defaults then that were not necessarily a result of a TEL. Given such a low number, these three observations are still included in this analysis, though they were also excluded in some specifications for robustness. There was no material change in the results. Given this, and for the sake of space, these tables have been excluded from the analysis, but are available upon request.

[7]The population averaged model is employed given the fact that there were a number of states that experienced no local government defaults over the sample meaning they were time invariant.

TABLE 2 Summary statistics

Variable	Observations	Mean	Std. Dev.	Min	Max
Default	1800	0.027	0.217	0	5
Local TEL index	1800	12.674	9.493	0	38
Local property tax limit (1 = yes)	1800	0.235	0.424	0	1
Local expenditure limit (1 = Yes)	1800	0.078	0.269	0	1
Number of local governments	1800	1671.279	1462.147	19	6958.6
Population density	1800	166.17	234.961	0.53	1176.499
Real *per capita* GDP	1800	20266.17	11863.3	3271.547	62593.62
% population 65 and over	1550	11.47	2.28	2.28	18.21
Homeownership rate	1800	67.028	5.513	46.9	81.3
% unemployed	1500	5.934	2.000	2.242	17.367
Local debt to revenue	1800	94.198	38.073	26.608	317.093
Local *per capita* public expenditures	1702	3572.335	1193.665	1403.451	9827.011
NOMINATE	1800	56.934	20.199	6.514	95.58
State bond bank (1 = yes)	1800	0.143	0.351	0	1
Proactive state (1 = yes)	1800	0.16	0.367	0	1
Chapter 9 protection (1 = Yes)	1800	0.26	0.439	0	1
Northeast	1800	0.20	0.400	0	1
Midwest	1800	0.24	0.427	0	1
West	1800	0.28	0.449	0	1

First, I include a variable for the total number of local governments within a given state. Obviously, as the total number of local governments increase so will the likelihood that any given local jurisdiction will default. Thus, I expect a positive relationship to exist between this variable and total defaults. I also include several variables for fiscal capacity. These include total local debt as a percentage of revenue and also per capita public expenditures. Here, as these two variables increase, the ability to service debt or confront economic downturns tends to become more difficult. Thus, I would expect these two variables to also be positively associated with defaults. Both of these variables were collected from the State & Local Government Finance data compiled annually by the US Census Bureau.[8]

Next I include several socio-economic variables. These variables are real *per capita* GDP, population density, percentage of the population age 65 and older, homeownership rates, and unemployment rates. Each of these variables is aggregated to the state level. The first variable is drawn from the Bureau of Economic Analysis, which compiles GDP by state.[9] As *per capita* GDP rises, this should be affiliated with increased economic activity and also an increased tax base, which may alleviate fiscal pressures on public entities. Thus, this variable is expected to be negatively associated with default. The same would hold true for homeownership rates, which is also taken from data compiled by the US Census Bureau. Here, higher rates of homeownership should increase the potential property tax base, which should again act to alleviate fiscal pressures if necessary.

The final two variables are both expected to be positively correlated with defaults. Specifically, as the percentage of the population age 65 and over increases, this should lead to fewer working-age adults which would tend to reduce the tax base and also increase pressures placed on the public provision of goods. Finally, as the unemployment rate increases this should also have a positive effect on default rates. These latter two variables were obtained from US Census data and the Bureau of Labor Statistics respectively.

[8]Information is freely available at http://www.census.gov/govs/local/.

[9]These data are freely available at https://www.bea.gov/regional/.

Given the nuance that exists in regard to how state governments might react to a municipal default or the potential occurring, I also include three variables to control for certain institutional features. Each is represented as a dummy variable and is whether or not a municipal government may issue debt through a bond bank administered by its parent state, whether or not a state government is 'proactive' in the lead up to or event of a default, and whether or not a municipal government may file for Chapter 9 bankruptcy protection.

Bond banks, which currently exist in some form in ten states, are state agencies that allow municipal governments to pool bond issues and then distribute the costs associated with issuing debt across a larger portion of municipal governments. Further, in some instances state bond banks also outright cover certain costs associated with issuing debt on the open market. These cost advantages have been shown to have a positive effect on municipal borrowing costs (Robbins & Kim, 2003).

Further, state law varies substantially in the event of a default occurring. Some states allow municipalities to file for Chapter 9 bankruptcy unconditionally, while others have specific policies in place that allows state authorities to intervene directly in the event of a default and thus allows for risk sharing between a state and municipal government (Gao, Lee, & Murphy, 2017). These programmes include emergency loan programmes, revenue transfers, or restructuring of local finances. Gao et al. (2017) provide indicator variables for both Chapter 9 states and states with 'proactive' policies in place, finding that Chapter 9 states result in higher municipal yields and are more sensitive to default. Thus, I expect Chapter 9 states to be positively associated with default and proactive states negatively. Finally, I also include regional dummy variables for the four major census regions (West, Midwest, South, and Northeast), in order to control for any unobservable, region-specific characteristics.

One final issue is the potential endogeneity associated with TELs and the prevalence of default. While instrumental variables would provide a solution to the problem, there are few valid instruments that exist. Thus, as a means to overcome this problem I include two approaches. The first is to overcome the potential for some omitted third variable to be influencing the results. This would be some form of voter preference as suggested by Poterba and Rueben (1999). Therefore, I include an additional variable for voter preference. This is the NOMINATE score as compiled and described by Berry, Fording, Ringquist, Hanson, and Klarner (2012). This variable measures the ideological disposition of a state's citizenry with scores ranging from '0' (most liberal) to '100' (most conservative). By accounting for voter preference it should now be possible to overcome this issue of an omitted variable. Further, it may be the case that more defaults may actually lead to a change in the structure of a local TEL, meaning reverse causation could be an issue. Given this potential, I also include a 5-year lagged variable for the TEL index in some of the following specifications. Overall, with the inclusion of these two variables it should be possible to minimize any potential problems with endogeneity.[10]

4 | RESULTS AND INTERPRETATION

The results indicate a number of interesting outcomes. Table 3 lists the results for the overall local TEL index for both the poisson (columns (1) to (4)) and probit (columns (5) to (8)) specifications. For the Poisson model, column (1) only includes the TEL index along with the total number of local governments. Column (2) also includes population density, public debt as a percentage of revenue, *per capita* public expenditures, and the census regions. Along with those variables, column (3) also adds per capita income, the percentage of the population aged 65 and over, homeownership rates, the unemployment rate, and the indicator variables for a state bond bank, proactive states, and Chapter 9 states. Finally, column (4) uses the 5-year lagged TEL index variable and also the NOMINATE scores for each state. Columns (5) to (8) for the Probit model follow the same layout. Further, all coefficients listed in the tables are the estimated marginal effects.

Here all of the coefficients are positive and highly significant for the TEL index, while the signs of each of the control variables are generally as expected. Thus, the findings overwhelmingly indicate that as a local TEL becomes

[10]Additionally, it is important to note that TEL restrictions on local governments are determined at the state level. Thus, in this way they are, at least to some extent, exogenously determined.

TABLE 3 Overall local TEL index

Dependent variable = number of municipal defaults 1970–2005								
Variables	**(1) Poisson**	**(2) Poisson**	**(3) Poisson**	**(4) Poisson**	**(5) Probit**	**(6) Probit**	**(7) Probit**	**(8) Probit**
Local TEL index	0.00101** (0.000490)	0.00140** (0.000621)	0.00111** (0.000445)		0.000726** (0.000327)	0.00111*** (0.000390)	0.00105** (0.000410)	
5-year lagged local TEL index				0.00125*** (0.000470)				0.00121*** (0.000449)
Number of local governments (In 1,000 s)	0.0127* (0.00707)	0.0131*** (0.00364)	0.00513* (0.00271)	0.00522* (0.00272)	0.00767** (0.00304)	0.00613*** (0.00216)	0.00402 (0.00265)	0.00415 (0.00261)
Population density (In 1,000 s)		0.0277 (0.0333)	0.0345 (0.0245)	0.0366 (0.0242)		0.0154 (0.0188)	0.0382* (0.0227)	0.0403* (0.0222)
Real *per capita* GDP (In 100,000 s)			0.00119 (0.0571)	−0.00867 (0.0555)			−0.00726 (0.0535)	−0.0178 (0.0527)
% population 65 and over			−0.0896 (0.201)	−0.0936 (0.199)			−0.111 (0.189)	−0.134 (0.186)
Homeownership rate			0.00137 (0.00102)	0.00133 (0.000986)			0.00112 (0.000927)	0.00112 (0.000900)
% unemployed			−0.00144 (0.00230)	−0.00145 (0.00236)			−0.00118 (0.00192)	−0.00134 (0.00194)
Local debt to revenue (In 1,000 s)		0.332** (0.137)	0.112 (0.118)	0.100 (0.114)		0.134 (0.0821)	0.0947 (0.102)	0.0819 (0.0981)
Local *per capita* public expenditures (In 1,000 s)		0.0127*** (0.00481)	0.00392 (0.00558)	0.00389 (0.00566)		0.00918*** (0.00245)	0.00392 (0.00494)	0.00388 (0.00505)
State bond bank (1 = yes)			0.00116 (0.0132)	0.00139 (0.0129)			0.00401 (0.0122)	0.00406 (0.0118)
Proactive state (1 = yes)			−0.00210 (0.0120)	−0.00213 (0.0122)			−0.00399 (0.0104)	−0.00373 (0.0108)
Chapter 9 protection (1 = Yes)			0.00822 (0.00888)	0.00818 (0.00875)			0.00852 (0.00816)	0.00842 (0.00821)

(Continues)

TABLE 3 (Continued)

Dependent variable = number of municipal defaults 1970–2005								
Variables	**(1) Poisson**	**(2) Poisson**	**(3) Poisson**	**(4) Poisson**	**(5) Probit**	**(6) Probit**	**(7) Probit**	**(8) Probit**
NOMINATE				1.14e-05 (0.000179)				3.14e-05 (0.000173)
Northeast		−0.0247 (0.0185)	0.00215 (0.0146)	0.00107 (0.0144)		−0.00874 (0.0115)	−0.00190 (0.0125)	−0.00260 (0.0121)
Midwest		−0.0432*** (0.0147)	−0.0138 (0.0134)	−0.0134 (0.0134)		−0.0194** (0.00954)	−0.0109 (0.0116)	−0.0105 (0.0116)
West		−0.0725*** (0.0219)	−0.0289** (0.0117)	−0.0288** (0.0114)		−0.0441*** (0.0111)	−0.0282*** (0.0104)	−0.0282*** (0.0106)
Observations	1,800	1,702	1,250	1,250	1,800	1,702	1,250	1,250

Notes: Standard errors clustered by state in parentheses. Listed coefficients are marginal effects. ***p < 0.01, **p < 0.05, *p < 0.1.

TABLE 4 Local property tax limit

Dependent variable = number of municipal defaults 1970–2005								
Variables	**(1) Poisson**	**(2) Poisson**	**(3) Poisson**	**(4) Poisson**	**(5) Probit**	**(6) Probit**	**(7) Probit**	**(8) Probit**
Local property tax limit (1 = Yes)	−0.00467 (0.0113)	0.0160 (0.0126)	0.0213* (0.0112)		0.000132 (0.00761)	0.0112 (0.00721)	0.0182* (0.00962)	
5-year lagged local property tax limit (1 = Yes)				0.0218* (0.0112)				0.0187* (0.00966)
Number of local governments (ln 1000s)	0.0128* (0.00696)	0.0153*** (0.00392)	0.00599* (0.00310)	0.00616** (0.00306)	0.00826*** (0.00303)	0.00759*** (0.00236)	0.00471 (0.00289)	0.00492* (0.00285)
Population density (ln 1,000 s)		0.0354 (0.0344)	0.0351 (0.0249)	0.0355 (0.0247)		0.0189 (0.0190)	0.0375 (0.0228)	0.0374* (0.0225)
Real *per capita* GDP (ln 100,000 s)			0.0390 (0.0627)	0.0408 (0.0630)				
% population 65 and over			0.0293 (0.203)	0.0298 (0.204)			0.0232 (0.188)	0.0211 (0.191)
Homeownership rate			0.000553 (0.00102)	0.000577 (0.00101)			0.000363 (0.000908)	0.000406 (0.000894)
% unemployed			−0.00194 (0.00234)	−0.00212 (0.00244)			−0.00147 (0.00193)	−0.00166 (0.00201)
Local debt to revenue (ln 1000s)		0.348*** (0.131)	0.222* (0.116)	0.224** (0.114)		0.144* (0.0854)	0.188* (0.104)	0.189* (0.102)
Local *per capita* public expenditures (ln 1000s)		0.0144*** (0.00486)	0.00130 (0.00543)	0.00117 (0.00532)		0.0105*** (0.00264)	0.000983 (0.00471)	0.000851 (0.00461)
State bond bank (1 = yes)			0.00115 (0.0148)	5.47e-05 (0.000194)			0.00353 (0.0132)	7.13e-05 (0.000184)
Proactive state (1 = yes)			−0.00133 (0.0134)	0.00159 (0.0146)			−0.00179 (0.0114)	0.00392 (0.0130)
Chapter 9 protection (1 = yes)			0.00514 (0.00990)	−0.000944 (0.0125)			0.00634 (0.00888)	−0.00139 (0.0107)

(Continues)

TABLE 4 (Continued)

Dependent variable = number of municipal defaults 1970–2005								
Variables	**(1) Poisson**	**(2) Poisson**	**(3) Poisson**	**(4) Poisson**	**(5) Probit**	**(6) Probit**	**(7) Probit**	**(8) Probit**
NOMINATE				0.00532 (0.00986)				0.00659 (0.00903)
Northeast		−0.0333* (0.0182)	−0.00184 (0.0141)	−0.00219 (0.0135)		−0.0135 (0.0105)	−0.00637 (0.0124)	−0.00652 (0.0119)
Midwest		−0.0483*** (0.0152)	−0.00843 (0.0133)	−0.00842 (0.0133)		−0.0197** (0.00975)	−0.00571 (0.0117)	−0.00569 (0.0116)
West		−0.0753*** (0.0259)	−0.0296** (0.0136)	−0.0286** (0.0133)		−0.0413*** (0.0125)	−0.0274** (0.0117)	−0.0264** (0.0115)
Observations	1,800	1,702	1,250	1,250	1,800	1,702	1,250	1,250

Notes: Standard errors clustered by state in parentheses. Listed coefficients are marginal effects. *Per capita* GDP excluded from probit results due to collinearity. ***p < 0.01, **p < 0.05, *p < 0.1.

TABLE 5 Local expenditure limit

Dependent variable = number of municipal defaults 1970–2005								
Variables	**(1) Poisson**	**(2) Poisson**	**(3) Poisson**	**(4) Poisson**	**(5) Probit**	**(6) Probit**	**(7) Probit**	**(8) Probit**
Local expenditure limit (1 = Yes)	−0.0254 (0.0191)	−0.0218 (0.0254)	−0.0176 (0.0260)		−0.0158 (0.0120)	−0.0170 (0.0167)	−0.00792 (0.0212)	
5-year lagged local expenditure limit (1 = yes)				−0.0145 (0.0236)				−0.00576 (0.0203)
Number of local governments (ln 1,000 s)	0.0129* (0.00709)	0.0148*** (0.00422)	0.00489 (0.00309)	0.00488 (0.00304)	0.00844*** (0.00310)	0.00775*** (0.00272)	0.00389 (0.00294)	0.00395 (0.00287)
Population density (ln 1,000 s)		0.0433 (0.0377)	0.0500 (0.0357)	0.0454 (0.0319)		0.0270 (0.0201)	0.0436 (0.0300)	0.0412 (0.0279)
Real *per capita* GDP (ln 100,000 s)			0.0446 (0.0592)	0.0524 (0.0584)			0.0415 (0.0557)	0.0469 (0.0556)
% population 65 and over			0.0292 (0.213)	0.0439 (0.204)			0.0414 (0.196)	0.0433 (0.191)
Homeownership rate			0.00116 (0.00105)	0.00109 (0.00101)			0.000656 (0.000933)	0.000639 (0.000900)
% unemployed			−0.000289 (0.00211)	−0.000333 (0.00221)			−7.50e-05 (0.00178)	−0.000143 (0.00185)
Local debt to revenue (ln 1000s)		0.318*** (0.123)	0.174 (0.116)	0.177 (0.114)		0.125 (0.0814)	0.151 (0.0984)	0.154 (0.0963)
Local *per capita* public expenditures (ln 1,000 s)		0.0140*** (0.00471)	0.00265 (0.00510)	0.00216 (0.00487)		0.0105*** (0.00258)	0.00150 (0.00425)	0.00115 (0.00406)
State bond bank (1 = Yes)			0.00225 (0.0148)	2.90e-05 (0.000180)			0.00475 (0.0132)	5.07e-05 (0.000179)
Proactive state (1 = Yes)			0.00836 (0.0121)	0.00251 (0.0146)			0.00637 (0.0112)	0.00513 (0.0131)
Chapter 9 protection (1 = Yes)			0.0145 (0.0106)	0.00840 (0.0120)			0.0128 (0.00923)	0.00673 (0.0111)

(Continues)

TABLE 5 (Continued)

Dependent variable = number of municipal defaults 1970–2005								
Variables	**(1) Poisson**	**(2) Poisson**	**(3) Poisson**	**(4) Poisson**	**(5) Probit**	**(6) Probit**	**(7) Probit**	**(8) Probit**
NOMINATE				0.0140				0.0127
				(0.0103)				(0.00928)
Northeast		−0.0357*	−0.0112	−0.0110		−0.0174	−0.0134	−0.0134
		(0.0187)	(0.0128)	(0.0127)		(0.0107)	(0.0124)	(0.0122)
Midwest		−0.0455***	−0.00645	−0.00641		−0.0177*	−0.00413	−0.00413
		(0.0149)	(0.0126)	(0.0127)		(0.00923)	(0.0113)	(0.0112)
West		−0.0562**	−0.0162	−0.0164		−0.0301**	−0.0163*	−0.0163*
		(0.0231)	(0.0116)	(0.0113)		(0.0125)	(0.00968)	(0.00954)
Observations	1,800	1,702	1,250	1,250	1,800	1,702	1,250	1,250

Notes: Standard errors clustered by state in parentheses. Listed coefficients are marginal effects. ***p < 0.01, **p < 0.05, *p < 0.1.

more restrictive it also tends to increase the likelihood that any given municipal government will default. However, given the nature of the TEL index, it is difficult to interpret what the exact magnitude is. As a way to better interpret these coefficients, the findings indicate that a one standard deviation increase in the TEL index is associated with an increased likelihood of a municipal default anywhere between 0.96 per cent and 1.3 per cent for the Poisson model depending on the specification, with the probit estimates similar as well.

This suggests that while the relationship between relatively more restrictive TELs and default is statistically significant, the magnitude is relatively small. The finding may provide a number of important implications and avenues for future research, to be discussed in greater detail below. Next, I break the TEL index down into several subcomponents to see how specifically tax limits and expenditure limits might affect the overall likelihood of default. Tables 4 and 5 include these results.

The layout of both of these tables follow that of Table 3. In Table 4 I create a dummy variable to represent whether or not a strict property tax limit was in place on municipal governments represented by a '1' if yes and '0' otherwise. This variable is again derived from the dataset compiled by Amiel et al. (2009) and corresponds to what they consider to be the most restrictive component of a TEL: whether or not there was an overall property tax limit.

With the breakdown of this TEL index into a particular subcomponent it is now possible to better understand which aspect of TELs in general might be having a particular effect. Here the results indicate that a strict property tax limit is positively associated with an increased likelihood of municipal default. Specifically, the coefficients are positive in seven of eight specifications (with only the result in column (1) – when no control variables are included – slightly negative), with four of those eight results statistically significant (in columns (3) and (4) and (7) and (8), both of which include most or all control variables). However, again these coefficients are not particularly large in magnitude, with the existence of a property tax limit increasing the likelihood of a default anywhere between 0.67 per cent and 0.90 per cent depending on the particular specification.

Finally, Table 5 includes a dummy variable for whether or not municipal governments within a given state faced an expenditure limit. This is again taken from the database compiled by Amiel et al. (2009) and corresponds to the existence of a 'general expenditure limit' in that dataset. Again, the variable is represented by a '1' if the constraint exists and '0' otherwise. The existence of a local expenditure limit is consistently associated with a lower likelihood of municipal default. However, here once again none of the results appear to be very large in magnitude, nor are any of the results statistically significant.

Overall then, these findings suggest a number of important implications. First, while there are many negative unintended consequences, both real and potential, associated with state and local TELs, based on this current study it does not appear that one of them is a significantly higher risk of local government default. Though the risk does tend to increase, the magnitude is relatively negligible. While it was noted that a number of authors found evidence that the existence of a TEL tends to lead to revenue shifting by local governments and may even retard economic growth at the state level, neither of these possible outcomes seems to translate into a greater risk of default.

Further, while property tax limits and expenditure limits tend to increase and decrease the likelihood of default respectively, again neither appears to have a large effect. Given this then, while there may be many merits and demerits that policy-makers should consider when deciding whether or not to adopt or impose a TEL, especially on local governments, based on this current study there is little evidence that the potential for an effect on default rates should be a concern. Thus, greater focus should be placed on determining how it might be possible to better overcome other potentially negative unintended consequences that have been shown to be associated with TELs where they exist.

5 | CONCLUSION

This research has evaluated the extent to which the restrictiveness of TELs placed on local governments might impact the likelihood of default. With data on municipal default and an index of TEL restrictiveness developed by Amiel et al.

(2009), the evidence suggests that relatively more restrictive TELs imposed on local government jurisdictions do, in fact, tend to lead to an increased likelihood of default. This result is robust to a number of specifications. However, while the likelihood of default does increase as a TEL becomes more binding and restrictive, the magnitude does not appear to be very large. Specifically, the coefficients indicate that a one standard deviation increase in the TEL index would result in roughly a 1 per cent increase in the likelihood of default, depending on the specification.

Overall then, these findings should add important nuance to the literature and provide researchers with important and additional opportunities for future research. Some additional research questions that these findings could provide would be the exact causal mechanism through which this occurs. Specifically, to what extent did changing revenue structures matter given the outcomes observed? Further, how might these changing revenue sources have been relatively more or less stable through the business cycle and through times of fiscal distress, which could have also played a heavy role in the likelihood of default. An additional question would be to assess whether or not relatively fiscally unstable jurisdictions (and thus those at greater risk of default) had restrictive TELs placed on them and whether or not such a circumstance helped or hindered them moving forward, and especially whether such a circumstance may have augmented or mitigated the potential for default. While beyond the scope of this current study, these considerations would be worthy of future research.

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Resumen. Los efectos económicos de los límites de impuestos y gastos (TEL, por sus siglas en inglés) se han estudiado a menudo en la literatura. Sin embargo, pocos estudios han abordado la forma en que los TEL podrían influir en la propensión de una jurisdicción a incumplir sus obligaciones. Este estudio llena ese vacío específico. En general, los resultados indican que, si bien la probabilidad de incumplimiento aumenta a medida que los TEL se vuelven más restrictivos, la magnitud no es particularmente grande. Una vez desagregados, parece ser que los límites del impuesto sobre inmuebles aumentan la probabilidad, mientras que los límites en el gasto tienen el efecto contrario, aunque este último resultado no es significativo. Los resultados son robustos respecto a una serie de especificaciones y ofrecen posibles implicaciones para las políticas.

抄録: 税および支出に関する制限事項 (tax and expenditure limits: TELs)の経済効果については、これまでに多数の論文において検討されてきた。しかし、TELsがどのように租税管轄が債務不履行に陥る傾向に影響を与え得るのかについて取り組んだ研究はほとんど行われておらず、本研究は特にその空白を埋めるものである。概して、結果からTELsによる制限が強くなるほど債務不履行に陥る確率が上昇するものの、その規模は特に大きいわけではないことが指摘される。分析によると、固定資産税の制限が債務不履行に陥る確率を上げ、一方で支出の制限はその反対の効果があると考えられるが、後者の結果は取るに足らないものである。この知見は、多数の仕様に対して頑健であり政策的な意義を有すると考えられる。