Effects of State-Imposed Tax and Expenditure Limitation on Municipal Revenue Structure: A Legal Approach

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Chapter 1: Introduction

1.1 Statement of the Problem

Fiscal policy makers of local governments operate within a confined decision environment that defines the range of their options available. As Pagano and Hoene (2010) point out, not only institutional constraints but also levels of local demand shape the policy space within local governments make fiscal policies. To understand how an institutional constraint affect local finance, it is important to take into account not only the mechanism through which the constraint is imposed, but also the interaction between the constraint and the local financial structure. Using state-imposed tax and expenditure limits (TELs) as an example, this study demonstrates a way to understand the constraint from a legal perspective, and proposes a new way of examining TEL stringency by taking into account both the differences in TEL terms and conditions, and the local property tax level.

Among various institutional constraints, TELs imposed by state governments on local jurisdictions are an important institutional factor that shapes local fiscal policies to a great extent. TELs set limits on property tax rates, assessment growth, property tax levies, and in some states restrict the level of general revenue collected by local governments. Although there is abundant literature exploring the effects of TELs on local revenue structures and service provision, most of the research only includes the mere existence of different types of TELs in the analysis, and fails to acknowledge different aspects of TELs or their evolution over time.

It has been almost four decades since the Tax Revolt movement that brought out various limitations on government revenue raising power, and some states wrote limitations into their constitutions years before the Tax Revolt. Each piece of TEL legislation specifies how limitations are imposed on local governments, and such specifications not only vary across states

but also across time. These subtle modifications to specific TEL terms play important roles in determining the extent to which TELs constrain the revenue-raising capacity of local governments. However, current TEL literature only takes into account the existence of a certain type of the limitation and use the TEL type as the sole basis for measuring the TEL restrictiveness, and therefore overlooks how specific limitation terms affect the TEL stringency, or whether the limitation has been tightened or loosened over time.

A comprehensive review of TELs and their evolution over time is needed if one is to understand the mechanism through which TELs affect local fiscal policy making. This study aims to fill in the knowledge gap by conducting a comprehensive review of various TEL aspects and their changes over time with a legal approach. The TEL law data will then be coded and used to investigate the TEL effects on municipal fiscal policies.

1.2 Research Question

This study investigates the effects of state-imposed TELs on municipal revenue structure with both qualitative and quantitative methods. It focuses on TELs on property tax revenues. It takes a novel legal approach to examine aspects of TELs that have not been explored in previous studies, as well as their evolution over time. These aspects include TEL types, tax base to which the limitation is applied, the fiscal growth factor used to set the limits, conditions under which a limit can be lifted, as well as the legislative procedure to override a limitation. By retroactively tracking the changes made to TEL laws over time, the exercise of legal review produces a panel data set on all state-imposed TEL on municipalities for analysis.

State constitutions, statutes and regulations are examined to identify TELs and describe the aspects discussed above. In addition, session laws are used to track changes made to the laws pertaining to specific TEL terms. After a bill is passed during a legislative session, it becomes a

session law, and may later be codified (i.e., assigned with a law number) into a statute. A session law is binding (even if it is never subsequently codified) and is therefore as equally enforceable as the provisions of a state constitution or codified statute or regulation. Using session laws to collect TEL data can effectively capture the full scope of changes made to TELs over time, thereby enhancing the accuracy and comprehensiveness of the data.

I coded TEL law data and investigated the effects of TELs on municipal revenue structure, including reliance on different revenue sources and revenue diversification. I developed a novel index, TEL leeway, to indicate the gap between the maximum levy allowed by state-imposed TELs and the actual level of property tax levy collected by municipalities. This index measures the TEL stringency by taking into account both the cap rate and city-specific conditions. TEL leeway is constructed using maximum allowable rates for growth collected from TEL laws, and assessed values and tax levy collected from the Comprehensive Annual Financial Reports issued by each city.

The findings suggest that stringent TELs result in higher revenue reliance on non-tax sources such as user fees, and do not increase the reliance on alternative tax sources such as sales taxes. However, the extent to which TEL stringency affect revenue structure is very small. The results of the analyses using TEL leeway are different from ones using the conventional binary variable approach, which indicates higher reliance on both sales taxes and user fees due to TELs. In short, this study provides the field of public finance with richer information on the evolution of TEL laws, and proposes a new way of measuring TEL stringency by taking into account the differences in TEL terms and conditions across states, as well as the actual levy level of a municipality. The different findings using different TEL measurements also suggest a more complex fiscal policy making process in reaction to TELs.

1.3 Significance of the Study

Rosenbloom (1983) proposes a legal perspective to examining public administration in addition to the political and managerial perspective. With a political approach, the field of Public Administration grows by first searching for answers to the grand question, "what is the relationship between politics and public administration?", and by acknowledging the role of public administrators in the policy making process. A managerial approach integrates knowledge developed by behavioral sciences such as management and psychology, and explores the ways in which public values such as efficiency, effectiveness, and equity can be realized in the context of public organizations. In contrast, a legal approach highlights the importance of procedures of law making and the role of judiciary in the policy formulation process. Compared to the political and managerial approaches, it remains as a route less traveled and yet has great potential. Taking advantage of the interdisciplinary roots of Public Administration, this study employs economic, political science, and legal perspectives to examining how TELs affect local fiscal policy making. The study will make contribution in the following ways.

First, it documents the variations of TELs in different procedural and technical aspects and how they evolve over time. It supplements current TEL data with the subtle and yet important details that have not been included in previous empirical research. The result of data collection updates the Advisory Commission on Intergovernmental Relation's (1995) report that has been the main data source about TELs, and extends the scope of current TEL research by examining various aspects of TEL terms and conditions that affect the stringency, which in turn influences municipal revenue-raising.

Second, the construction of TEL leeway more accurately measures the limit stringency than using only binary variables of TEL types. A limit is not restrictive if it is set at a level so

high that actual property tax growth will be never making it binding. TEL leeway takes into account not only the different ceiling rates imposed by different states, but also the varying level of property tax revenue across cities. As such, the TEL leeway index attempts to unpack differences in TEL terms and conditions and measure the stringency based on cities' tax levy levels.

Third, the study introduces the legal research method to policy research. Policies are enacted in the form of laws. The legal review conducted in this study demonstrates the richness of information embedded in the actual legal language, and contributes to the field by suggesting a comprehensive and replicable method for legal data collection that can be applied to studies on other policy topics.

1.4 Organization and Overview

The dissertation is organized as follows. Chapter 2 presents the theoretical framework and reviews of literature on TELs that informs this study. Chapter 3 discusses the methods used by this study, including legal research, TEL leeway construction, sample, and measurements. Chapter 4 reports the findings of content analysis on TEL laws. Chapter 5 reports the results from predictive models that analyze effects of TEL leeway on various aspects of revenue structure. Chapter 6 discusses the policy implications of the findings. Chapter 7 presents the analysis of TELs' effects using the dummy variable approach, and compares the results with the TEL leeway analysis. Chapter 7 concludes. All tables and figures are presented in the end of the paper.

Chapter 2: Theoretical Framework & Literature

2.1 Overview of TELs

2.1.1 Definition of TELs

TELs impose limitations on the extent to which a government can collect revenue or make expenditures. TELs can be authorized and enforced at different levels of government. State-level TELs are ones that a state government imposes on itself, restricting the level or growth of state government from revenue and/or spending. State can also impose TELs on local governments (including counties, cities, school districts, and other special districts), setting limits upon the revenues local governments can collect. These limits are usually applied to property taxes, or total general revenues in some states (e.g. California, Arizona, and Colorado). In addition, local governments can also impose TELs on themselves, referred to as "locally-imposed TELs", as a way for local voters to self-regulate their revenue-raising capacity. State-imposed TELs on local governments are the focus of this study. Therefore, the following use of the term "TELs" refers to this category unless otherwise specified.

Joyce and Mullins (1991) and the now defunct ACIR (1995) provide a commonly used classification of TELs. According to ACIR, there are six types of TELs: (1) *overall property tax rate limits* that apply to the aggregate tax rate of all local governments, (2) *specific property tax rate limits* that apply to specific types of local jurisdictions or narrowly defined service areas, (3) *Property tax levy limits* that constrain the total amount of revenue that can be raised from the property tax, usually enacted as an allowable annual percentage increase in the levy, (4) *Limits on assessment increase* that control local governments' ability to raise revenue through reassessment of property that escalates the property values, (5) *Limitation on general revenue or general expenditure increase* that cap the total amount of revenue (rather than only property tax

revenue) that can be collected or constrain spending during the fiscal year, (6) *full disclosure/truth-in-taxation* that requires public discussion and specific legislative vote before enactment of tax rate or levy increases.

ACIR (1995) indicates that limits on annual increases in property tax levies and general revenue and expenditure are most binding because they impose a fixed ceiling of the revenue collected. At the other extreme, full disclosure is a minimal constraint that requires only a public hearing and a simple majority vote by the legislative body to override and raise a property tax levy. Based on this classification, Mullins and Wallin (2004) develop a scale of TEL restrictiveness, and distinguish between non-binding TELs and potentially binding TELs. The total property tax levy is the product of tax rate and assessed market value of properties within a jurisdiction. The existence of either limits on the property tax rate or limits on the growth rate of assessed value only has a non-binding effect, because a limit on the property tax rate can be circumvented by increasing the assessed property values, and vice versa. Similarly, full disclosure has a non-binding effect as well, for it only specifies the procedure through which the tax rate or levy is increased rather than imposing restrictive a revenue cap. On the contrary, both the limits on levy and limits on general revenue and expenditure are potentially binding because they directly impose a fixed revenue ceiling. The combination of property tax rates and assessment increase is equivalent to a limit on property tax levy, and therefore has a binding effect. Note that in this scale, only the TEL type, or the basis to which limitation is applied is taken into account for determining the TEL restrictiveness. As Section 2.2 and 2.3 discuss in detail, other aspects of TEL, such as the fiscal growth factor, exemption terms, and the override provision, also affect the restrictiveness in implementation. This is the knowledge gap this study strives to fill.

2.1.2 Motivation of TEL Enactment

The TEL enactment has many objectives. Lowery and Sigelman (1981) offer several explanations for the tax revolt that brought about the emergence of TELs. The first one is based on a narrowly defined rationality model in which the individual's demand for government taxes and expenditures is a function of self-interest, inferred from the individual's demographic characteristics. However, little empirical evidence lends support for this model, despite its wide application as a basic assumption in the economics literature (Mariotti, 1978). The second explanation is concerned with citizens' dissatisfaction with the tax system. The tax revolt movement can be viewed as an outlet for venting grievances against the government taxes, a reaction to the perceived rampant waste and inefficiency in the public sector (Mushkin, 1979; Lucier, 1980), and an action taken by home owners to address distributional inequity for they believe they shoulder a growing share of the public financial responsibility (Shapiro, Puryear, & Roo, 1979). The third explanation employs a political perspective and views the support for the tax revolt as a matter of ideology, or a symbolic challenge to 50 years of New Deal Liberalism (Musgrave, 1979). It is also a reflection of declining confidence in government. Clearly, this explanation overlaps with the previous two; it is plausible that a self-interest citizen would prefer less tax paid, and conservatives may be more likely than liberals to view the level of taxation of the scope of the government as excessive and its use of taxes as inefficient.

Although these explanations approach the tax revolt from different perspectives, what they share in common is the desire to reduce the size of a perceived bloated government (Lowery, 1983), which becomes the goal for TEL enactment. The school of public choice views the government as a greedy Leviathan that consumes taxpayers' monies endlessly (Brennan & Buchanan, 1979), and holds that public officials, if enabled, would expand the public sector

through creation of fiscal illusion (Buchanan & Wagner, 1977), public employee block voting (Tullock & Buchanan, 1977), and bureau control of information about true costs of public service (Niskanen, 1971). Therefore, the passage of TEL laws are legislature's attempts to guard against a wasteful and inefficient government by devising a set of institutional arrangements that set limits on the maximum revenue a government can collect. With such arrangements, the public can obtain the benefits of government action, while minimizing the risk of monopoly exploitation by Leviathan (Brunori et al, 2008). Therefore, it is important to clarify that the goal of TEL enactment is to curtail the growth of government, but not to limit public service citizens can receive (Levine, 1980).

To this end, the evaluation of whether TELs achieve this goal thus lies in their impacts on both the spending and tax burden. This study will investigate both the spending level and revenue structure as outcomes of TEL changes. The impact on municipal financial conditions will also be examined.

2.2 TEL Research Development

2.2.1 Data Sample & Units of Analysis

Table 1 summarizes the research designs and key findings from 24 empirical studies and illustrates the development of TEL research. For starters, all of the studies examine TELs over a period of time; although the periods examined in some studies are longer than others (e.g., 36 years in Sun, 2014, 2 years in Poterba & Rueben, 1995), Almost no study uses a cross-sectional data that is only focused on the association between TELs and fiscal outcomes at one point of time. The only exception is Skidmore, Ballard, and Hodge (2010), which relies on a one-time survey of Michigan homeowners to investigate how the effective property tax rates due to the limits on assessed property values affect the tax burden on homeowners. The underlying

assumption here is that the effects of TEL will become increasingly evident over time. To further the understanding of the short-term and long-term effects of TELs, Dye and McGuire conducted another study on Illinois local governments eight years after their initial analysis (Dye and McGuire, 1997; Dye, McGuire, & McMillen, 2005). Although the study periods, types of government, and model specifications are different in the two studies, the authors confirm that the property tax growth rate in Illinois is effective in slowing the growth of local expenditures, and such effect becomes stronger in the long run.

As for units of analysis, while some earlier studies aggregate local finance data to the state level (Mullins & Joyce, 1996; Skidmore, 1999), the recent studies are able to gain more in-depth understanding of local fiscal policies by using individual local government data. There is also variation in the type of local government examined, including counties (Johnston, Pagano, & Russo, 2000), cities (Preston & Ichniowski, 1991; Chapman & Gorina, 2012), and school districts (Nguyen-Hoang, 2013). Some studies examine cities from one state (Bradbury, Mayer, & Case, 2001), whereas others draw a national sample in order to reach a more generalizable conclusion (Sun, 2014). Few studies compare how different types of government respond to limits on property taxes differently besides Dye et al (2005), which finds the effect on to be greater on school districts than on municipalities in Illinois. However, cities are often the focus to examine how TELs contribute to the change of local revenue structure. One possible reason for this choice of units of analysis is that cities have access to more revenue sources and even have authority to levy new taxes, whereas school districts mainly rely on property taxes and user charges.

2.2.2 Methods

One can find that econometric analysis to be a dominating method used to investigate this research topic, while case studies have also been used to gain a more in-depth understanding about the mechanism through which TELs affect local fiscal policy making. For example, Sun (2014) examines TELs' effects on local revenue measured by per capita general own-source revenue. A panel data on 724 cities with population greater than 250,000 from 1970 to 2006 is used as the sample for her study. Similar to Shadbegian (1999), she uses the rate at which voters are able to pass citizen initiatives in a state as an instrument for TEL enactment, and finds that TELs lead to reduction in per capita property taxes and increases in sales taxes, income taxes, and user charges per capita. The total increases in per capita non-property taxes exceed the reduction in per capita property taxes, resulting in a net gain of $855 in per capita municipal general own-source revenue.

In contrast, Saxton, Hoene and Erie (2002) conduct case studies on five local jurisdictions in the county of Los Angeles, including the county, the City of Los Angeles, and three suburban communities. With in-depth examination of the fiscal policies adopted by these jurisdictions and interviews with the local officials, the authors find that there are three general phases of the post-Proposition 13 fiscal regime: bailout (1978-1981), institutionalization and transition (1981-1991), and readjustment (1991-2002). The study shows that the local governments, depending on their varying degrees of resource abundance, respond to TELs differently. The city chooses to diversify revenue sources, cuts non-essential services, and makes recovery-based financial decisions, and relies more on economic growth, whereas suburban cities turn to short-term policy options based on the community affluence and demand for services. Compared to econometric analyses like Sun (2014), studies using qualitative research

methods are able to provide more insight of the municipal responses to TELs from a policy maker's point of view.

2.2.3 Endogeneity Treatment

More recent studies take on the challenge of addressing the endogeneity issue of TELs. These researchers acknowledge the underlying political culture that drives both the revenue and spending level and the TEL enactment. In other words, the enactment of TELs may be due to certain underlying voter attributes that affect both the enactment of TELs and fiscal policy outcomes; thus, a correlation between TELs and the fiscal outcome may not indicate a causal relationship as they both result from certain voter preferences (Poterba & Rueben, 1995; Rueben, 1996; Shadbegian, 1999).

To address this issue, Dye and McGuire (1997) used the enactment of levy cap on Illinois local jurisdictions in 1991 as an opportunity for natural experiment, and examined the effects of levy cap on property tax per capita in all types of local governments from 1998 to 1993. They found that the growth rates of property taxes are diminished due to the levy limit, and the effects appear to be stronger in the long term. Lowery (1983) uses a similar approach to investigate the TEL effects on spending in 12 states from 1957 to 1976. Clair (2012) uses 113 counties in Colorado as the treatment group, and 92 cities in Wyoming, 102 cities in Connecticut, and 144 cities in New Hampshire as the control, and employs difference in differences to examine expenditure volatility due to TELs. The results suggest that expenditure becomes more volatile when a government shifts to more elastic revenue sources in response to TELs.

Instrumental variable approach is also common for addressing TEL endogeneity (Chapman & Gorina, 2012; Shadbegian, 1998; Skidmore & Tosun, 2011). The instrumental variables are usually some measures for local political culture, such as whether referenda are

allowed in the local jurisdiction (Shadbegian, 1999; Sun, 2014). Some scholars use the measures for community characteristics, such as form of government (Chapman & Gorina, 2012) and demographics and housing desirability (Bradbury, Mayer, & Case, 2001). Nguyen-Hoang (2013) and Dye et al (2005) also supplement this approach with propensity score matching.

2.2.4 Measurement of TELs

The measurement of TELs relies greatly on binary variables to indicate the existence of a certain limit type. The report on TELs conducted by ACIR (1995) remains the key data source. Some studies use the number of years after TEL enactment to measure how certain revenue limits affect the change of revenue and/or expenditure over time (Dye et al, 2005; Nguyen-Hoang, 2013), whereas a few studies use the outcome of the taxation limit (e.g., cap on the assessment growth) to indicate its effect (Merriman, 1986; Skidmore & Tosun, 2011). Merriman (1986) measures the effect of New Jersey cap on municipal spending by calculating the differences between the predicted spending level without the cap and the actual spending. Skidmore and Tosun (2011) use the ratio between state equalized value (SEV) and taxable value (TV). The growth of SEV is limited by the assessment limit of Michigan, whereas TV rises with the housing prices. The ratio of SEV to TV therefore captures the effect on tax erosion due to the state-imposed assessment limit, and it varies across local jurisdictions within Michigan because of the differences in housing markets.

Qualitative studies (Sokolow, 2000; Saxton et al, 2002) provide more details about the process through which TELs were enacted, circumvented, and repealed. For example, Sokolow (2000) points out that there are two kinds of policy environments underlying the tax revolts in the western states: one sparked by the rhetoric of populist leaders who mobilize the voters, and the other built by deliberate actions of governors and legislatures. The former is more likely than

the latter to produce severe measures through ballot campaigns. However, such variation in the TEL legislative process has not yet been incorporated in any predictive model. The contribution of this study is to collect richer data on various aspects of TELs and to examine their effects on local finance. Section 2.3 discusses this point in detail.

2.3 Hypothesis Development

This section discusses TELs' effects on various aspects of revenue structure, and the hypotheses to be tested in this study informed by previous literature. The significance of municipal revenue structure is two-fold. First, the reliance on alternative revenue sources may have a mediating effect between TEL restrictiveness and spending. There is lack of consensus in regards of whether TELs reduce the local spending level. Shadbegian (1998), using the degree of monopolization of government as an instrument to control for endogeneity between TEL enactment and government spending, finds that TELs lead to reductions in the growth of local government revenue and expenditure. Poterba and Rueben (1995) use employment of the public sector as an indicator for government growth, and also find that property tax limits curb the wage growth of local government employees.

On the contrary, Joyce and Mullins (1991) find TELs to have little impact on the relative amount each government level spends. TELs are only partially effective in reducing revenues when political agents can bypass limitations by transferring revenue reliance to less constrained sources (Skidmore, 1999). Lowery (1983) and Culter, Elmendorf, and Zeckhauser (1999), using different methods and samples, both find that although TELs lead to less reliance on property taxes, their effects on total municipal revenue are negligible when there are additional state aid and alternative local revenue sources available. Joyce and Mullins (1991) also show that state-imposed TELs result in increase in state aids and user fees. Dye, McMillen, and Merriman (2006)

find that the assessment growth cap introduced in Cook County, Illinois results in the increase in other tax revenues. The revenue loss due to the cap on assessed values of residential properties is offset by increased taxes for industrial and commercial property owners. Investigating the effects of TELs on revenue structure can help us understand the mechanism through which TELs affect municipal expenditure, and provide an explanation to the mixed findings about the TEL effect on local spending.

Second, shifting revenue reliance onto the sources that are more susceptible to the external economic environment also influences local financial condition because it increases the revenue procyclicality. Stallmann and Deller (2011) examine TELs' effects on business climate and performance, and find that although there is no evidence that TELs are associated with higher levels of economic performance or business climate, there is limited evidence that they are associated with a poorer business climate and lower economic performance. McCubbins and Moule (2010) also argue that property tax limits have detrimental effects on state and local revenues during recessions, because they cause states to rely on income-elastic revenue sources, such as the income tax or charges and fees. Greater reliance on these revenue sources results in greater revenue declines during economic downturns. Clair's (2012) analysis of the impact of Colorado's 1992 Taxpayer's Bill of Rights (TABOR) on the stability of government revenues support this notion; the results from the difference-in-difference estimation suggest that TELs increase revenue and expenditure volatility.

TELs also contribute to transforming the vertical fiscal structure of state–local relations. The reliance on state aid facilitates centralization and the transfer of services from the local to state level. Aggregating local revenues to the state level, Mullins and Joyce (1996) find that binding TELs are positively related to state responsibility for spending especially for education.

Further, the magnitude of the positive effect of TELs on state expenditure increases over time, and indicates an increased level of reliance and service centralization. Saxton, Hoene, and Erie (2002) also suggest that by imposing structural constraints on local government fiscal decisions, TELs reduced local discretion and autonomy and increased centralization of state and local finances. Based on case studies on the revenue change in nine western states, Sokolow (2000) goes even further and indicates, "We can no longer characterize the property tax as a locally determined revenue source in many states; rather, it resembles more a fiscal tool of the state government (p.86)." In short, TELs can push the revenue structure to change from a traditional, property tax reliant system to a more consumption-based, market-driven one if a local government resort to sales tax and user fees, or facilitates revenue centralization to the state level.

The extent to which TELs affect reliance on alternative revenue sources varies by the limit stringency. Shadbegian (1999) finds that, from 1962 to 1987, TELs lead to reductions in per capita tax revenue of the local governments in 2,955 counties, but result in an increase of per capita non-tax revenue at the same time. However, such substitute effect only takes place in the local governments facing less stringent TELs, that is, local property taxes are not restricted to five percent growth or less. For the governments facing more stringent TELs, there is decrease in both tax and non-tax revenue. This suggests that the degree to which alternative revenue sources are available for local governments depends on the TEL stringency. Using a national sample of cities with more recent data (1970-2006), Sun (2014) reaches a similar conclusion, and finds that when facing diminishing property tax revenues due to TEL enactment, municipalities actually raise much more in other revenue sources. The total increases in per capita sales taxes, income taxes, and user charges exceed the reduction in per capita property taxes, resulting in a net gain of $855 in per capita municipal general own-source revenue. Therefore, I propose:

A local government subject to more restrictive TELs will offset the revenue loss by increasing alternative revenues, including sales tax and user fees.

There are two aspects of TEL restrictiveness examined in this study. First is whether the TEL is binding. Consistent with ACIR (1995) and Mullins and Wallin (2004), a TEL is considered as binding if the city is subject to a levy limit, or to an assessment limit and rate limit at the same time. Second, the closer the actual levy level approaches to the legal limit, the more restrictive the TEL becomes for municipal property taxation. Different from the bindingness, this aspect of restrictiveness varies over time within a city and varies across the cities subject to the same set of TELs, depending on the actual level of property tax levy.

Five corollary hypotheses are derived from this proposition. Focusing on municipal revenue structure, this study examines the particular types of revenues municipalities rely on when facing stringent TELs, as well as the diversification of revenue sources. Different from previous literature that examines the TEL effects in terms of tax burden on residents (e.g., tax revenue or user fee revenue per capita), this study investigates the weights of the main revenue sources in municipal general revenue. Therefore, I propose the following hypotheses:

Hypothesis 1: More stringent TELs result in lower reliance on property taxes.

Hypothesis 2: More stringent TELs result in higher reliance on sales taxes.

Hypothesis 3: More stringent TELs result in higher reliance on user fees.

Hypothesis 4: More stringent TELs result in a more diversified tax revenue structure.

Hypothesis 5: More stringent TELs result in a more diversified user fee structure.

Chapter 3: Methodological Innovation: TEL Legal Research

By far, ACIR's (1995) report on TELs has been the most comprehensive TEL data source used by public finance research. However, as shown in Table 1, most empirical studies examine only the presence of certain TEL type indicated by binary variables, and use the number of years as a measure of the TEL effect over time. This specification does not specify the mechanism through which TELs affect local fiscal policies besides the limitation type (levy, assessment growth, property tax rate, full disclosure). Lincoln Institute of Land Policy[1] (2012) updates ACIR report by checking whether the legislations listed in ACIR's report are still in effect; while the update is valuable and provides richer description on the specific terms of each limitation, how other aspects of TELs have rarely been explored empirically.

Using binary variables to operationalize TELs may emerge from a flawed conceptualization of TELs. It assumes that the type of limitation is the sole determinant of the stringency, however, the terms and conditions under which TELs operate also greatly influence the limitation restrictiveness. Both the municipalities in California and in Pennsylvania, for instance, are subject to a limit on their property tax revenue growth. The property tax levy collected by Pennsylvania municipalities cannot grow above 10% from the prior year, whereas the growth rate is capped at 2% for California cities. California cities have more constraints on the level of the property tax levy; using a binary variable to indicate the existence of levy limit will treat the stringency of the limit equal for the two states.

Second, the literature on TELs assumes that there is no change to TEL laws over time since enactment, and overlooks the TEL amendments that tighten or loosen their restrictiveness.

[1] *Significant Features of the Property Tax.* http://www.lincolninst.edu/subcenters/significant-features-property-tax/Report_State_Summaries.aspx. Lincoln Institute of Land Policy and George Washington Institute of Public Policy. (State Summaries; accessed: 1/20/2014 9:28:00 PM)

Reviewing the history of this law, however, one can find that there have been incremental changes and policy layers that, over time, change the level of TEL restrictiveness. For example, the state of Washington has changed several times its levy limitation on local jurisdiction with population of 10,000 or larger since enactment in 1971. In 1989, the law was amended to specify that the increased levy can only be used for payments on bonds for no more than nine years[2]. In 1997 the state changed the maximum allowable rate for levy growth from 6% to 1%. In 2007 the law was revised again to specify that the levy limit can stay in in effect for up to six consecutive years[3]. In contrast, Kentucky loosened its limit on property tax revenue, and amended its levy limit in 1990, changing the limit of no growth allowed except for new construction, to a maximum of 4% growth from the prior year[4].

Last but not least, current research views cities from the same state as being subject to the same set of TELs. While this is true from a legal perspective, we should take into account not only the legal limit, but also the actual level of tax levy of a city when understanding the actual level of TEL stringency. That is, although TELs set the ceiling for how much property tax a municipality is allowed to levy, the actual restrictiveness of the limitation also depends on how much space for levying property tax a city has been used given each city's levels of property tax levy. It is the gap between the maximum allowable levy and the actual levy level that indicates how much room is left for levying additional property tax, and thus how restrictive a limitation is, given the unique revenue composition of a city. As such, the same set of TEL laws imposed by the state may have different levels of stringency when applied to different cities.

To address the limitation noted above, this study makes two methodological innovations. One, it uses legal research methodology to deepen the understanding of TEL terms and

[2] 1989 Washington ALS 287
[3] 2007 Washington ALS 380
[4] KRS §132.027; 1990 Ky. Acts 343

conditions. Second, it constructs the index of "TEL leeway" to take into account the actual level of TEL stringency based on municipal revenue structure.

3.1 Legal Research Methodology

I adapted the legal research method and developed a replicable and precise protocol to collect TEL law data. The method includes two aspects: searching for relevant laws and coding law data.

3.1.1 Law Search

A three-stage strategy was used to ensure data comprehensiveness and data collection replicability. First, I conducted an exploratory content analysis based on the TEL statutes listed by Lincoln Institute of Land Policy (2012). This exercise was to identify key words in TELs that could be used to construct search strings in the next step.

Next, I used the key words identified through law reviews and selected TEL laws to design search strings, and used these search strings to find TEL statutes. A robust search string enables me to find the key statutes that Lincoln Institute has listed, related state constitutions and statutes pertaining to TELs, and identify new amendments made to TELs including the ones that were once in effect but had since expired. It also excludes statutes that, although containing the same high frequency words such as "property", "authority", and "limitation", are concerned with unrelated legal contexts. The strings were checked and revised by legal researchers to augment the search results. The laws I collected using the search strings include the universe of TEL laws identified by Lincoln Institute (2012), indicating the accuracy and comprehensiveness of my results. The search strings are the following:

1) "*heading (revenue or taxation) and text(property tax or ad valorem tax w/25 rate or limit! or roll back or assess! or levy or expenditure and municipal! or local)*"

2) "heading (revenue or taxation) and text(levy w/25 rate or limit! or assess! or levy or expenditure and city)"

3) "heading (revenue or taxation) and text(property tax or equalization w/25 rate or mill or limit! or roll back and municipal! or local)"

Finally, data on TELs' historical change were collected by tracking session laws listed in the history section of the statute. After a bill is passed during a regular or special legislative session of a state, it becomes a session law, and may later be codified (i.e., assigned with a law number) into a statute. Session laws are "the chronological compilation of slip laws passed by the legislature during a legislative session…The session laws contain the official text of the law as passed by the legislature (Cornell Law Library, n.d.)." A session law is binding and therefore equally as enforceable as the provisions of a state constitution or codified statute or regulation. A legislature sometimes decides not to codify into a statute temporary or short-term legal acts, such as the amount of money that is to be appropriated to certain agencies or funds, or required reports or findings that must be reported to the governor or state legislature in the near future. In those cases, the law simply remains as a session law, and does not become part of the state's official statutes. Using session laws to collect TEL data can effectively capture the full scope of changes made to TELs over time, and pinpoint the year when the change went into effect, thereby enhancing the accuracy and comprehensiveness of the data.

Because the Lexis database that I used only provides session laws dating back to the late 1990s or early 2000s depending on the state, I used supplemental data sources to track changes in TELs prior to that time, including notes listed below the history section of each law, and law reviews. Public finance scholarship also contains valuable data. For example, Skidmore (1999) indicated that he had conducted a similar legal research on TELs in 1995 and the procedure and

results were described in an unpublished manuscript. The latest ACIR's (1995) report on TELs also provides information on the years when the limitation rates were revised by the law. However, these reports did not document every amendment made to all aspects of TELs, including the cap rate, overriding processes, and exemptions.

3.1.2 Law Coding

Informed by research examining TEL restrictiveness, I developed a protocol to code various aspects of TEL technical structure, that is, the interpretation and application of statutory and constitutional rules (Hou & Smith, 2006; Kioko, 2011; Resnick, 2004). For starters, Poulson (2005) develops a grading scale for state TELs and uses five dimensions to evaluate and the restrictiveness of TELs: (1) type of limit and method of approval, (2) what the tax and expenditure limitation limits, (3) the size of the tax and expenditure limits, (4) treatment of budget surpluses, and (5) provisions for voter approval of tax and expenditure increases and waiver of the TELs. Within each of these dimensions, states are ranked on a scale from one to five, five being the most stringent. Using this scaling method, states with no TEL in place receive a score of 0 and the maximum possible score is 25.

Similar to Poulson (2005), Kioko (2011) also takes into account other aspects of TELs besides the limitation type when examining the extent to which a limitation constrains government revenue-raising. Adapting qualitative analysis used in a study on state balanced budget requirements (Hou & Smith, 2006), Kioko examines the limitations on state revenues imposed by the states themselves, and highlights the importance of a fiscal growth factor, base of the limit, exemptions, as well as override processes. My coding protocol integrates both the Poulson (2005) and Kioko (2011) scaling systems, and applies them to state-imposed TELs on municipalities. The outline of the protocol is presented below.

TEL types. Following ACIR's (1995) classification of TELs discussed in section 3.2, I coded the TEL type as limits on assessment growth, levy growth, property tax rates, as well as revenue and expenditure growth.

Maximum allowable rates. As discussed in Section 3.2, the limitation stringency varies within TEL types because of the different levels of maximum allowable rates for growth. I recorded the maximum rate at which the assessed value, property tax revenue, or general revenue and expenditure can grow annually as the law specifies, as well as the maximum property tax rate. While some states use a constant number to set the ceiling for revenue growth, it is not uncommon for states to use a fiscal growth factor as the reference to cap the revenue growth. Fiscal growth factors are economic indicators that indicate exogenous factors affecting government spending, such as cost of living (inflation), expansion of service base (population growth), and economic condition (gross national/state product).

For the states using fiscal growth factors to set the maximum rates for revenue growth, I first recorded the economic indicators, and then collected the actual values of the indicators for the years when the limitation using the indicator was in effect. The data source for collecting the indicator value is specified in statutes and regulations pertaining to the TEL application. For the states that require a comparison between the values of a fiscal growth factor and a constant number when determining the final rate of maximum growth, I also conducted the comparison following the guideline given by the law.

Exemptions. TELs will be less restrictive if the municipality is able to exempt some revenue from the limitation and raise additional revenue that otherwise would be forbidden by TELs. Amiel, Deller, and Stallmann (2009) indicate that exemptions to TELs can be made in the case of budget reserves, grants, capital projects, debt services, and court mandates. I coded, for

all states with TELs imposed on municipalities, the conditions under which a limitation will be lifted. The common categories for TEL exemption include debt service, capital projects, and fiscal emergencies.

Override Provisions. The requirement for overriding a limitation also adds complexity to the measurement of TEL stringency. The more difficult it is to override a limitation, the more stringent a limitation is. As indicated in Poulson's (2005) scale, with all else being equal, a TEL that requires a majority vote of the legislature to override is the least restrictive, whereas a TEL that requires voter approval is the most restrictive. The percentage of affirmative votes needed for overriding a limitation also affects the difficulty to override a limitation, and hence the TEL stringency. I coded the provisions for overriding a limitation imposed by the state on municipalities, including the level of majority needed and the conditions under which a limitation can be lifted.

3.2 Construction of "TEL Leeway" Index

To understand the extent to which TELs constrain municipal revenue-raising capacity, one should take into account not only the maximum property tax revenue allowed by TELs, but also how much of that revenue has been collected by municipalities. As Merriman (1986) points out, whether TELs affect spending depends on the actual level of spending, which is a function derived from either a median voter model (Inman, 1979) or the Leviathan model (Brennan & Buchanan, 1980). If the actual level of spending has already been below the limit set by TELs, TELs will have no effect on local spending, and thus change little of local fiscal behavior. Similarly, Skidmore and Tosun (2011) find that while Michigan's Proposal A imposes a state-wide assessment limit that restricts the growth of property valuation, the extent of tax base erosion differs by region. The counties enjoying faster growth in property values experience

significant tax base erosion, whereas the counties suffering from poor economic conditions have little erosion resulting from the assessment growth cap. In other words, the same state-imposed TEL can have different degrees of restrictiveness on local governments depending on the unique economic condition and demand function each local government has.

To take into account both the cap rate and city-specific conditions, I constructed an index called "TEL leeway" that indicates the gap between the revenue ceiling set by TELs and the actual level of the property tax levy. The rationale for TEL leeway construction is similar to Kioko's (2011) "TEL slack", that is, the difference between the TEL cap on state expenditure and the actual expenditure. Kioko studies expenditure limits imposed on state budgets, whereas this study focuses on limits imposed on municipal property taxation that set caps on tax levy, property tax rate, and assessment growth. As such, the calculation of TEL leeway is different from Kioko's TEL slack, presented in the following equation:

$$\text{TEL leeway} = \frac{P(max)it - Pit}{P(max)it},$$

where $P(max)_{it}$ is the maximum levy allowed given the set of TELs imposed on municipality i in year t, and P_{it} is the actual amount of property tax levied of i in year t. TEL leeway is the difference between maximum levy and the actual levy expressed as a proportion in the maximum levy allowed. This proportion indicates how much room there is left to increase the current level of tax levy given the legal limit.

The inference of P(max) was made based on the guideline provided by TEL laws. Although the procedure of determining the amount of property tax revenue varies from city to city, the levy in essence is the product of the property tax rate and the assessed property value. I calculated P(max) differently depending on the combinations of TEL types a city is subject to. Table 2 outlines all the combinations, and the calculation of P(max) for each combination. The

maximum levy can be inferred given the maximum property tax rate and the maximum assessment, or by applying the maximum allowable rate for levy growth to the base value, usually the actual levy of the prior year. For cities subject to only rate limits or assessment limits, the effect of TELs is non-binding because the city can circumvent the limitation by raising rate or assessed values, whichever has no limit on its growth (ACIR, 1995l Mullins & Wallin, 2004). On the other hand, there are cities subject to limits on levy, assessment, and property tax rate. For these cities, a conservative estimate is to calculate two values, one by applying the levy limit, the other by applying the rate and assessment limit, and take the lesser value.

For the cities with no TELs, I used the maximum property tax rate across all cities in a given year as the rate limit in order to construct TEL leeway. The rationale for this treatment is that, although these cities are not subject to any legal limits on property taxes, their levy in practice is not infinite, either. The maximum tax rate in the sample provides a reasonable estimate for the highest possible level of tax levy. The treatment also has the advantage of including no-TEL cities in the sample for analysis.

To construct TEL leeway, I collected data on assessed property values and actual property tax levy from Comprehensive Annual Financial Reports issued by municipalities from 1995 to 2012[5]. I collected the values of maximum allowable rates from TEL laws. For the TELs that use certain fiscal growth factors, I used the data sources specified in the laws to collect data on these fiscal growth factors. The specific data sources are reported in Appendix D.

There is a caveat in TEL leeway due to data limitation, however. As Section 4.3 in Chapter 4 will discuss more in detail, additional revenue can be generated and excluded from the limit, such as taxes levied for debt services, economic development projects, and for coping with

[5] The assessed property value and tax levy data were collected by me and the rest of the research team of Fiscal Policy Space funded by MacArthur Foundation (Principle Investigator: Michael Pagano). I thank the generous support provided by Dr. Pagano, Nisa Yazici Aydemir, Ayman Bari, and Yu Shi.

financial emergency. New construction and development is also exempt from TELs. However, I do not have data on the amount of revenue raised that is exempt from the limitation; and the data of assessed property value collected from city CAFRs includes assessment increases generated by new constructions, and the tax levy includes additional levy for debt and special projects. As a result, my estimate of TEL leeway is downwardly biased for it includes the revenue that should have been excluded from the limit calculation.

3.3 Sample, Measurement, & Analytical Strategy

I developed a set of predictive models to investigate the effects of TEL leeway on municipal revenue structure. This section discusses the sample used in the study, the measurement of revenue structure, and the analytical strategy used.

3.3.1 Sample & Units of Analysis

The sample of this study includes 100 large cities in the United States. In order to be included in the sample, a city must be among the largest central cities and within the largest MSA's in the US. The interaction of city size and MSA size produced a list of cities that approximates the most economically and fiscally influential cities. The study period is 1995-2011, because 1995 is the earliest year when assessed values were consistently reported in cities' comprehensive annual financial reports and official statements, and 2011 is the most recent year that the Census Bureau has data available on city finance.

Focusing on the municipality as the unit of analysis is necessary for this study. As discussed in the previous chapters, this study uses TEL leeway to indicate the space left for levying additional property taxes. While cities may be subject to the same TELs that set the ceiling of property tax revenue, they can have different TEL leeway depending on the actual level of property taxes. In addition, although TELs are imposed by the state, many states apply

different limitations to the local governments within their jurisdictions. Hence, using municipalities as units of analysis is critical to examine the effect of TELs by acknowledging each city's unique position of revenue-raising.

Five cities[6] are excluded from the sample in the analysis using TEL leeway, because the assessed property values were not reported in their CAFRs. The data sources for the variables used in the analysis are reported in Appendix D.

3.3.2 Measurement of Revenue Structure

Different aspects of revenue structure are examined in this study. First, I examine *the reliance on property taxes*, measured by the share of property tax in general revenue, and how TELs constrain municipal revenue-raising capacity through property taxes. Second, I investigate two dimensions of revenue structure: the dispersion of revenue sources, as well as the concentration on a particular source.

Revenue diversification includes both tax and user fee revenue composition; that is, the degree to which municipal revenues are diversified across different sources. To capture the diversity, I use the reverse Herfindahl- Hirschman Index (R-HHI), a popular approach for measuring revenue diversification in the literature (Berry & Lowery, 1987; Carroll, Eger III, & Marlowe, 2003; Carroll, 2005; Hendrick, 2002; Wagner, 1976). It calculates a diversification score that ranges from 0 to 1 based on how balanced a government's total revenue is among its revenue categories, with a higher number representing a greater level of diversification. It is constructed as follows:

$$\text{R-HHI} = (1\text{-}\sum_{k=1}^{n} R^2)$$

[6] They are: Augusta-Richmond, GA; Modesto, CA; Montgomery, AL; Syracuse, NY; and Tucson, AZ.

where R is the proportion of total revenue generated by a particular source, and n represents the number of revenue sources. I construct two R-HHI for both tax and user fee structure; R-HHI of tax revenue is the summed squared percentage of each tax type in total tax revenue subtracted from one, and similarly, R-HHI of user fee is the summed squared percentage of each type of user fee in total user fee revenue subtracted from one.

As a common measure for revenue diversification, HHI has certain limitations, primarily due to the underlying assumptions of the index. As Carroll (2005) points out, the measure implies that each government has equivalent ability to diversify the revenue structure. In reality, however, different cities have access to different taxes and fees, depending on whether the authority to impose a certain tax or fee is granted by the state. The measure also implicitly recommends a balanced distribution of revenue across different sources as a most diversified revenue structure. This recommendation does not hold when one takes into account volatility of each revenue source, alignment between tax base and economic base of each city, and unique local needs and demands. Keeping in mind the caveat of this measure, one should not compare a city's HHI value to some benchmark that assumes access to all revenue sources and equal distribution across all the sources. Rather, in the context of this study, it is an aggregate indicator that describes how revenue is raised across different sources without normative content.

While revenue diversification aggregates the weights of all types of sources in municipal revenue into one index, it is also theoretically and practically important to examine *the reliance on alternative revenue sources*, particularly user fees and sales tax, as they are the main sources cities use to buffer the constraints on property tax. The study will measure this aspect by calculating the percentages of user fees and sales tax in general revenue. General revenue is defined by Census as the revenue collected by municipalities, excluding revenues from revenues

from liquor stores, water supply systems, electric power, gas supply, and public mass transit. Municipal revenue data are collected from the US Census of Governments.

3.3.3 Key Predictors

TEL leeway is a key predictor for revenue structure. As discussed in Section 3.2 of Chapter 3, this index indicates the TEL stringency by measuring how much additional property tax a city is allowed to levy given the maximum level set by the state. When a city is subject to only a non-binding TEL (i.e., only a rate limit or an assessment limit), it can have TEL leeway with a large negative value, because a rate limit can be circumvented by raising assessment, and vice versa. Another aspect of stringency lies in the type of TELs imposed on municipalities (ACIR, 1995; Mullins & Wallin, 2004). Cities subject to binding TELs are expected to have less TEL leeway; *Binding* (1=binding) is thus included in the model to indicate whether a city is subject to binding TELs; the limitation is only considered as binding when the city is subject to a levy limit, or is subject to both rate and assessment limit simultaneously.

Control variables include city *population size* (log-transformed) and *median household income* (in real 2011 dollars, log-transformed). Both variables indicate service demand and economic base. *Form of government* (1=council-manager) is included to take into account city professionalism, and *home rule status* (1=home rule) is also included as an indicator for city autonomy of fiscal policy making. Just as TELs whose terms and conditions vary across states, the extent of city autonomy defined by home rule statutes also vary from state to state (Krane, Rigos, & Hill, 2001). A binary variable used in this study is not a sufficient measure to indicate the variation in the autonomy granted by home rule; it is to indicate that a city has certain autonomy due to home rule, rather than the specific areas in which the city has the autonomy to

make policies. Some model specifications also include city and year dummies to control for unobserved time-invariant and city-invariant factors.

3.3.4 Analytical Strategy

Panel regression with clustered robust standard errors at the city level is used to analyze the effect of TEL leeway on municipal revenue structure. In addition, two-stage least squares (2SLS) regressions are also used to treat for the endogeneity of TEL leeway. TEL leeway is endogenously determined by the equation affecting the share of property tax. TEL leeway is calculated as the gap between the maximum levy allowed by TELs and the actual levy. As such, a large TEL leeway can result from a low level of actual levy instead of a low ceiling limit. The actual levy is correlated with the share of property tax; therefore, TEL leeway is potentially endogenous with the share of property taxes.

To purge the endogeneity, I used as instruments TEL cap rates specified in TEL laws. As discussed in Section 4.2 "maximum allowable rate for growth", TEL cap rates are either constant numbers, or economic indicators that are correlated with inflation and vary over time. They set the level of ceiling levy, but are exogenous to the annual property tax levy of a city. In particular, three variables are used as instruments: TEL cap rates, a dummy variable indicating whether the rate is set at a constant number (1=constant), and the interaction term between these two variables.

$$S = \alpha\left(\widehat{leeway}\right) + \beta X + \mu \qquad (1)$$

$$\widehat{leeway} = \gamma_1(caprate) + \gamma_2(constant) + \gamma_3(caprate * constant) \qquad (2)$$

In equation 1, S is a set of the variables indicating different aspects of revenue structure, and X is a vector of other covariates that also affect revenue structure. In equation 2, $\widehat{leeway}$ is the estimated TEL leeway by three instrumental variables: *caprate*, the maximum allowable rate

for growth, *constant*, a dummy variable if the cap rate is constant over time (1=constant), and the interaction term between the two.

The maintained (identifying) assumption is that $\widehat{leeway}$ is uncorrelated with the error term μ in equation (1). This is justified because the cap rate is determined by the state legislators, and not correlated with the share of property taxes in municipal general revenue. The cap rate, when is set at a constant number over time, is clearly unrelated to the change of the share of property taxes. Even for the cap rate that is set according to a certain fiscal growth factor, as discussed in Section 4.2, the factor is disconnected with local economy because it refers to national or state-level general economy, and is exogenous to the municipal property tax level.

On the other hand, the cap rate directly sets the ceiling of property tax levy, and thus is related to TEL leeway, the endogenous variable in the model. I ran first-stage regression to further test the strength of instrumental variables. The result show that the cap rate is a significant predictor positively related to TEL leeway. As such, the instrumental variables used for estimating TEL leeway are warranted.

Chapter 4: Content Analysis of TEL Laws

Reading and coding TEL laws enables me to understand how TELs constrain municipal property taxation and how they differ across states. This chapter summarizes my main findings from reading TEL laws. Appendix A, B, and C provide more detailed reports on maximum growth rates, TEL exemptions, and definitions of fiscal emergencies for overriding TELs, respectively.

4.1 TEL Types

ACIR (1995) and Mullins and Wallin (2004) indicate TEL stringency based on types, and a limitation is only binding when the state imposes a limit on the property tax levy, or simultaneously on rate and assessment limit. My review reveals that 37 states impose binding TELs on municipalities, and 13 states have non-binding TELs or no TEL. Table 3 outlines the state-imposed TEL types in a matrix similar to Table 2 that lists all combinations of TEL types. Seven states (Connecticut, Delaware, Hawaii, New Hampshire, Tennessee, Virginia, and Vermont) do not impose TELs on municipalities. Among the six states (Alabama, Georgia, North Carolina, North Dakota, Ohio, and Wyoming) that impose non-binding TELs, only Georgia imposed a temporary assessment limit in 2010, and the rest impose limits on municipal property tax rates.

For the rest of 43 states that impose binding TELs, seven (Florida, Iowa, New Mexico, Oklahoma, Oregon, South Carolina, and Texas) impose rate limits and assessment limits. The majority of the states impose levy limits, some of which have additional limits on rates or assessment. Three states (Arizona, California, and Michigan) have limits on levy, rate, and assessment. In short, rate limits and levy limits are more prevalent than assessment limits.

TELs have become more stringent over time. Although the emergence of TELs is often attributed to Tax Revolt movement in the early 1980s, many TELs had been enacted before that, and more came into effect in the 1990s. Figure 1 depicts the emergence of different TEL types from 1875 to 2013. Before 1929, rate limit was the only TEL type. Four states (Alabama, Missouri, Arkansas, and Wyoming) enacted rate limits by state constitutions in the 1880s, and North Dakota and Utah enacted statutory rate limits in 1929. During 1930-1975, six states enacted levy limits (Nevada was the first state enacting a levy limit in 1933), and the first assessment limit was enacted in Maryland in 1971.

The number of TELs increased between 1976 and 1990. Not only did 14 states enact levy limits, general revenue and expenditure limits were enacted for the first time in New Jersey, California, and Arizona. More TELs were enacted in the 1990s. Compared to the previous periods assessment limits gained more popularity during this period and six states (Minnesota, Michigan, Texas, Arizona, Oklahoma, and Oregon) enacted limits on assessment growth. Colorado and Nebraska also enacted limits on municipal general revenue and expenditure.

Although there were fewer TELs enacted from 2001 to 2013, most of the enactment in states where there were no TELs before. Montana, Maine, Wisconsin imposed levy limits as their first TELs. The only exception is New Jersey; in addition to a limit on general revenue and expenditure enacted in 1976, it imposed a levy limit in 2007 to constrain growth in property tax revenue. Minnesota changed its TEL to be binding by enacting a levy limit in addition to the assessment limit. South Carolina also imposed binding TELs by enacting an assessment limit and a rate limit in 2007.

4.2 Maximum Allowable Rate for Growth

Using a constant number to set the ceiling rate is common for most of the states especially for the levy limit and the property tax rate limit, although fiscal growth factors are also used by some states as floating ceiling rates of TELs. Kioko (2011) contends that the fiscal growth factor, that is, the economic indicator with which the limitation on revenue is set, affects the restrictiveness of the limitation. She decomposes the growth in personal income (PI) into inflation, population growth, and the real per capita income growth, and shows that PI growth would be greater than inflation plus population growth with the difference being the real change in per capita income. Therefore, the limit set at the level of the PI growth is not as restrictive as the limit set at the level of inflation plus population growth when there is increase in real per capita income. Similarly, Kousser, McCubbins, and Rozga (2006) hypothesize that a TEL tied to population and inflation will be a more stringent restriction on the size of government than personal income growth, because personal income has had a higher growth rate since 1980 than the inflation rate. To construct TEL leeway, I collected actual values of the indicators using data sources specified in TEL laws. This section is to discuss the types of fiscal growth factors used by several states and their influences on municipal revenues.

Table 4 reports the number of states using constant number and using fiscal growth factors by different TEL types. For the states that use alternative fiscal growth factors, either in comparison with a constant number or as the only criterion, Consumer Price Index and population growth are the most common proxies for the change in economic base and service needs. The assumption of the lawmakers appears to be one that the revenue collected by municipalities is only allowed to grow to meet increased service needs due to population growth, or to cover the service provision cost due to increased cost of living.

There are differences in the level of government at which CPI and the population change is chosen. California and Michigan use state-level CPI as the fiscal growth factor published by the states' Department of Industrial Relations, whereas Arizona and Colorado uses CPI at the city level. Illinois uses the national-level CPI; other states using national-level inflators include New Mexico, which uses change in state and local government purchases of goods and services index, and Minnesota, which uses the implicit price deflator for government consumption expenditures and gross investment for state and local governments. By setting CPI as the ceiling for revenue growth, TEL laws in fact make nominal municipal revenue procyclical. Deflators specifically focusing on revenue and expenditure of state and local government are arguably better measures because they are concerned with government operations; however, since these deflators are usually highly correlated with CPI, the procyclicality of revenue resulted from TELs is inevitable.

Similarly, the rate of population growth can refer to the change in state population (e.g., California) or the change in city population (e.g., Minnesota). While the change in the city population is a reasonable measure for the level of local service needs, the change in state population does not necessarily capture the service level of a particular city within the state. In California, there is a wide variation in city characteristics such as industry composition, urbanization, household income, and property value; the state population change is thus a poor standard for determining the needed level of revenue. Further, the change of population, either at the state or the city level, can also be a result of the level of service provision which is sustained by the level of taxes. In this case, the loss of population is an indicator for the need of additional revenue that can be used to expand local services; constraining the revenue growth using the

sluggish population growth rate (or the rate of zero when there is population loss) creates a vicious cycle that deprives the cities of the resources that they need the most.

In addition, the growth in levy is sometimes capped based on housing market or specific government financing needs. Indiana and Missouri use the change in assessed property value as the ceiling rate for property tax levy. Compared to inflators and population change, this measure ties municipal revenue to the local housing market rather than to the general economic condition. California does not allow any growth in property tax levy unless additional revenue is used to finance voter-approved debt services. Nebraska directly asks voters to set the levy cap.

Using the actual fiscal growth factors mandated in TEL laws, I find more year-to-year variation in maximum allowable rates for growth. Besides the variation due to changes in CPI, population, and other fiscal growth factor, several states also amend the statutes pertaining to TELs and change the ceiling of the growth of property tax levy, assessment growth, and property tax rates. Some states loosen the stringency by setting the ceiling at a higher level; for example, Idaho in 1995 amended the maximum property tax rate and changed it to nine mills from 4.5 mills. In contrast, Washington changed the maximum growth rate for levy from 6% to 1% in 1997, greatly reducing the potential space for additional revenue-raising.

Some states develop a sophisticated procedure to determine the cap rate over the course of years. Indiana[7], for example, put in place a six-step procedure to determine its property tax rate. It can be summarized as the following:

Step 1: max (3-yr average of change in assessed value, 0)

Step 2: max [0, (change in assessed value-step 1)]

Step 3: max. rate/(1+step 2)

Here:

[7] Citations of related laws: Burns Ind. Code Ann. § 6-1.1-18-3; 1997 Ind. ALS 6; 2012 Ind. ALS 137

Max. rate = 0.667% for properties inside a city or town, and 0.4167% for property outside (after 1997).

Both the steps and the maximum rate have been revised several times. This procedure ensures that the property tax rate does not go above 0.667%; however, as long as there is positive change in the assessed value, the property tax rate will certainly be lower than 0.667%. The procedure therefore builds in the interaction between assessment and the property tax rate in order to constrain the level of property tax.

4.3 TEL Exemptions

Property tax levies can be expanded if certain revenue is excluded from the limitation. Over time, states have amended TEL laws so that revenue dedicated to specific purposes is exempted from the limits. While maximum allowable rates for growth are relatively standardized and thus comparable across states, the terms and conditions of TEL exemptions are more idiosyncratic. Table 5 presents the main categories for TEL exemptions for debt and capital projects, Appendix B reports more in detail the exemption conditions as well as their restrictions, and Appendix C reports the definitions of fiscal emergency for TEL exemption. In general, there are four common categories of TEL exemptions, debt service, capital projects, financial emergency, and voter approval. Each is discussed more in detail below.

Debt service & Capital projects. These two categories are intertwined because debt issuance is a common financing tool to fund capital projects, and additional revenue needs to be secured in order to pay for the debt services, especially the ones pledged by the full faith and credit of the government. The exemptions can be applied to one or many limits; for example, while Colorado does not provide exemptions to its levy, rate, or assessment limit for debt services, the limitation on general revenue and expenditure can be lifted for debt services. In

Florida, debt service can be exempted from the rate limit with the voter's approval, but not from the assessment growth limit. All except four states provide exemptions for property taxes levied for debt services. Iowa allows additional revenue collected and deposited into capital project funds imposed by a library board; Idaho imposes special levies by passing statutes; Kentucky issues urban renewal taxes in addition to its levy limit or imposes additional millage rates to pay for charges assessed by a joint fire department; Montana allows an additional levy to support a study commission on alternative forms of government, a newly established regional resource authority, or airport construction and maintenance. For these four states, additional levies are raised and directly paid for the projects, instead of through debt financing.

Some TEL laws do not specify what debt service categories enable additional property taxes to be levied; for the states that incorporate debt service exemptions into their TEL laws, common capital projects that allow municipalities to levy additional taxes exceeding TELs include education-related projects such as school facilities and special education, projects related to infrastructure development such as roads, bridges, sewer systems, and the development of renewable energy, public libraries, public parks, etc. Additional levies to fund public welfare projects such as public housing can also be entitled to TEL exemptions. The type of projects varies by state and reflects different needs and priorities of each state. Water conservation-related projects as well as payments for sale, delivery, or use of water is a major category that allows California municipalities to go above their levy limit, whereas Colorado makes projects related to oil and gas production an exception for collecting additional general revenue exceeding the limit set by Taxpayer Bill of Rights.

Besides capital projects, four states (California, Illinois, New Jersey, and Oregon) allow additional taxes collected to pay for the related expense to pay for increasing costs of retirement

and pension systems. The increased need for spending can also result from policies enacted by other governments. Nine states allow TEL exemptions in order to fulfill federal and state mandates. California allows for property tax rates higher than the maximum rate specified in Proposition 13 for expenditure mandated by the federal, state government, or the court. Maine allow local governments to lift the levy limit to make up the exact amount decreased in state-municipal revenue sharing program since 2007. Interlocal cooperation and annexation are also common categories for TEL exemption, such as the cases in Indiana, Michigan, and New Jersey. To this end, West Virginia defines categories of debt services entitled to TEL exemption as ones "indispensable to the orderly discharge of the governmental functions determined by Tax Commissioner," a broad definition that implies subjective judgment of, and open discussion between, policy makers.

There are limits applied to the additional property tax levies, however. The millage rate with which additional property taxes are levied to fund debt services is subject to a new limit in Alabama, and the new limit varies by cities. South Dakota sets half of the budget as the maximum amount for a city to exceed the levy limit for debt services. The length of the period is also limited in some states; for instance, Michigan does not allow the exemption of rate limit to go beyond 20 years.

Similar to debt services, there are caps on the additional property taxes levied for capital projects in some states. An example is the exemption to the levy limit in Nevada, which allows for additional levy for capital projects as long as it does not exceed $4.5 on each $100 of assessed valuation including all overlapping rates in the state, and does not go beyond five years. Oregon has a similar restriction for its exemption to the assessment growth limit, which sets the

maximum period for the exemption to the lesser of ten years and the expected useful life of the project.

Voter approval. TELs can be overridden by voters' approval; however, the difficulty of overriding the limit varies depending on the procedure mandated. The people who vote to override the limit varies, ranging from registered voters, electors, to members of the governing body of a municipality. Affirmative votes of a supermajority of voters are the most popular for overriding a TEL through voters, a requirement adopted in 11 states. Here the level of supermajority also varies by state, including two-thirds, three-fifths, and four-fifths. Eight states allow voter referendum. Other requirements for voter approval include supermajority of electors, simple majority of electors, and simple majority of voters. There are also 10 states that do not specify voter approval procedure based on my review of TELs. Amiel et al (2009) code these states as no override allowed, whereas I classified them as procedure unknown.

Emergency. Catastrophic events such as natural disaster and war are usually recognized as emergencies that trigger TEL exemption. Many states acknowledge dire financial condition as a type of emergency that requires assistance through TEL exemption. For example, Florida defines emergency in need for TEL exemption as "municipality of special financial concern;" similarly, North Carolina considers deficit as a sign of emergency, and North Dakota allows a rate limit exemption if a municipality declares tax insufficient to provide adequate service. South Carolina recognizes both deficit and the loss in tax revenue as emergency; particularly, cities are considered to be in emergency when there is loss of major taxpayer that results in at least ten percent decrease in revenue. Interestingly, Maine considers the loss of state or federal funding as an emergency serious enough for an exemption from its levy limit, while it explicitly states that

financial emergency does not apply to changes in economic conditions, revenue shortfalls, or increased costs due to increased salaries or program expansion.

Emergency can also be triggered by a change in expenditure. New Jersey imposes a general revenue limit, but allows additional appropriation to "meet a pressing need for public expenditure to protect or promote the public health, safety, morals or welfare, or to provide temporary housing or public assistance prior to the next succeeding fiscal year." In comparison, Rhode Island defines emergency with specific expenditure categories, that is, a situation "when the city experiences or anticipates health insurance costs, retirement contributions, or utility expenditures which exceed the prior fiscal year's health insurance costs, retirement contributions, or utility expenditures by a percentage greater than three times the percentage increase."

Compared to exemptions for debt and capital projects, there are more restrictions specified in TEL laws regarding the procedure through which the exemption is granted, the amount of the revenue collected exceeding TELs, and the duration of the exemption. Affirmative votes by super majority of the governing body is often required for declaring the emergency and granting the exemption. TEL relief for emergency also tend to be temporary, usually only for the year when the emergency is declared.

4.4 Patterns of TEL-referencing laws

TELs affect various aspects of municipal finance, and the breadth of the influence is also reflected in the laws referring to, and affected by, the enactment of TELs. This body of laws is termed "TEL-referencing law" in this paper. To understand how TELs interact with other laws pertaining to municipal finance, I conducted an exploratory legal analysis on TEL-referencing laws in four states: California, Colorado, Illinois, and Massachusetts. I used the legal citation of a TEL law to develop search strings, with which I collected and coded TEL-referencing laws. I

documented 128 TEL-referencing laws. California has 72 TEL-referencing laws, the highest number of the four states, followed by Illinois that has 29. Colorado and Massachusetts have 19 and eight TEL-referencing laws, respectively.

There are five categories of laws affected by TEL enactment: education, special districts, functional responsibilities, government administration, and revenue and taxation. Table 6 lists the number of TEL-referencing laws of each category found in the four states. The categorization is mainly based on the name of the chapter under which a TEL-referencing law falls. Although the categorization helps us understand the similarities shared by the TEL-referencing laws, a careful reading also reveals that there is overlap between the four categories if one read the laws more in depth. For example, many laws governing education are administered by school districts, a type of special districts, and the construction and maintenance of educational facilities are also a kind of functional responsibilities assumed by local governments. In short, the breadth of laws affected by TELs suggests the central role played by the property tax in municipal fiscal policy making and the interactive relationship between property taxes and other fiscal policies.

Illinois and California have education-related laws referring to TELs, whereas Colorado is the only state that refers to TELs in the laws governing special districts, including drainage districts and rail districts. Colorado, Illinois, and California cite TELs in the laws related to functional responsibilities, including health and safety, water, library, roads and bridges, transportation, and utility. Although contexts vary from state to state, most of the TEL-referencing laws indicate explicitly whether the revenue raised for the special districts and the functional responsibilities are exempted from TELs.

All four states cite TELs in the laws regarding revenue and taxation and government administration. TEL-referencing laws regarding government administration are mainly

concerned with legislative procedures to amend property taxation, allocation of property taxes to local agencies, as well as the authority of local governments over administering the TEL enforcement. TEL-referencing laws in California greatly overlap with revenue and taxation; TELs play a central role when the government determines requests for intergovernmental revenue to fund legislatively determined mandate, appropriation to local governments, need for special taxes, creation of funds, and the transfer from and to general fund. In the other three states, TEL-referencing laws regarding government administration are mainly concerned with duties of local governments, including counties, cities, special districts, and townships, for administering property taxation and TEL enforcement.

TELs affect various aspects of property assessment, such as adjusting property value when there is change in ownership, procedure for reduction in assessment, exclusion of certain safety-related home improvement from assessment, value loss due to natural disaster, just to name a few. This broad influence of TELs is shown in the TEL-referencing laws governing revenue and taxation. It is noteworthy that many Illinois TEL-referencing laws regarding taxation are laws governing tax-increment financing (TIF). In Illinois, revenues raised through TIF are exempted from state-imposed TELs, but this exemption is not specified in TEL laws, but in the laws that create TIF districts.

Different states appear to have different change patterns of the number of referencing laws introduced over time. As indicated in Figure 2, in California there have been TEL-referencing laws introduced almost every year since 1978 when Proposition 13 came into effect. On the contrary, Illinois and Massachusetts have periods during which no referencing laws were passed. In Illinois, more TEL referencing laws were enacted in the early 1990s in response to P-

TELL[8], the levy limit in Illinois enacted in 1991; later, no referencing law was passed until 2011 when a tax related to emergency financial oversight was enacted. Massachusetts shows the opposite trend. Only two referencing laws were passed in the 1980s following the enactment of Proposition 2-1/2. One additional law was passed in 1993. More than half (five out of eight) of Massachusetts TEL-referencing laws were enacted in the most recent decade.

It appears that Colorado revised existing laws in response to the enactment of TELs, instead of passing new laws. The Taxpayer Bill of Rights (TABOR) was enacted in 1992, but 13 out of 19 TEL referring laws were enacted before 1992. The most likely explanation is that while these laws existed before 1992, they were amended after TABOR was passed. In comparison, all TEL-referring laws in California, Illinois and Massachusetts have enactment years later than the enactment years of their TEL laws.

[8] The only Illinois city in the study sample, Chicago, is exempt from P-TELL due to its home-rule status.

Chapter 5. Effects of TEL Leeway on Revenue Structure

5.1 TEL Leeway

Before presenting the results from regression analyses, this chapter begins by describing TEL leeway and its distribution. As a proportion of the room left for additional property tax levy in total levy allowed by TELs, an ideal measure of TEL leeway will range between zero and one. In other words, the actual tax levy would be no more than the maximum levy mandated by TEL laws if one does not take into account TEL exemptions. The exemptions, however, can result in negative TEL leeway because it allows the cities to levy property taxes greater than the legal ceiling. As the data limitation discussed in Section 3.2, the amount of tax levy exempted from TELs is not available for this study, and thus I am not able to account for the negative values of TEL leeway.

5.1.1 Negative TEL Leeway

There is no TEL leeway above one in this sample. Out of 1,609 observations that have TEL leeway values (the source of missing data is discussed in Section 5.2), there are 652 (40%) observations that have negative TEL leeway; among them, 315 observations (that is, 40 cities in some years) have TEL leeway that is between zero and -0.1, indicating these cities have exceeded their ceiling levy by ten percent in these years. 177 observations (that is, 31 cities in some years) have TEL leeway that is between -0.1 and -1, indicating that the actual levy exceeds the ceiling levy by two times. In addition, the following 12 cities account for TEL leeway smaller than -1, that is, the level of actual levy that is greater than two times of the ceiling: Fort Wayne, Indianapolis, Huntsville, Birmingham, Philadelphia, Pittsburgh, Minneapolis, Shreveport, Chicago, Des Moines, Detroit, and Little Rock. The first four cities in the list are only subject to

rate limits[9], and thus it is easier for them to exceed the ceiling levy by increasing the property assessed values. The rest of the cities are all subject to binding TELs; it is likely that there is certain TEL exemption that allows the city to exceed the ceiling levy by such a great amount. Unfortunately due to the data limitation, I can only speculate that the marginal negative TEL leeway is probably due to new construction, whose assessment and property taxes are excluded from TELs, whereas the negative TEL leeway with greater magnitude indicates TEL exemptions that involve debt service, capital projects, and the like.

To examine the prevalence of TEL stringency measured by TEL leeway, I divide TEL leeway into six brackets. The first bracket includes all negative TEL leeway, indicating that municipalities have exceeded the limits. The next four brackets are 0-0.2, 0.2-0.3, 0.3-0.4, and 0.4-0.5, respectively. The last bracket includes all TEL leeway with values greater than 0.5. Figure 3 depicts the number of cities within each bracket of TEL leeway, and the change of the number of cities by TEL leeway from 1995 to 2011. Despite some fluctuation, there is an increasing amount of cities in the brackets of below zero and between zero and 0.2, indicating that TELs become increasingly stringent over time when the level of actual property tax levy is taken into account. It also suggests that over the course of time, more cities are approaching the legal levy limit, or even managed to exceed it through exemptions or voter override.

5.1.2 Interaction between TEL Leeway and Bindingness

There is also interaction between TEL leeway and bindingness, another measure for TEL stringency based on TEL types. Non-binding TELs, defined as only a rate limit or only an assessment limit imposed on a municipality, can create abundant leeway for property taxation. This is because the municipal government can circumvent the rate limit by raising assessment or

[9] Although there is a levy limit imposed by State of Pennsylvania, the limit only applies to cities with population less than 250 thousand, and thus is not applicable to Philadelphia and Pittsburgh.

bypass the assessment limit by raising the property tax rate. For the non-binding TEL cities, the legal levy ceiling is set at a very high level practically.

Dividing cities into binding and non-binding groups, figure 4 delineates the change in the average TEL leeway from 1995 to 2011. During this period, cities subject to non-binding TELs or with no TELs have had greater means of TEL leeway compared to the ones for the binding-TEL cities. The period of 2001-2007 also witnesses positive means of TEL leeway in the non-binding cities, whereas the mean of TEL leeway for binding-TEL cities remain negative throughout the study period, indicating the exhaustion of TEL leeway. This figure provides suggestive evidence that binding TELs are more restrictive because they give municipalities less leeway for additional property tax growth.

5.2 Results from Regression Analysis

I investigated the effects of TEL leeway on five aspects of municipal revenue structure: reliance on property taxes, reliance on sales taxes, reliance on user fees, tax revenue diversification, and user fee diversification. The following five subsections report the results for each aspect.

Before discussing the results from the regression analyses, I reported the missing data here. Table 7 outlines the sources of missing data. A full sample would have 1,700 observations (100 cities for 17 years from 1995 to 2011). However, three cities (Augusta-Richmond, GA; Tucson, AZ; and Syracuse, NY) do not report their assessed values index through the entire study period that are necessary for constructing the TEL leeway, and have no value for TEL leeway. This results in 51 missing values. There are another ten cities that have missing assessed values for a few years, which total additional 40 missing values. As a result, the models using TEL leeway have 1,609 observations.

The number of observations becomes 951 when median household income is included. The data on city-level median household income, collected from American Community Survey by the US Census Bureau is only available after 2000; this limitation shortens the study period to 2000-2011, and results in the loss of 500 (100 cities for five years) observations. 41 cities do not have data on median household income from 2000 to 2004, resulting in additional 205 missing values. Additionally, there are 44 observations excluded from analysis due to missing TEL leeway values, even though they have data on median household income. As such, when I controlled for household income, the study period is shortened and the sample is reduced. As a way to test the robustness of the results, I ran all model specifications both with and without the income variable, as discussed more in detail in the rest of this section. Table 8 reports summary statistics of all variables used in the analyses.

Overall, the results find that TELs have little effects on various aspects of revenue structure examined in this study. Even for the coefficients that show statistically significant effects of TELs, the magnitudes are so small that indicate little practical significance. The rest of this section discusses the results of a series of regressions that examine the effects of TELs on various aspects of municipal revenue structure. Besides the results reported in Table 9 through 13, for each dependent variable, I also ran a set of pooled OLS regressions with covariates added one at a time. The results with different control variable inclusion are consistent with the pooled OLS regressions reported in table 9 through 13. They are reported in Appendix E for interested readers.

5.2.1 Reliance on Property Taxes

Reliance on property taxes is measured as the share of property taxes in municipal general revenue. I expect that less stringent TELs, indicated by a higher TEL leeway, allow a

city to have a higher reliance on property tax. For example, TEL leeway in Denver, Colorado was 0.03 in 2010 and increased to 0.06 in 2011. This means while in 2010 the gap between the legal limit and the actual levy was 3% of the total levy allowed by TELs, this gap expanded to 6% in 2011. Meanwhile, the share of property tax increased by one percentage point, whereas the share of sales tax decreased by two percentage points. The municipalities with less stringent TEL will rely more on property taxes as it is a stable revenue source more resilient to the external economic environment (Alm, Buschman & Sjoquist, 2011; Doerner & Ihlanfeldt, 2011; Lutz, Molloy, & Shan, 2011). As such, I expect a higher TEL leeway to be related to a higher level of property tax reliance.

Table 9 reports the results of a set of regressions that analyze the effect of TELs on the reliance on property taxes. Overall, the findings do not support my hypothesis that cities with stringent TELs rely less on property taxes; on the contrary, I find evidence that suggests the more stringent TELs are, the higher share of property taxes cities have. Although I find that TEL leeway is positively related to the share of property taxes when using pooled OLS (column 1 and 2), the coefficient is not statistically significant. When the models control for unobserved time-invariant city characteristics and city-invariant time effects (column 3 and 4), the results show TEL leeway is negatively related to the reliance on property taxes.

TEL leeway is endogenous because the actual property tax levy also affects the share of property taxes in municipal general revenue. To treat for endogeneity, I used the cap rates mandated by TEL laws as the instruments for TEL leeway (see Section 3.3.4, Analytical Strategy, for more discussion). The 2SLS[10] estimates (column 5 and 6) are consistent with the ones of fixed-effect model, and suggest that TEL leeway is negatively related to the share of property

[10] The Stock and Yogo's (2005) test at a nominal 5% Wald rejects the null hypothesis that the instruments are weak (Eigenvalue statistic=36.24>22.30, 2SLS Wald test at the 5% level).

taxes. The coefficient becomes significant when the model takes into account median household income (column 6). The magnitude of the effect is small, however; a ten-percentage point increase in TEL leeway results in only 0.0003 percentage point decrease in the share of property taxes in municipal general revenue.

The negative values of TEL leeway indicate that cities have taken actions to override the limit, or to exempt part of property taxes from the limit. In other words, we can also consider the negative TEL leeway as no room left for additional property tax growth due to legal limits, and thus conceptually equivalent to zero. Column 7 and 8 report the results of 2SLS regressions when all negative values of TEL leeway are replaced with zero. Not surprisingly, the magnitudes of the coefficients on TEL leeway are then increased. The results are consistent with the previous models, and suggest that a city with a larger TEL leeway, which indicates less restrictive TELs, relies less on property taxes. The coefficient on TEL leeway becomes significant when the model includes median household income. Increasing TEL leeway by ten percent will result in 0.003 decrease in the share of property taxes. Opposite to my hypothesis, the finding suggests that cities subject to less stringent TELs (that is, a larger leeway) also rely less on property taxes.

The results also suggest that cities with binding TELs rely more on property taxes but the finding is not robust. The coefficients on the binding variable are only significant in the fixed effect model (column 4) and the 2SLS model (column 6) that control for median household income. A city subject to binding TELs is more reliance on property tax, resulting in approximately 0.02 percentage point increase in the share of property tax.

The results also indicate that city size and economic base have effects on the reliance on property tax. Although population is negatively related to the share of property tax in the pooled OLS models, the results of all other models suggest that population is positively related to the

share of property taxes. Without controlling for median household income, a ten-percent increase in population will increase the share of property tax by 0.26 percentage point. However, when median household income is included in the model, population is no longer a significant predictor and the magnitude of its effect becomes marginal. The effect of median household income is inconclusive. It is significantly and positively related to the share of property tax in the pooled OLS model, but it appears to be negatively related to the share of property tax, although the coefficients are not statistically different from zero.

A city with the council-manager form of government, an indicator for government professionalism, relies less on property taxes, but the coefficients are not significant regardless whether median household income is included in the model. A city with home-rule status, an indicator for government autonomy, also has a lower share of property taxes. The coefficient on home rule becomes significant when the model accounts for income. All other things being equal, the share of property tax is 0.05 percentage point lower in a home-rule city.

5.2.2 Reliance on Sales Taxes

Reliance on sales taxes is measured as the share of sales taxes in municipal general revenue. As a major revenue alternative to property taxes, sales tax may play a greater role in municipal financing when TELs impose stringent constraints on property taxation. I include both general and selective sales taxes because they are both consumption-based. It is reasonable to expect a city to raise not only the general sales tax rate, but also tobacco or gasoline taxes, as a way to enhance its revenue, as long as the city has the taxing authority.

Table 10 reports the results of a set of regressions that analyze the effect of TELs on the reliance on sales taxes. Overall, I find little support for the hypothesis that more stringent TELs

result in higher reliance on sales taxes. In fact, some model specifications indicate that cities subject to more stringent TELs also rely less on sales taxes.

Although the pooled OLS estimates (column 1 and 2) suggest that cities with more stringent TELs rely more on sales tax, the coefficients on TEL leeway are not significant. When the models control for unobserved city- and time-characteristics, however, TEL leeway becomes positively related to the share of sales taxes, and the coefficient is significant when the model includes median household income. A ten percent increase in TEL leeway will result in 0.0003 percentage point increase in the share of sales taxes.

The 2SLS estimates confirm the finding from the fixed-effect model. Here, a ten percent increase in TEL leeway will result in 0.0008 percentage point increase in the share of sales tax (column 5). The coefficient remains significant but has a magnitude half of the size when the 2SLS model controls for median household income (column 6). TEL leeway is not a significant predictor when I replaced all negative leeway values with zero (column 7 and 8). However, the coefficients still indicate a positive relationship between TEL leeway and the share of sales tax.

On the other hand, the results suggest that the cities subject to binding TELs rely more on sales taxes. Binding is a significant predictor for the share of sales tax in the pooled OLS specification (column 1and 2). Consistent with my hypothesis, cities subject to binding TELs rely more on the sales tax than their non-binding-TEL counterparts by approximately 0.05 percentage point. Binding becomes insignificant when the models control for city- and time-factors and purge endogeneity between TEL leeway and the revenue structure (column 3through 6). However, when all negative values of TEL leeway are replaced with zero, binding becomes significantly positively related to the share of sales tax in the model controlling for median

household income (column 8). The share of sales taxes is 0.03 percentage point higher in the cities subject to binding TELs.

Population is not a significant predictor for the share of sales taxes across all eight models. The signs on the population coefficients are also mixed. Median household income appears to be negatively related to the share of sales taxes; that is, cities with lower household income rely less on sales tax. However, the coefficient is only significant in the pooled OLS model (column 2). In addition, cities with the council-manager form of government have slightly higher shares of sales tax, but the coefficient is not statistically significant. Cities with home-rule status have a lower share of sales taxes, but the coefficient is not statistically different from zero.

When examining the effects of TELs on the reliance of sales taxes, it is important to take into account whether a city has authority to levy sales taxes granted by the state. As such, I ran additional analyses to examine the effects of TELs on the reliance on sales taxes only for the cities with sales tax authority. The results are presented in Appendix F.

There are approximately 60 percent of the cities in the sample that have sales tax authority, reducing the sample size to 895 (without median household income) and 551 (with median household income). The findings are consistent with the ones using the full sample; that is, there is no significant relationship between TEL stringency measured by TEL leeway and the reliance on sales taxes, even for the cities with sales tax authority. However, binding TELs are significantly and negatively related to the share of sales taxes, indicating that cities with sales tax authority and subject to binding TELs in fact rely less on sales taxes. In the 2SLS model controlling for median household income, the magnitude of the effect of TEL leeway is ten times larger than the ones in other model specifications. The estimate, however, is not statistically significant.

5.2.3 Reliance on User Fees

User fees are a major revenue source especially for large cities. The reliance of user fees is measured as the share of user fees in general revenue. As indicated in summary statistics (Table 8), the mean of the share of user fees is 23% in this sample, higher than the mean of the share of property taxes (21%). I expect a negative relationship between TEL leeway and the share of user fees, that is, cities subject to more stringent TELs (thus less TEL leeway) will rely more on user fees. Table 11 reports the results of the regressions investigating the TEL effects on the share of user fees. In general, the findings lend support for this hypothesis, although the support is not robust.

The pooled OLS estimates suggest that TEL leeway is positively related to the reliance on user fees, although the coefficient is not statistically different from zero (column 1 and 2). In the model with city- and year-fixed effects, TEL leeway is significantly and negatively related to the share of user fees, consistent with my hypothesis. A ten percent increase in TEL leeway will result in 0.0002 percentage point decrease in the share of user fees (column 3). When the model controls for median household income, the coefficient on TEL leeway becomes insignificant but the magnitude is larger. 2SLS estimates also suggest a negative relationship between TEL leeway and the share of user fees, although the coefficient is sensitive to the changes in model identification. When controlling for median household income (Column 6), TEL leeway is significantly related to the share of user fees with a larger magnitude than the ones in the previous models. Ten percent decrease in TEL leeway will result in 0.06 percentage point increase in user fees.

Column 7 and 8 report the results of the 2SLS regressions with all negative values of TEL leeway replaced with zero. Without controlling for median household income, TEL leeway

is insignificantly and positively related to the share of user fees. When median household income is included in the model, TEL leeway again becomes a significant predictor negatively related to the share of user fees. A ten percent decrease in TEL leeway will result in 0.003 percentage point increase in the share of user fees.

Binding is significantly and positively related to the share of user fees as indicated by the results in model 1 through 7. The share of user fees is approximately 0.07 percentage point higher in binding-TEL cities (column 1 and 2), and this magnitude becomes smaller (0.03 percentage point) when the models take into account city- and year-fixed effects and the endogeneity of TEL leeway (column 3 through 7). The direction changes and the coefficient loses significance in model 8 when all negative values of TEL leeway are replaced with zero and median household income is included. Binding TEL cities also have 0.03 percentage point higher share of user fees compared to the non-binding and no-TEL cities. Median household income is negatively related to the share of user fees, while the coefficient is statistically insignificant.

Cities with council-manager form of government also rely more on user fees (0.03 percentage point higher). Home-rule cities also have higher share of user fees, but the coefficient is not statistically significant. Population is positively, while insignificantly, related to the share of user fees.

5.2.4 Tax Revenue Diversification

In addition to increasing revenue raised by a particular source, municipalities can also enhance revenue by diversifying the revenue sources across different tax categories. Tax revenue diversification is measured by reverse Herfindahl-Hirschman Index constructed as follows:

$$\text{R-HHI} = (1-\sum_{k=1}^{n} R^2),$$

where R is the proportion of general revenue generated by a particular source, and n represents the number of revenue sources. The score ranges from zero to one, with a higher value indicating a more diversified revenue structure. The mean of tax revenue diversification is 0.90, indicating a fairly diversified tax revenue structure of the sample. I expect cities subject to more stringent TELs, or with smaller TEL leeway, to have more diversified tax structure; in other words, there is a negative relationship between TEL leeway and the reverse Herfindahl index. Table 12 reports the results of the regressions investigating the TEL effects on tax revenue diversification.

The regressions do not provide evidence for my hypothesis. TEL leeway is not a significant predictor for tax revenue diversification in pooled OLS or fixed-effect models. The coefficients on TEL leeway are significant in the 2SLS models controlling for median household income; the magnitude becomes larger when the negative values of TEL leeway are replaced with zero. In short, the closer a city approaches to its property tax levy ceiling, the less diversified its tax revenue structure becomes. Similarly, there is weak evidence that binding is a significant predictor for tax revenue diversification. In both the fixed effect model (column 4) and 2SLS model (column 6) that include median household income, binding is significantly and negatively related to the reverse Herfindahl Index, suggesting cities subject to binding TELs have a less diversified tax structure.

The pooled OLS estimates suggest that population is significantly and positively related to tax diversification. However, population is not significant in the other model specifications. Similarly, there is no significant relationship between median household income and tax diversification. The results also suggest that cities with council-manager form of government

have more diversified tax revenue structure. Home-rule cities also have more diversified tax revenue structure, although the coefficient is not statistically different from zero.

Similar to the reliance on sales taxes, the extent to which a city need to diversify its tax revenue depends greatly on the tax authority granted by the state. To explore whether the effect of TELs on tax revenue diversification is moderated by tax authority, I ran two additional analyses: one examines only the cities with sales tax authority, and the other examines the cities with individual income tax authority. The results are reported in Appendix G and H. The results show that, when constraining the samples by tax authority, TEL leeway appears to have no effect on tax revenue diversification. This finding suggests that tax authority greatly dictates the extent to which a city can diversify its revenue sources. When the cities are granted by the state the authority to impose sales taxes, they may not have the need to enhance revenue by diversifying other tax revenue sources. The analysis examining only the cities with income tax authority provides similar evidence; however, there are only 19 cities in the sample that have access to individual income tax. The smaller sample results in large standard errors and thus the results are only suggestive.

5.2.5 User Fee Diversification

User fee diversification is also measured by reverse Herfindahl-Hirschman Index, with a higher value indicating a more diversified fee structure. One can expect cities with smaller TEL leeway to have more diversified tax structure; that is, when facing restrictive TELs, a city expands the services that it can charge user fees for.

As indicated in Table 13, the findings regarding the relationship between TEL leeway and user fee diversification is inconclusive. Although TEL leeway is significantly and negatively related to user fee diversification in the pooled OLS model controlling for median household

income (column 2), the fixed-effect and 2SLS models show a positive relationship between TEL leeway and user fee diversification. When controlling for city- and year-specific characteristics, TEL leeway is significantly and positively related to user fee diversification (column 3). The coefficient remains significant with greater magnitude in the 2SLS model controlling for median household income (column 6). When all negative values of TEL leeway are replaced with zero, TEL leeway is again significantly and positively related to user fee diversification when the model includes median household income (column 8). These results shows the opposite of my hypothesis; more stringent TELs, indicated by less TEL leeway, result in a more concentrated user fee structure.

On the other hand, binding only appears to be a significant predictor when all negative values of TEL leeway are replaced with zero and the 2SLS model controls for median household income (column 8). Cities subject to binding TELs have more diversified user fee structure compared to the cities subject to non-binding TELs or with no TELs. Population, form of government, and home-rule status are not significant predictors for user fee structure. Population is positively related to user fee diversification in model 1 through model 6, but only significant in the models controlling for median household income. It indicates that cities with larger population also have more diversified user fee structures. Binding is only significant when all negative TEL leeway is replaced with zero and median household income is included the model (column 6), indicating cities subject to binding TELs have a higher level of user fee diversification.

5.2.6 Magnitudes of the Effects

How would the revenue structure change if a TEL is imposed onto a city for the first time? This section presents the estimated TEL effects measured by TEL leeway. To do this, I

calculated the median of TEL leeway for no-TEL cities (0.86), and the median for TEL cities (0.01). The difference between the two medians (0.85) was used as an estimate for the change in TEL leeway if a TEL is imposed onto a no-TEL city; in other words, TEL leeway is decreased from 0.86 to 0.01 if a no-TEL city is now subject to a TEL. Table 14 presents the TEL effect on revenue source reliance measured by this change in TEL leeway. The effects on tax revenue diversification and user fee diversification are not reported, because the magnitudes of the changes in the diversification indices (Herfindahl Index) carry little practical meaning.

Overall, the magnitude of TEL effects is marginal. TELs affect the reliance on non-property taxes (sales taxes and user fees) more greatly than on property-tax reliance. In the 2SLS model without controlling for median household income, for example, the decrease in TEL leeway results in the increase in the share of property tax by 0.002 percentage point, a decrease in the share of sales taxes by 0.007 percentage points, and an increase in user fees by 0.003 percentage points. When all negative TEL leeway values are replaced with zero, the magnitudes become larger, and the effects on the reliance on three revenue sources have similar magnitudes. In sum, although the regression results show TELs have statistically significant effects on revenue structure, the changes due to TELs are not practically significant.

5.3 Effects of Political Culture and Local Demand

5.3.1 Measurement of Local Political Culture and Demand

Revenue decisions are susceptible to local political culture and demand. Unfortunately, the data on political culture and demand are not available at the city level on an annual basis. Although the city- and time-fixed effects used in previous analyses largely control for the effects of local political culture and demand, it does not allow us to examine how specific aspects of local factors influence revenue decisions. This section aims to fill this gap by using data

collected in 2000 and 2010. The data is obtained from Fiscal Policy Space team who collected the original data from City and County Year Book by US Census of Governments, an annual data report that has recently been discontinued.

In addition to the two variables that were included in the previous pooled OLS models, council-manager form of government and home-rule status, I added local initiative (Yes=1) to indicate that the city has voter initiative power. Three variables are included to indicate local demand: homeownership, measured by the share of homeowners in total city population, the share of the elderly, measured by the share of the people with age above 65 in total population, and the poverty rate, measured by the share of the families living below poverty line in total number of households. A year dummy (Year 2010=1) is also included.

A full sample would have 200 observations. However, as indicated in Table 7, three cities (Augusta, Syracuse, and Tucson) do not report assessed values during the study period, and thus generate six missing data points in both 2000 and 2010. Modesto does not report assessed value in 2010, and both Montgomery and New Haven does not report assessed value in 2000, resulting in additional three missing data points. 37 cities have missing data on median household income in 2000. In total, there are 154 observations used in the final analysis. Due to the data limitation, one should note that the results are subject to omitted variable bias and thus is suggestive.

5.3.2 Results from Pooled OLS Analysis

Appendix I reports the effects of local political culture and demand on municipal revenue structure. First of all, the findings of TELs' effects are consistent with the ones of the previous pooled OLS models. TEL stringency does not appear to have sizable effects on revenue structure, although TEL leeway is significantly and negatively related to the share of sales taxes. Binding

TELs are significant predictors for the reliance on sales taxes and the reliance on user fees, indicating cities subject to binding TELs are more reliant on alternative revenue sources.

In general, there are different determinants for different aspects of revenue structure. Population is a significant predictor only in the model predicting the share of sales taxes. One percent increase in population will result in approximately three percentage point increase in the share of sales taxes. Median household income is a significant predictor for the share of user fees as well as user fee diversification. One percent increase in median household income will result in 12 percentage points in the share of user fees, as well as a more diversified user fee structure.

Local demand also affects municipal revenue structure. Homeownership is a significant predictor for the share of property taxes. Ten percent increase in the share of homeowners will result in approximately four percentage point decrease in the share of property taxes. This suggests homeowners' resistance to higher property taxes. In addition. Homeowner exemptions may also contribute to a lower level of property taxes.

A higher share of the elderly contributes to less reliance on user fees and a more diversified user fee structure. One percent increase in the share of the elderly in total population will result in one percentage point decrease in the share of user fees. Similarly, poverty rate will also result in less reliance on user fees; ten percent increase in the poverty rate will result in five percentage point decrease in the share of user fees. Together with the finding regarding the negative effect of median household income on the share of user fees, the finding suggests that a less wealthy city tends to rely less on user fees. In addition, a higher poverty rate will also result in a lower share of property taxes.

Neither council-manager form of government nor home rule is a significant predictor for any aspect of revenue structure. Cities where citizens have direct legislation power have a higher

share of user fees. They also have a more diversified tax revenue structure but a more concentrated user fee structure. In addition, the coefficients on the year dummy (1=Year 2010) show that from 2000 to 2010, cities have increased their reliance on property taxes and user fees, whereas shifting to a more concentrated tax revenue structure and a more concentrated user fee structure.

Chapter 6: Policy Implications of Tax and Non-Tax Revenue Reliance

Before discussing its policy implications, I acknowledge the limitation of the study. The major limitation of this study lies in the lack of data. First of all, approximately 67 percent of the TELs were enacted before 1995, the beginning year of the study period. As such, I am unable to examine TEL effects with a pre-posttest. Second, without more detailed administrative data on municipal property taxation, I am unable to exclude the amount of revenue exempted from TELs from calculating TEL leeway in order to construct a more accurate measure. In addition, since the sample consists of only large municipalities in the US, one should exercise caution when generalizing the findings to smaller municipalities and to other local governments.

Although the literature indicates the enactment of TELs motivate municipalities to seek alternative revenue sources (e.g., Joyce & Mullins, 1991; Sun, 2014), this study reveals that instead of raising higher sales tax revenue as an alternative, municipalities subject to more stringent TELs rely less on sales taxes, but instead raise user fees to sustain the revenue level.

The findings that cities with stringent TELs increase charges for services as an alternative is consistent with Skidmore (1995), who finds property tax limits result in increases in unrestricted revenues. Similarly, in a study examining TELs' effects in 107 counties in 44 states, Johnston et al (2000) finds restrictive TELs generate higher fee burdens for county residents while mitigating county tax reliance. Other studies also confirm the opposite effects that TELs have on tax and nontax revenue sources. For example, Shadbegian (1999) finds that TELs lead to reductions in per capita local taxes but result in increases in per capita non-tax revenues. Similarly, Hoene (2004) examines the revenue change trend in California cities from 1972 to 2002, and finds that the cities have not increased reliance on sales taxes as much as expected.

The study suggests a complicated mechanism through which cities seek alternative revenue sources. This section discusses the policy implications of the findings. I first offer some explanations for why stringent TELs are related to increased reliance on property taxes. I then discuss the constraints faced by municipalities to increase sales taxes, and then the flexibility of user fees for municipal financing. The chapter concludes with a discussion of the consequences of a user fee-reliant revenue structure.

6.1 Higher Property Taxes due to TEL Stringency

Empirical analyses in this study suggest that when the property tax levy approaches to the legal ceiling, the municipality increases the share of property taxes in general revenue. This finding holds even when I treated the variables measuring the legal ceiling for endogeneity. There are two plausible explanations to this seemingly counterintuitive finding. First, anticipating the increasingly stringent TELs, the municipal government may increase property taxes in order to maximize revenue while it still can. Levy and assessment limit both cap growth based on the prior-year level. Facing a closing TEL gap, the municipality may increase the levy and/or assessed value of the current year in order to broaden the base for the following year's revenue. The increased levy will therefore result in a higher share of property taxes in general revenue on the one hand, and a smaller TEL leeway on the other. Merriman (1986) also finds that the general revenue and expenditure limit imposed by the state of New Jersey provided municipalities with incentives to spend the maximum allowed in order to raise the base for future spending.

Second, the increase in the share of property taxes may also result from TEL exemption and overrides, which greatly mitigates the limit stringency. As discussed more in detail in Section 4.3, TEL exemptions are prevalent across states, and provide municipalities with an

alternative to secure additional property tax revenue above the limits. For instance, although Proportion 13 is notoriously stringent, the state of California has amended the body of TEL laws over the course of time and allows municipalities to raise additional property taxes to fund debt services, water conservation-related capital projects, and pension liabilities. Illinois allows revenue raised by tax increment financing districts to be exempt from the levy limit.

Similarly, local voters can override statewide limits if they decide that additional revenues are necessary for sustaining service provision. Fligio and O'Sullivan (2001) find that city managers can motivate local voters to override the limits by manipulating the mix of productive and administrative services, and proposing to cut service input. Due to data limitation, TEL exemptions are indicated with negative TEL leeway in some of my quantitative analyses. As such, a smaller TEL leeway, if below zero, in fact indicates more room for property tax growth. The negative relationship between TEL leeway and the share of property taxes therefore indicates the association between TEL exemption (negative TEL leeway) and the increase in property taxes (additional revenues raised by TEL exemption).

6.2 Constraints on Increasing Sales Taxes

The results show that when facing more stringent TELs, municipalities also rely less on sales taxes instead of using sales taxes as an alternative revenue to compensate for the constraints on property tax. The constraints for a city to raise sales taxes may explain this finding. Although municipal governments receive sales tax revenue, they do not always have the authority to change sales tax rates. For example, state of Illinois allows home-rule municipalities to impose a sales tax on general retails and selected products such as utilities, hotels, tobacco, and alcohol, in addition to state sales taxes[11]. In contrast, although Florida authorizes county governments to

[11] 65 ILCS 5/8-11

impose local discretionary sales surtaxes, the municipalities do not have the authority to raise sales tax revenue unless through the revenue-sharing program with the county government.[12] As a result, shifting revenue reliance onto sales tax is not an option for Florida municipalities when the capacity of property taxation is confined by TELs.

Even with the authority to impose sales taxes, the local political culture may be such that raising taxes is resisted by local voters and thus becomes politically infeasible. Elazar (1972) defines political culture as "the particular pattern of orientation to political action in which each system is embedded (p. 89-90)." Based on this conceptualization, Elazar identifies three cultures, the moralistic, the individualistic, and the traditionalistic. Both the individualistic and the traditionalistic culture view the legitimate role of the government to be minimal, mainly for correcting basic social problems and maintaining legal order. Similarly, Musgrave (1978) views that tax revolts that brought about the diffusion of TELs as conservative challenges to New Deal-style liberalism, and the conservative orientation echoes both the individualistic and traditionalistic political culture (Sigelman, Lowery, & Smith, 1983). One can anticipate that guided by such cultures, local voters will object to the proposal of increasing sales tax rates to compensate the revenue loss due to TELs, a set of policies that symbolizes the triumph of conservative ideology.

Local politicians react to the voters' preferences of revenue-raising policies. Campbell (1993) examines tax policy through the lens of fiscal sociology, an approach that differs from macroeconomics by recognizing a wide range of political, economic, cultural, institutional, and historical factors that influence fiscal policy making. He finds that in addition to partisan control that indicates local ideological leaning, electoral politics also lends explanation to variation in government taxation policies. Catering to local voters' preferences, incumbent politicians lower

[12] Fla. Stat. §212.054-055

taxes as a way to secure votes especially during competitive elections (Lee, 1986; Tufte, 1978). If there is any adjustment of tax policies, the adjustment will take place incrementally and subtly, in order to avoid upsetting voters (Campbell & Allen, 1992). In short, electoral politics facilitates the process through which local political culture shapes taxation policies, and in the municipalities with anti-tax culture, becomes an obstacle to shifting reliance onto sales taxes.

6.3 Implications of User Fees

Due to the restrictions of taxing authority discussed in the previous section, municipalities may find it more flexible to increase user fees as a way to enhance revenues than taxes. The findings provide evidence that shows when the property tax level is approaching to TEL ceiling, the city government start relying more on the user fees. Unlike tax authority granted by the state, the cities in the sample are large cities and have comparable functions and responsibilities. While the cities may not have access to sales taxes, they can use charges for services as an alternative revenue source when facing a closing TEL gap.

However, the finding of this study that stringent TELs result in a more concentrated user fee structure suggest that municipalities may have limited number of services for which they can charge. Functional responsibilities of a municipality are mandated by state laws, which limit the number of services for which a city charges user fees. Although municipal governments may have more discretion in raising service charges, the base for user fees is still constrained by the number of services provided. The concentration of user fee structure suggests that, instead of charging for new services, the cities choose to increase the fees for a few selected services, increasing the weights of these services in the user fee structure.

The increased reliance of user fees can also indicate service contracting-out or privatization of public services. Martell and Teske (2007) find that there is a shift toward

privatization in Colorado as a response to the TEL enacted in 1992. In Colorado, if an entity receives no more than ten percent of its funding from the state, it qualifies as an enterprise, a status that allows the government to exclude the cash fund revenues from TELs (Martell & Teske, 2007). Indeed, privatization has been adopted by governments which perceive it as a cost-saving strategy when facing institutional or economic constraints on revenue and spending (Boyne, 1998; Jang, 2006; Osborne & Gaebler, 1992). Contracting-out changes the funding mechanism for public services to be user fee-driven rather than tax-based. The increased reliance on user fees therefore can be a reflection of the restructuring of municipal public service driven by the revenue constraint, although further empirical studies need to be conducted to confirm the relationship between TELs and contracting-out mediated by revenue structure shift.

6.4 Influences of Revenue Structure Shift

Stringent TELs drive municipalities to be more reliant on non-tax revenues, and facilitate a shift from a traditional, property-tax-reliant revenue structure to a market-based, user-fee-reliant one. Charging user fees for public services has advantages. Following the benefit principle, it enhances economic efficiency by providing information to public service providers about citizens' willingness to pay and by ensuring the public services are valued at marginal cost (Bird, 2001). Citizens' response to user charges can also provide public managers with information about the quality of the public services, and thus enhance the efficiency and effectiveness of service delivery, or as Bird and Tsiopoulos (1996) advocates, promote a new dynamic of "client-responsive" management.

The complication of user fee financing lies in determining which services should be charged, and how much it should be charged to accurately reflect the cost of public good provision. Pricing public services is especially challenging if the services are less exclusive, have

externalities, and bear social costs in addition to economic costs. User charges are popular in transportation financing (Ecola et al, 2009; Wachs, 2005), and both scholars and practitioners have proposed to replacing motor fuel tax with highway charges on the basis of vehicle miles traveled. In 2013, Oregon passed the first legislation in the US that establishes a road usage charge system for transportation funding. Beginning July 1, 2015, for the volunteers who participate, this program will assess a charge of 1.5 cents per mile in lieu of the gasoline taxes, a revenue source usually earmarked for road maintenance[13]. However, Greene (2011) argues that this funding mechanism fails to build the social and environmental costs into the price. A more efficient pricing model will be a user fee on all energy used for transportation indexed to inflation; as such, the toll will provide a market signal by encouraging motorists to choose more energy efficient vehicles. Designing an efficient user fee structure for public services provided by municipalities is beyond the scope of this study; however, it is important for the municipalities, especially the ones shifting onto user fee-reliant revenue structure, to reexamine whether their public services are priced appropriately to provide the right economic incentives.

The reliance on user fees may also raise concerns about equity as well. This is particular a concern in the health care arena in low- and middle-income country contexts (McIntyre, Thiede, Dahlgren, & Whitehead, 2006; Ridde & Morestin, 2010). For example, Gertler, Locay, and Sanderson (1987) examined the welfare implications of user fees for health care in Peru, and found that user fees reduce the access to health care more for the poor than for the rich. Although user fees generate revenues, they also result in substantial reductions in consumer welfare with the burden of the loss borne by the lower income group. Although the issues of user fee reliance in the developing countries may not be fully generalizable to the US, policy makers should still keep in mind the effects on equity when formulating and implementing charges for public

[13] Senate Bill 810, 77th Oregon Legislative Assembly, 2013 Regular Session

services, and consider welfare policies as supplement in order to ensure service access of the disadvantaged group.

Chapter 7: Comparison with Conventional (Binary) Approach

A contribution this study strives to make is to improve TEL measurement. Compared to using dummy variables to indicate the types of TELs imposed on a city, measuring TEL stringency with TEL leeway has the advantage of capturing the difference in ceiling rates that vary across cities and change over time. It also takes into account the fact that the restrictiveness of a limit also depends on the current property tax level of a city; the same TEL can be more stringent for city A than for city B if city A has levied the property tax at a level close to the ceiling, whereas city B has levied at a lower level.

This section compares the findings of using TEL leeway with findings using a dummy-variable approach. I used dummy variables to indicate the existence of levy, rate, and assessment limits imposed on cities, and an interaction term between rate and assessment limits to indicate the binding effect when these two TELs are imposed simultaneously. I then analyzed their effects on revenue structure using pooled OLS and panel regressions with year- and city-fixed effects. Revenue structure is measured with the same variables as the ones in Chapter 5. For each dependent variable, I also ran the same model specification with and without median household income, whose data availability shortens the study period by five years. The findings are presented below. Table 15 through table 19 report the results of the regressions using TEL type dummy variables, with the results of using TEL leeway presented for comparison. Because TEL type indicates stringent limitation on property taxation whereas TEL leeway indicates available space left for additional property taxes, the same directional effects of TELs are indicated with opposite signs of the coefficients on TEL binary variables and on TEL leeway.

7.1 Reliance on Property Taxes

Table 15 shows TELs negatively affect the reliance of property taxes when TELs are measured by the presence of different limit types. Levy limit, which arguably is the most restrictive as it sets the limit directly on property tax revenue growth, has no significant effect on the share of property taxes across all models. The Rate limit is negatively related to the share of property taxes across all model specifications, but the coefficients are only significant in the pooled OLS model without median household income (column 2) and the panel regression with fixed effects with the income variable (column 8). The share of property taxes is 0.02 percentage point lower in the cities subject to rate limits when the model controls for median household income an unobserved city and time characteristics.

Assessment limit is negatively related to the reliance on property taxes in pooled OLS models (column 2 and column 4), but the coefficients are not statistically significant. In the panel regressions with fixed effects at the city- and year-level, assessment limit is significantly and positively related to the share of property taxes. The share of property taxes is 0.04 percentage point higher in the cities subject to assessment limits (column 6), or 0.03 percentage point higher if the model includes median household income (column 8).

The interaction between rate and assessment limit is not a significant predictor in the pooled OLS models, but is significantly and negatively related to the share of property taxes in the fixed-effect models. The share of property taxes is 0.05 percentage point lower in the municipalities subject to both rate and assessment limits when the model does not control for median household income (column 6); or 0.02 percentage point lower when the model controls for median household income (column 8).

In sum, when TELs are measured by the presence of limit types, the findings confirm the conventional theory that cities subject to TELs rely less on property taxes. In contrast, TEL leeway is not a significant predictor for the reliance on property taxes in these models, but appears to be significantly and positively related to the share of property taxes in 2SLS models discussed in Chapter 5. The contradictory findings suggest that how TELs affect municipal property taxation may be more complicated than one expects.

7.2 Reliance on Sales Taxes

Table 16 shows the results of TELs' effects on the reliance on sales taxes using binary variables of TEL types. Although in the pooled OLS models, levy limit, rate limit, and assessment limit do not have significant effects on the share of sales taxes (column 2 and column 4), all three TEL types have significant and positive effects when the models control for unobserved city and time factors. The magnitudes of their effects are very close in the models with and without median household income. After controlling for median household income, the result shows that the presence of a levy limit will increase the share of sales taxes by 0.03 percentage point (column 8). The presence of a rate limit and the presence of an assessment limit also have effects with the same magnitude.

On the other hand, the pooled OLS model and the fixed-effect model show opposite findings in regard of the effect of the simultaneous presence of rate and assessment limit. In the pooled OLS models, the interaction between rate and assessment limit is the only significant TEL predictor (column 2 and column 4), indicating that the simultaneous existence of rate and assessment limit results in 0.13 percentage point increase in the share of municipal sales taxes. The results of the fixed-effect models, however, suggest that cities with rate and assessment limits rely less on sales taxes by 0.07 percentage points. In other words, the simultaneous

presence of rate and assessment limit affects municipal sales taxes in the opposite way of levy, rate, and assessment limits.

Again, the binary variable approach does not have the same finding as the one from the analysis using TEL leeway. One should note, however, that different TEL types affect the reliance on sales taxes differently. The finding that the simultaneous presence of rate and assessment limits result in a lower share of sales taxes is consistent with the conclusion drawn from TEL leeway analysis.

7.3 Reliance on User Fees

Table 17 reports the effects of TEL types on the reliance on user fees. Levy limit is significantly and positively related to the share of user fees in the pooled OLS models (column 2 and column 4), indicating that the share of user fees is approximately 0.03 percentage point higher in the cities subject to levy limits. The coefficient on levy limits remains significant but becomes smaller in the fixed-effect panel regression model without median household income (column 6). Levy limit is not a significant predictor in the fixed effect model controlling for median household income.

Rate limit, assessment limit, as well as the interaction between the two are not significant predictors in the pooled OLS models or the fixed-effect model without median household income. In the fixed-effect model including median household income (column 8), however, the coefficients on these three variables are all significant. Rate limit and assessment limit are negatively related to the reliance on user fees; the presence of rate limit and assessment limit will result in 0.03 and 0.027 percentage point decrease in the share of user fees, respectively. On the other hand, cities subject to both rate and assessment limits have the share of user fees that is 0.3 percentage point higher.

In short, as the analysis on the reliance on sales taxes, TELs' effects on user fees also vary by TEL types. It is consistent with the finding of TEL leeway analysis that stringent TELs (levy limit, rate and assessment limit) result in higher reliance on user fees.

7.4 Tax Revenue Diversification

Table 18 reports the effects of different TEL types on tax revenue diversification. In the pooled OLS models levy limit is significantly and positively related to the reverse Herfindahl Index that measures tax revenue diversification (column 2 and column 4), indicating cities subject to levy limits have more diversified tax structures. After controlling for city- and time-factors, however, levy limits become significantly and negatively related to tax revenue diversification (column 6 and column 8).

Rate limits and assessment limits have opposite effects on tax revenue diversification. Rate limit is significantly and positively related to tax revenue diversification in the fixed-effect model controlling for median household income. On the other hand, both the fixed-effect models with and without median household income indicate that assessment limits result in less diversified tax revenue structure. Cities subject to both rate and assessment limits also have more diversified tax revenue structures.

When TEL stringency is measured by TEL leeway, the analysis shows that more stringent TELs will result in more concentrated tax revenue structure. Levy limits and assessment limits show similar effects, whereas cities subject to rate limits, or rate limits and assessment limits have more diversified tax revenues.

7.5 User Fee Diversification

Table 19 reports the effects of different TEL types on user fee diversification. Both levy limit and rate limit are significantly and positively related to user fee diversification in the fixed-

effect model controlling for median household income (column 6 and column 8), although not significant in the other model specifications. The fixed-effect models also indicate that assessment limits result in more diversified user fee structures, and the magnitude of the effect becomes larger when the model includes median household income.

Cities subject to both rate and assessment limits have more concentrated user fee structures. The coefficients on the interaction between rate and assessment limits are negative in all model specifications, but the effect is only significant in the fixed-effect model controlling for median household income. Compared to the TEL leeway analysis that shows stringent TELs result in a higher level of user fee concentration, the binary variable approach shows the opposite, that is, most of the TEL types make the user fee structure more diversified.

7.6 Summary: Differences between the binary variable and the TEL leeway approach

Table 20 summarizes the differences in the findings of TEL effects on revenue structure between the two approaches, namely, the binary variable approach and the TEL leeway approach. As indicated, the results of TEL leeway analyses are different from the ones of the binary variable analyses. An explanation to the differences lies in the different aspects of TELs measured by these two approaches. The binary variable approach measures the enactment of certain type of TELs over time and as such, it varies very little across years or across cities within the same state. In this sense, the binary variable approach captures the symbolic effects of TELs. On the other hand, TEL leeway varies both across years and across cities because it measures the stringency of the property tax ceiling given the level of tax levy of difference cities in different years.

It is premature to determine which approach is better given the data limitation of this study; however, the different findings with different TEL measurements indicate that TELs

affect municipal revenue structure in a more complex way than the literature has previously suggested. Table 21 compares the magnitudes of TEL effects measured by TEL types and TEL leeway. To measure the change in TEL leeway given a certain TEL type, I calculated the differences between the TEL leeway medians with and without a TEL type. For example, the median of TEL leeway for the cities without levy limits is 0.4 whereas the median of TEL leeway for cities subject to levy limits is -0.03. Therefore, the difference of 0.43 (0.4-(-0.03)) is an estimate of the change in TEL leeway if a levy limit is imposed onto a city. Panel 1 reports the differences in TEL leeway medians given TEL types, and Panel 2 presents the simulated TEL effects on revenue source reliance given different TEL types and the changes in TEL leeway.

The simulation shows that the effects of TELs differ between the dummy variable measurement and TEL leeway. Overall, the effect of TELs, when measured by TEL leeway, is much smaller than the one measured by TEL types. As discussed before, TEL leeway often suggests the opposite TEL effects of the findings indicated by dummy variables of TEL types. (Reminder: because TEL leeway measures the lack of TEL stringency, the opposite signs on TEL leeway and on TEL type indicate the same directional effect of TELs). For example, when TELs are measured by TEL type, the simultaneous presence of rate and assessment limit results in 0.01 percentage point decrease in the share of property taxes. The presence of rate and assessment limit results in a decrease of TEL leeway by 0.133 (panel 1), which in turn increases the share of property taxes by 0.0001 percentage point. This effect is the opposite of the one found using TEL dummies, with the absolute magnitude being only one hundredth of the one from the binary variable approach.

Even when both approaches indicate the same directional effect of TELs, the extent to which TELs affect revenue source reliance is much smaller when TELs are measured by TEL

leeway. For example, an assessment limit results in an increase of 0.043 percentage point in the share of property taxes, when the limit is measured by a dummy variable. The assessment limit decreases TEL leeway by 0.19; with this as a measure for the change in TEL stringency given the assessment limit, the increase in the share of sales taxes is in fact minimal (0.0001 percentage point). In sum, as indicated by the comparison with the binary variable approach, TEL leeway reveals different way through which TELs affect municipal revenue structure.

Chapter 8: Conclusion & Future Research

This study introduces a new way of understanding state-imposed TELs. I collected TEL law data using a replicable search strategy, and conducted legal research on the following aspects of TELs' terms and conditions as well as their amendments: institutional codification, maximum allowable rates for growth, exemptions, and overriding processes. The legal research updates the ACIR's (1995) report on TELs and contributes to the field of public finance with richer TEL data. The exercise also shows the potential of legal research as a useful method that can be extended to a wide variety of topics in policy studies.

Based on the TEL data, I constructed a new measure for TEL stringency, "TEL leeway," to examine the effects of TEL stringency on municipal revenue structure. TEL leeway indicates the gap between the legal ceiling and the actual property tax levy. Compared to the conventional binary variable approach that fails to take into account the between-city and across-year variations, TEL leeway incorporates the different maximum rates for growth between states, and captures the different levels of stringency based on each city's existing levy level. Although the index of TEL leeway is lack of accuracy due to the limited data on TEL exemptions, the exercise is worthwhile for demonstrating an alternative way to measuring TEL stringency.

The results indicate that municipalities respond to state-imposed TELs in a more complex way than the previous literature indicates. Non-tax revenues such as user fees appear to be a preferable alternative revenue source, whereas tax revenues such as sales taxes are subject to both institutional and political constraints. The magnitudes of TELs' effects on municipal revenue structure, however, are marginal. The results are sensitive to the change of model specifications and the change of study period. The findings are also different from ones using the

conventional binary approach, which suggests different TEL types can have opposite effects on the reliance of alternative revenue sources.

For future research, learning the behavioral response to a closing TEL gap will also further the understanding about how TELs influence local fiscal policy making. As Martell and Teske (2007) find, the state of Colorado used revenue earmarking, privatization, and "gimmick" strategy in response to Taxpayer Bill of Rights that imposes revenue and expenditure limits on state budget. I expect local governments have adopted similar strategies to cope with TELs, especially when raising alternative taxes or charging services are politically infeasible. It will be interesting to explore how TELs affect other aspects of local government finance, including service delivery restructuring, budgetary processes, as well as financial conditions. In regard of the application of the legal research method, case laws provide an opportunity for researchers to gain insights of how local governments administer TELs and interact with concerned parties such as state governments and local businesses; the study of case laws, therefore, can be a useful extension of the legal research method to the field of public finance.

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Tables & Figures

Table 1: Empirical Studies on TEL Effects on Local Finance

Author	Year	Dependent Variables	Units of Analysis & Sample	Period	Analytical Strategy	Endogeneity treated?	TEL Measurement	Findings
Size of Government								
Reduce spending								
Merriman	1986	Spending per capita	168 municipalities in NJ	1975-1976	OLS; comparison between observed & counterfactual spending level	Yes	Allowable spending mandated by NJ cap law	63% municipalities have reduction in spending, whereas 36% increased their spending level
Preston & Ichniowski	1991	Revenue growth	1,368 cities in the US	1977-1986	First difference	No	Binary variables of TEL types identified by ACIR (1995)	•Overall property tax rate limits coupled with assessment limits can reduce the growth of property taxes and total municipal revenue per capita by 45% and 13%, respectively. •The limitations on total revenue are associated with decreased intergovernmental revenue and increased non-property tax revenue
Poterba & Rueben	1995	Wage growth of local government employees	48 continental states	1979-1980; 1990-1991	Panel with FE	No	A binary variable for TELs with binding effects	•Local government employees have experienced slower wage growth in states with property-tax limits than states without such limits
Shadbegian	1998	Expenditure per capita; property tax per capita	Local revenue aggregated to state; all 50 states	1972-1992	Panel with FE	IV = Degree of monopolization of government	Binary variables for overall TEL, and property tax restricted to 5% growth	•TELs lead to reductions in both level and growth of local government revenue, expenditures, and property tax per capita
Mullins	2004	Coefficient of variation in per capita revenue and per capita expenditure	Counties in 48 continental states	1972-1997	Panel with FE	No	Binary variables for - Type 1: non-binding Type 2: potentially-binding Type 3: Both 1&2	•TELs increased service differentials across general purpose governments and school districts. •Effects are found to be asymmetric, with increased variation greatest within counties comprising the urban core and those with relatively more disadvantaged populations. •TELs are most constraining on the ability of governments serving economically less prosperous and at risk populations to meet public service needs.

Author	Year	Dependent Variables	Units of Analysis & Sample	Period	Analytical Strategy	Endogeneity treated?	TEL Measurement	Findings
Dye, McGuire & McMillen	2005	Property tax growth rates; School district operating & instructional expenditure growth rates	All municipalities and school districts in IL, outliers excluded	1991-2003	Panel with FE	IV= whether counties are allowed to hold referenda on the tax cap & local economic base factors Propensity score matching	A binary variable to indicate the year when TEL was enacted; Number of years of TEL implementation	•Tax cap in IL is effective and appears to slow the growth of municipal and school property taxes and the growth of school expenditures •The cap appears to have a larger impact for municipalities and school districts •For school expenditures, there does not seem to be a difference between the short-term and long-term effects of the cap.
Chapman & Gorina	2012	Per capita direct general expenditures; Own source revenues	378 cities from 44 states with population over 50,000	2002	3SLS	IV = Number of municipal council members, crime rate, expenditure diversity	Binary variable of potentially binding limit	•Potentially binding state-imposed property tax limits effectively restrict local revenues •The form of government is a significant predictor of local expenditures.
Little impact on spending								
Lowery	1983	Property tax revenue; state aid; non-property tax revenue; expenditure; employment	12 states (4 states as TEL treatment, 8 states as control)	1957-1976	Interruptive time-series	Natural experiment with control group	Number of years of TEL implementation	•TELs were not found to have sharply reduced expenditures and local employment, but may have led to less reliance on property taxes. •This is accomplished by increased reliance on state aid and alternative local revenue sources.
Joyce & Mullins	1991	Total amount of taxes; total local property tax; total state aids; % of expenditure by spending category	Local revenues aggregated to state in all 50 states	1960-1988	Description of revenue change trend	No	Type 1: non-binding Type 2: potentially-binding Type 3: Both 1&2	•TELs had little or no impact on increasing reliance on general tax revenue source. •TELs had little impact on the relative amount each government level spent except public welfare expenditures.

Author	Year	Dependent Variables	Units of Analysis & Sample	Period	Analytical Strategy	Endogeneity treated?	TEL Measurement	Findings
Fligio & O'Sullivan	2001	Ratio of spending on police and fire protection to spending on general administration	5,150 US cities	1975-1986	Differences in means test; Panel with FE	No	Group cities by: •Whether they are subject to TEL; •Whether they have local-override options	•Cities with local override options cut service inputs by a relatively large amount while cutting administrative inputs by a relatively small amount in an attempt to get voters to override the limit. •Among cities with local-override options, the largest service input decrease occurs in the cities whose citizens have the least inter-jurisdictional mobility and in cities run by city managers.
Nguyen-Hoang	2013	Expenditures per pupil	695 school districts in NYS	1980-1994	Difference in differences	Propensity score matching	3-way interaction between binary variables for school districts with limits, years after the enactment, and the counter of the years	•Did not find tax limit repeal in New York State to have immediate or gradual impact on the average spending of school district. •The "at limit" districts were not constrained by tax limits, either because the desired spending levels were exactly "at limit," or because the limits were no longer binding after the districts utilized other non-property tax revenues such as state aid. •State provides supplemental aid in addition to regular formula-based state education aid to the at-limit districts.
Change in Revenue Structure								
Mullins & Joyce	1996	Shifts in reliance among various revenue sources; change in the state share of total state-local revenue/expenditure	Local aggregated to state; 48 continuous states	1960-1990	Panel with FE	No	Binary variables for - Type 1: non-binding Type 2: potentially-binding Type 3: Both 1&2	•TELs lead to decreased use of local taxes and increased use of state aid and other nontax revenues. •Potentially binding TELs initially reduce local reliance on nontax revenues but that the effect becomes positive over time.
Dye & McGuire	1997	Property tax per capita	All types of local governments in IL	1988-1993	Natural experiment	Yes	A binary variable to indicate the year when TEL was enacted	•The growth rates of property taxes are diminished by the property tax limits •The effects are stronger in the long run than the short run.

Author	Year	Dependent Variables	Units of Analysis & Sample	Period	Analytical Strategy	Endogeneity treated?	TEL Measurement	Findings
Shadbegian	1999	tax revenue per capita	Local aggregated to 2, 955 counties	1962-1987	Panel with FE	IV = direct legislation rules (time-invariant) & rate at which voters are able to pass citizen referenda	Binary variables of TEL types identified by ACIR (1995)	•TELs lead to reductions in per capita local taxes and increases in per capita nontax general revenue •The substitution effect is not dollar for dollar and only occurs in local governments facing less stringent TELs (where local property taxes are not restricted to 5 percent growth or less) and not in those facing more stringent TELs •More stringent TELs reduce more own-source revenue than less stringent TELs.
Skidmore	1999	Different revenue sources per capita	Local aggregated to state; 49 states (excluding AK)	1976-1990	Panel with FE	No	Binary variables of TEL types identified by ACIR (1995)	•Property tax limits reduce per capita local own-source revenue and property taxes but are also associated with increases in unrestricted revenues, particularly state aid. •TELs are only partially effective in reducing revenues because political agents bypass limitations by transferring rev reliance to unconstrained sources
Johnston, Pagano, & Russo	2000	tax revenue per capita	107 counties in 44 states	1997-1998	Panel with FE	No	Binary variables of TEL types identified by ACIR (1995)	•TEL restrictiveness, combined with general taxing authority, not only mitigates county tax reliance and related resident tax burdens but also generates higher fee burdens for county residents. •State governments tend to provide more financial assistance to counties constrained by more restrictive TELs.
Hoene	2004	Alternative revenue sources before and after Prop 13	Cities in CA	1972-2002	Description of revenue change trend	No	Time point: before vs. after	•California's cities not only have become less reliant on property taxes but also more reliant on user charges and fees. •These cities have not increased reliance on sales taxes as much as expected.
Sun	2014	per capita general own-source revenue or revenue from different sources	724 cities with population > 25K	1970-2006	Panel with FE	IV= passage rate of citizen initiatives in a state	Binary variables of TEL types identified by ACIR (1995)	•TELs lead to considerable reductions in property taxes but substantial increases in sales taxes, income taxes, and user charges per capita. •The total increases in per capita sales taxes, income taxes, and user charges exceed the reduction in per capita property taxes, thus

Author	Year	Dependent Variables	Units of Analysis & Sample	Period	Analytical Strategy	Endogeneity treated?	TEL Measurement	Findings
								resulting in a net gain of $855 in per capita municipal general own-source revenue.
State Centralization								
Mullins & Joyce	1996	Total state direct general expenditures as share to total state and local direct expenditures	Local aggregated to state; 48 continuous states	1960-1990	Panel with FE	No	Binary variables for - Type 1: non-binding Type 2: potentially-binding Type 3: Both 1&2	•Binding TELs are positively related to state responsibility for spending especially for education •Magnitude of the positive effect of TELs on state expenditure increases over time.
Sokolow	2000	Change in property tax & state aid	9 western states (AZ, CA, CO, ID, MT, OR, UT, WA, WY)	1970-1994	Descriptive analysis	No	Qualitative description of TEL provision	•TELs facilitates state centralization by shifting the reliance on property taxes to state aid. •In western states, the property tax has lost much of its local character, becoming a fiscal and political tool for state policy makers.
Saxton, Hoene, & Erie	2002	Revenues, expenditures, redevelopment efforts	5 local jurisdictions in the County of Los Angeles (County, City of LA, 3 suburban communities)	1990-1991; 1997-1998	Case studies	No	Qualitative description of TEL provision	•TELs leaves the county with little fiscal authority and compromises its home rule status. •The city diversifies revenue sources and scales back nonessential services, making short-term, recovery-based financial decisions and relying more on economic growth. •Suburban cities also turn to short-term policy options with their main revenue source limited by the institutional constraint, although the degree varies based on the community affluence and demand for services.
Impacts on Tax Base & Financial Condition								

Author	Year	Dependent Variables	Units of Analysis & Sample	Period	Analytical Strategy	Endogeneity treated?	TEL Measurement	Findings
Bradbury, Mayer & Case	2001	% change in school and non-school spending	208 cities and towns in MA	1990-1994	First difference	Yes; IV = community characteristics	Number of years of initial levy reductions required to lower that rate to 2.5%; How close a community was to its levy limit; Whether the town passed any override to raise the limit	•Constrained local spending in some communities, with most of its impact on school spending. •Constrained communities realized gains in property values to the degree that they were able to increase school spending despite the limitation. •Changes in non-school spending had little impact on property values.
Skidmore, Ballard, & Hodge	2010	Effective property tax rate after assessment growth limits	628 individuals participating in The State of the State Survey of MI	2008	OLS	No	Taxable value of the property capped by TEL	•The length of tenure in a home is negatively correlated with the homeowner's effective rate of property tax. •Long-time homeowners enjoy an average reduction in effective tax rates (relative to new homeowners) of 19 percent. •The cap also appears to have reduced effective property tax rates for older homeowners, and for those with higher incomes. •Taxable value limit is regressive on the revenue side but progressive on the expenditure side.
Skidmore & Tosun	2011	In-migration rate	All counties in Michigan	1994-2006	2SLS	Yes; IV = a series of economic base factors	Ratio of state equalized value to taxable value capped by TEL	•Differential tax prices resulting from the assessment growth cap have reduced in-migration.
Clair	2012	standard deviation of the annual percent change of real per-capita revenues; Expenditure volatility	113 counties in CO (treatment) and in 92 cities in WY, 102 cities in CT, and 144 cities in NH (control)	1986-2000	Difference in differences	Yes	Binary variable for TABOR (limit on the growth rate of local government revenues)	•TELs increase revenue and expenditure volatility by shifting the revenue reliance onto other more elastic sources (sales tax, user charges).

Table 2: Calculation of maximum levy allowed based on different TEL combinations

	Levy=0	**Levy=1**
Rate=0, Assess=0	$AssessValue_{t-1}$*$p\text{-}rate_{max}$	$Levy_{t-1}$*(1+LevyCap)
Rate=1, Assess=0	AssessValue*RateCap	min[$Levy_{t-1}$*(1+LevyCap), AssessValue*RateCap]
Rate=0, Assess=1	MaxAssess*p-rate	min[$Levy_{t-1}$*(1+LevyCap), MaxAssess*p-rate]
Rate=1, Assess=1	MaxAssess*RateCap	min[$Levy_{t-1}$*(1+LevyCap), MaxAssess*RateCap]

This table outlines all the combinations for calculating P(max), the maximum levy allowed by state-imposed TELs. The maximum levy can be inferred given the maximum property tax rate and the maximum assessment, or by applying the maximum allowable rate for levy growth to the base value, usually the actual levy of the prior year. The notations are as below:

- "Rate", "Assess" and "Levy" denotes the enactment of rate, assessment, and levy limit, respectively (=1 if enacted).
- "LevyCap" denotes the maximum allowable rates for growth for levy.
- "RateCap" denotes the property tax rate cap.
- "AssessValue" denotes the assessment of a city in a given year.
- "P-rate" is the actual property tax rate of a city in a given year.
- "MaxAssess" denotes the maximum assessment a city is allowed to collect given the assessment limit; here MaxAssess=$AssessValue_{t-1}$*(1+AssessCap), where "AssessCap" is the maximum allowable rates for growth for assessment.

For the cities with no TELs, I used the maximum property tax rate, "$p\text{-}rate_{max}$", across all cities in a given year as the rate limit in order to construct TEL leeway. The rationale for this treatment is that, although these cities are not subject to any legal limits on property taxes, their levy in practice is not infinite, either. The maximum tax rate in the sample provides a reasonable estimate for the highest possible level of tax levy. The treatment also has the advantage of including no-TEL cities in the sample for analysis.

Table 3: States by TEL types in 2013

	Levy=0	**Levy=1**
Rate=0, Assess=0	CT, DE, HI, NH, TN, VA, VT	CO*, KS, MA, ME, MS, MT, NJ*, NV, RI, WA, WI
Rate=1, Assess=0	AL, NC, ND, OH, WY	AK, AR, ID, IL, IN, KY, LA, MO, NE*, PA, SD, WV, UT
Rate=0, Assess=1	GA (only in 2010)	MD, MN, NY
Rate=1, Assess=1	FL, IA, NM, OK, OR, SC, TX	AZ*, CA*, MI

States in shaded cells impose no TEL, or only non-binding TELs on municipalities. Non-binding TELs are the ones that only the property tax rates or the assessment growth is capped.
*States also impose limits on municipal general revenue and expenditure.

Table 4: Number of states by TEL maximum allowable rate for growth

	Levy Limit	Rate Limit	Assessment Limit	General Revenue Limit
Constant Number	21	26	12	1
Fiscal Growth Factor	8	1	4	3
Example	• Change in CPI (IL, SD) • Change in assessed property values (IN, MO) • Change in state & local government purchases of goods and services index (NM) • Change in price deflator for government consumption expenditures for state and local governments (MN) • Amount of debt service of a given year (CA) • Amount determined by voters (NE)	• Sum of change in CPI and change in population (SC)	• Change in CPI (CA) • Change in assessed values (MN, NM, OR)	• Sum of change in CPI and change in population (AZ, CA, CO)
Total	29	27	16	4

Table 5: States by TEL exemption conditions

		State	Total
Debt services/ Capital Projects	Economic development	AL, CA, CO, IL, KY, LA, MT, NE, NJ, OR, WY	11
	Education/Library	AL, FL, IA, IL, WI	5
	Public welfare	CA, FL, IN, NJ	4
	Pension/Retirement costs	CA, IL, NJ, OR	4
	Federal/State mandates	AZ, CO, ID, ME, MN, MS, NV, SC, WV	9
	Interlocal collaboration	CA, KY, IN, MI, MT, NJ, WI	7
	Non-specified GO bonds	AK, AL, AR, MA, MI, MD, MO, NV, ND, NM, NY, OH, OK, PA, RI, SD, TX, WA, WY	19
Voter approval	Simple majority of electors	AL, AR, FL, LA, MT	5
	Simple majority of voters	IL, IN, NJ	3
	Super majority of electors	CO, MO, MS	3
	Super majority of voters	AZ, CA, MA, NE, NV, NY, RI, SC, SD, WA, WV	11
	Referendum	FL, IA, IL, KY, MN, NV, NJ, WI	8
	Unknown	AK, ID, ME, MI, ND, NM, OH, OK, OR, PA	10

Table 6: Categories of TEL-referencing laws

	California	Colorado	Illinois	Massachusetts	Total
Education	17		8		25
Special districts		3			4
Revenue & Taxation	29	4	13	1	47
Functional Responsibilities	4	4	4		11
Government Administration	22	8	4	7	41
Total	**72**	**19**	**29**	**8**	**128**

Table 7: Sources of missing Data

	Number of Observations
Models using TEL Leeway (not including median household income)	
Full Sample: 100 cities for 17 years (1995-2011)	1,700
Missing TEL Leeway (no data on assessed values)	
3 cities (Augusta, Syracuse, Tucson), 17 years	-51
10 cities[14] for some years	-40
Total	**1,609**
Models using median household income & TEL Leeway	
Full Sample: 100 cities for 17 years (1995-2011)	1,700
No income data on all cities 1995-1999	-500
No income data on 41 cities 2000-2004	-205
Has income data but missing TEL leeway values	-44
Total	**951**

[14] They are: Boise (1995, 1998, and 1999), Little Rock (1995), Los Angeles (1995), Jackson (1995, 2011), Minneapolis (1995-1997), Modesto (1995, 2006, 2007, 2009-2011), Montgomery (1995-2009), New Haven (1995-2002), and Phoenix (1995-1996).

Table 8: Summary statistics

	N	Mean	Standard Deviation	Min	Max
Share of Property Tax	1,609	0.209	0.107	0.022	0.639
Share of Sales Tax	1,609	0.139	0.122	0	0.543
Share of User Fees	1,609	0.230	0.104	0.017	0.651
R-HHI (tax revenue)	1,609	0.907	0.051	0.591	0.993
R-HHI (User fees)	1,609	0.976	0.029	0.716	1
Binding	1,609	0.567	0.496	0	1
TEL Leeway	1,609	-0.237	2.170	-27.306	1
TEL Leeway2 (All negative values=0)	1,609	0.292	0.355	0	1
Population	1,609	551,873	921,367	77,295	8,214,426
Median HH Income (real 2011 dollars)	951	51,750	9,993	26,115	95,268
Council-Manager	1,609	0.365	0.482	0	1
Home rule	1,609	0.684	0.465	0	1

Table 9: Reliance on Property Taxes

	Pooled OLS		Fixed Effect		2SLS		2SLS: negative leeway=0	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
TEL Leeway	0.0058	0.0067	-0.0005	-0.0024	-0.0028	-0.0034***	-0.0253	-0.0319*
	(0.0043)	(0.0049)	(0.0013)	(0.0020)	(0.0030)	(0.0011)	(0.0222)	(0.0167)
binding	0.0190	0.0252	0.0018	0.0175***	0.0067	0.0192***	-0.0057	-0.0035
	(0.0225)	(0.0223)	(0.0079)	(0.0065)	(0.0090)	(0.0062)	(0.0092)	(0.0102)
Ln(Population)	-0.0175	-0.0207**	0.0259*	0.0032	0.0256*	0.0031	0.0256*	0.0032
	(0.0117)	(0.0101)	(0.0146)	(0.0142)	(0.0145)	(0.0133)	(0.0147)	(0.0135)
Ln(Income)		0.1564***		-0.0260		-0.0257		-0.0278
		(0.0458)		(0.0307)		(0.0287)		(0.0289)
Council-Manager	-0.0239	-0.0183						
	(0.0220)	(0.0212)						
Home-rule	-0.0430	-0.0474*						
	(0.0273)	(0.0269)						
City fixed effect	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	No	No	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.052	0.136	0.904	0.912	0.904	0.912	0.904	0.912
N	1609	951	1609	951	1609	951	1609	951

Table 10: Reliance on Sales Taxes

	Pooled OLS		Fixed Effect		2SLS		2SLS: negative leeway=0	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
TEL Leeway	-0.0102	-0.0133	0.0014	0.0033**	0.0081***	0.0048***	0.0382	0.0316
	(0.0098)	(0.0098)	(0.0011)	(0.0014)	(0.0019)	(0.0012)	(0.0270)	(0.0240)
binding	0.0458*	0.0442*	-0.0142	0.0096	-0.0167	0.0071	0.0029	0.0321**
	(0.0249)	(0.0262)	(0.0092)	(0.0068)	(0.0111)	(0.0062)	(0.0191)	(0.0130)
Ln(Population)	0.0139	0.0185	0.0191	-0.0057	0.0062	-0.0055	0.0060	-0.0059
	(0.0128)	(0.0117)	(0.0221)	(0.0166)	(0.0176)	(0.0155)	(0.0178)	(0.0155)
Ln(Income)		-0.1154***		-0.0057		-0.0062		-0.0035
		(0.0433)		(0.0303)		(0.0283)		(0.0287)
Council-Manager	0.0197	0.0348						
	(0.0259)	(0.0245)						
Home-rule	-0.0174	-0.0298						
	(0.0337)	(0.0342)						
City fixed effect	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	No	No	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.052	0.136	0.904	0.912	0.904	0.912	0.904	0.912
N	1609	951	1609	951	1609	951	1609	951

Table 11: Reliance on User Fees

	Pooled OLS		Fixed Effect		2SLS		2SLS: negative leeway=0	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
TEL Leeway	0.0022	0.0026	-0.0019***	-0.0029	-0.0040	-0.0058***	0.0045	-0.0339***
	(0.0026)	(0.0035)	(0.0007)	(0.0018)	(0.0034)	(0.0013)	(0.0314)	(0.0131)
binding	0.0708***	0.0768***	0.0301**	0.0212***	0.0367**	0.0261***	0.0378*	-0.0018
	(0.0202)	(0.0237)	(0.0121)	(0.0076)	(0.0149)	(0.0065)	(0.0199)	(0.0085)
Ln(Population)	0.0019	0.0021	-0.0154	-0.0089	-0.0085	-0.0092	-0.0081	-0.0088
	(0.0127)	(0.0149)	(0.0205)	(0.0117)	(0.0179)	(0.0109)	(0.0181)	(0.0111)
Ln(Income)		-0.0126		-0.0163		-0.0152		-0.0184
		(0.0378)		(0.0281)		(0.0266)		(0.0262)
Council-Manager	0.0341*	0.0297						
	(0.0196)	(0.0204)						
Home-rule	-0.0181	-0.0123						
	(0.0191)	(0.0206)						
City fixed effect	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	No	No	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.052	0.136	0.904	0.912	0.904	0.912	0.904	0.912
N	1609	951	1609	951	1609	951	1609	951

Table 12: TELs' Effects on Tax Revenue Diversification

	Pooled OLS		Fixed Effect		2SLS		2SLS: negative leeway=0	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
TEL Leeway	0.0011	0.0013	-0.0008	-0.0007	0.0002	0.0015***	0.0240	0.0228*
	(0.0015)	(0.0019)	(0.0005)	(0.0013)	(0.0025)	(0.0006)	(0.0195)	(0.0118)
binding	0.0134	0.0106	0.0024	-0.0148***	0.0013	-0.0186***	0.0125	-0.0037
	(0.0100)	(0.0110)	(0.0076)	(0.0055)	(0.0089)	(0.0037)	(0.0134)	(0.0083)
Ln(Population)	0.0107**	0.0097**	-0.0091	0.0100	-0.0052	0.0103	-0.0049	0.0103
	(0.0051)	(0.0048)	(0.0100)	(0.0068)	(0.0096)	(0.0064)	(0.0098)	(0.0065)
Ln(Income)		-0.0013		0.0060		0.0052		0.0064
		(0.0203)		(0.0137)		(0.0128)		(0.0129)
Council-Manager	0.0172*	0.0145*						
	(0.0088)	(0.0084)						
Home-rule	0.0147	0.0223**						
	(0.0112)	(0.0112)						
City fixed effect	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	No	No	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.052	0.136	0.904	0.912	0.904	0.912	0.904	0.912
N	1609	951	1609	951	1609	951	1609	951

Table 13: TELs' Effects on User Fee Diversification

	Pooled OLS		Fixed Effect		2SLS		2SLS: negative leeway=0	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
TEL Leeway	-0.0009	-0.0015*	0.0005***	0.0004	0.0010	0.0010***	0.0014	0.0062**
	(0.0007)	(0.0009)	(0.0001)	(0.0004)	(0.0007)	(0.0003)	(0.0071)	(0.0029)
binding	-0.0077	-0.0079	-0.0038	0.0004	-0.0046	-0.0006	-0.0038	0.0043***
	(0.0059)	(0.0073)	(0.0028)	(0.0015)	(0.0034)	(0.0014)	(0.0050)	(0.0017)
Ln(Population)	0.0021	0.0029	0.0087	0.0045	0.0058	0.0046*	0.0057	0.0045*
	(0.0025)	(0.0033)	(0.0054)	(0.0029)	(0.0039)	(0.0027)	(0.0040)	(0.0027)
Ln(Income)		-0.0094		0.0089		0.0086		0.0092
		(0.0112)		(0.0079)		(0.0074)		(0.0074)
Council-Manager	-0.0004	0.0017						
	(0.0057)	(0.0066)						
Home-rule	0.0005	-0.0016						
	(0.0044)	(0.0051)						
City fixed effect	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	No	No	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.052	0.136	0.904	0.912	0.904	0.912	0.904	0.912
N	1609	951	1609	951	1609	951	1609	951

Table 14: Magnitude of TEL leeway effects by model specification

	Fixed Effect		2SLS		2SLS: negative leeway=0	
	No Income	with income	No Income	with income	No Income	with income
Share of property taxes	-0.0004	-0.0020	-0.0024	-0.0029	-0.0215	-0.0271
Share of sales taxes	0.0012	0.0028	0.0069	0.0041	0.0325	0.0269
Share of user fees	-0.0016	-0.0025	-0.0034	-0.0049	0.0038	-0.0288

Note: The estimation is based on the change in TEL leeway if a TEL is imposed onto a city for the first time. The change in TEL leeway is measured by the difference in the medians of no-TEL and TEL cities.

Table 15: Reliance on property taxes: Binary approach vs. TEL Leeway

	Pooled OLS				**Panel with FE**			
	Without income variable		With income variable		Without income variable		With income variable	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
binding	0.0191		0.0256		0.0019		0.0171**	
	(0.0225)		(0.0222)		(0.0078)		(0.0066)	
TEL Leeway	0.0058		0.0067		-0.0005		-0.0024	
	(0.0043)		(0.0049)		(0.0013)		(0.0020)	
Levy limit		-0.0199		-0.0246		0.0036		0.0026
		(0.0178)		(0.0168)		(0.0032)		(0.0056)
Rate limit		-0.0772*		-0.0675		-0.0068		-0.0165***
		(0.0448)		(0.0431)		(0.0149)		(0.0024)
Assessment limit		-0.0120		-0.0081		0.0433***		0.0313***
		(0.0515)		(0.0500)		(0.0154)		(0.0050)
Rate*Assessment		0.0132		0.0270		-0.0510***		-0.0155*
		(0.0565)		(0.0563)		(0.0161)		(0.0092)
Ln(Population)	-0.0181	-0.0135	-0.0218**	-0.0193*	0.0188	0.0192	-0.0105	-0.0097
	(0.0117)	(0.0120)	(0.0101)	(0.0104)	(0.0139)	(0.0140)	(0.0109)	(0.0110)
Ln(Income)			0.1573***	0.1606***			-0.0260	-0.0273
			(0.0456)	(0.0411)			(0.0308)	(0.0309)
Council-Manager	-0.0242	-0.0061	-0.0188	-0.0076				
	(0.0220)	(0.0225)	(0.0212)	(0.0220)				
Home-rule	-0.0427	-0.035	-0.0469*	-0.0433				
	(0.0273)	(0.0286)	(0.0269)	(0.0284)				
City&Year FE	No	No	No	No	Yes	Yes	Yes	Yes
R-squared	0.053	0.076	0.138	0.149	0.904	0.904	0.913	0.913
N	1609	1609	951	951	1609	1609	951	951

Table 16: Reliance on sales taxes: Binary approach vs. TEL Leeway

	Pooled OLS				**Panel with FE**			
	Without income variable		With income variable		Without income variable		With income variable	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
binding	0.0458*		0.0442*		-0.0141		0.0097	
	(0.0249)		(0.0262)		(0.0092)		(0.0068)	
TEL Leeway	-0.0102		-0.0133		0.0014		0.0034**	
	(0.0098)		(0.0098)		(0.0011)		(0.0014)	
Levy limit		0.0011		-0.0019		0.0210**		0.0343***
		(0.0275)		(0.0247)		(0.0084)		(0.0060)
Rate limit		0.0232		0.0088		0.0273***		0.0297***
		(0.0446)		(0.0419)		(0.0087)		(0.0035)
Assessment limit		-0.0299		-0.0227		0.0169*		0.0280***
		(0.0410)		(0.0427)		(0.0094)		(0.0048)
Rate*Assessment		0.1275**		0.1200**		-0.0518***		-0.0703***
		(0.0520)		(0.0519)		(0.0189)		(0.0089)
Ln(Population)	0.0137	0.0015	0.0184	0.0036	0.0172	0.0172	0	-0.0003
	(0.0128)	(0.0138)	(0.0117)	(0.0130)	(0.0203)	(0.0203)	(0.0189)	(0.0188)
Ln(Income)			-0.1154***	-0.0971**			-0.0055	-0.0042
			(0.0433)	(0.0453)			(0.0305)	(0.0308)
Council-Manager	0.0197	-0.0225	0.035	-0.0062				
	(0.0259)	(0.0260)	(0.0246)	(0.0240)				
Home-rule	-0.0174	-0.0381	-0.03	-0.0485				
	(0.0337)	(0.0337)	(0.0343)	(0.0315)				
City&Year FE	No	No	No	No	Yes	Yes	Yes	Yes
R-squared	0.082	0.134	0.136	0.188	0.949	0.950	0.946	0.946
N	1609	1609	951	951	1609	1609	951	951

Table 17: Reliance on user fees: Binary approach vs. TEL Leeway

	Pooled OLS				**Panel with FE**			
	Without income variable		With income variable		Without income variable		With income variable	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
binding	0.0708***		0.0768***		0.0303**		0.0217***	
	(0.0202)		(0.0237)		(0.0122)		(0.0077)	
TEL Leeway	0.0022		0.0026		-0.0019***		-0.0028	
	(0.0026)		(0.0034)		(0.0007)		(0.0019)	
Levy limit		0.0294*		0.0368**		0.0069*		-0.0023
		(0.0157)		(0.0174)		(0.0038)		(0.0061)
Rate limit		0.0038		0.0014		-0.0085		-0.0304***
		(0.0545)		(0.0573)		(0.0152)		(0.0029)
Assessment limit		-0.0141		-0.0042		0.0186		-0.0273***
		(0.0803)		(0.0800)		(0.0158)		(0.0043)
Rate*Assessment		0.087		0.0773		0.0356		0.3022***
		(0.0823)		(0.0830)		(0.0252)		(0.0092)
Ln(Population)	0.0019	-0.0023	0.002	-0.0013	0.0032	0.0033	0.0118	0.0121
	(0.0126)	(0.0118)	(0.0147)	(0.0132)	(0.0280)	(0.0281)	(0.0189)	(0.0191)
Ln(Income)			-0.0125	-0.0243			-0.0162	-0.0173
			(0.0377)	(0.0391)			(0.0283)	(0.0283)
Council-Manager	0.0341*	0.0207	0.0297	0.0175				
	(0.0196)	(0.0190)	(0.0205)	(0.0188)				
Home-rule	-0.0181	-0.0213	-0.0123	-0.0166				
	(0.0191)	(0.0198)	(0.0206)	(0.0213)				
City&Year FE	No	No	No	No	Yes	Yes	Yes	Yes
R-squared	0.147	0.155	0.143	0.146	0.896	0.896	0.928	0.928
N	1609	1609	951	951	1609	1609	951	951

Table 18: Tax revenue diversification: Binary approach vs. TEL Leeway

	Pooled OLS				**Panel with FE**			
	Without income variable		With income variable		Without income variable		With income variable	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
binding	0.0134		0.0105		0.0024		-0.0143***	
	(0.0100)		(0.0110)		(0.0075)		(0.0053)	
TEL Leeway	0.0011		0.0013		-0.0008		-0.0007	
	(0.0015)		(0.0019)		(0.0005)		(0.0014)	
Levy limit		0.0147*		0.0157*		-0.0105***		-0.0109***
		(0.0077)		(0.0086)		(0.0017)		(0.0027)
Rate limit		0.0051		0.0016		-0.0011		0.0073***
		(0.0192)		(0.0198)		(0.0077)		(0.0018)
Assessment limit		0.0344		0.0266		-0.0188**		-0.0093***
		(0.0226)		(0.0244)		(0.0082)		(0.0033)
Rate*Assessment		-0.0157		-0.0149		0.0383**		0.1116***
		(0.0247)		(0.0267)		(0.0147)		(0.0054)
Ln(Population)	0.0107**	0.0092*	0.0096*	0.0097*	-0.0017	-0.0019	0.0217	0.0216
	(0.0051)	(0.0052)	(0.0049)	(0.0051)	(0.0171)	(0.0171)	(0.0167)	(0.0168)
Ln(Income)			-0.0013	-0.0102			0.0057	0.0055
			(0.0203)	(0.0194)			(0.0134)	(0.0135)
Council-Manager	0.0173*	0.0134	0.0146*	0.0134				
	(0.0089)	(0.0089)	(0.0085)	(0.0085)				
Home-rule	0.0147	0.0103	0.0222*	0.0181				
	(0.0112)	(0.0115)	(0.0112)	(0.0113)				
City&Year FE	No	No	No	No	Yes	Yes	Yes	Yes
R-squared	0.110	0.138	0.117	0.140	0.801	0.801	0.841	0.841
N	1609	1609	951	951	1609	1609	951	951

Table 19: User fee diversification: Binary approach vs. TEL Leeway

	Pooled OLS				**Panel with FE**			
	Without income variable		With income variable		Without income variable		With income variable	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
binding	-0.0077		-0.0079		-0.0038		0.0003	
	(0.0059)		(0.0073)		(0.0028)		(0.0016)	
TEL Leeway	-0.0009		-0.0015*		0.0005***		0.0003	
	(0.0007)		(0.0009)		(0.0001)		(0.0004)	
Levy limit		-0.0015		-0.0005		0.0010		0.0040***
		(0.0032)		(0.0040)		(0.0018)		(0.0013)
Rate limit		0.0151		0.0172		0.0006		0.0049***
		(0.0209)		(0.0229)		(0.0022)		(0.0006)
Assessment limit		0.0230		0.0260		-0.0048**		0.0148***
		(0.0225)		(0.0249)		(0.0022)		(0.0011)
Rate*Assessment		-0.0287		-0.0305		-0.0052		-0.0580***
		(0.0227)		(0.0255)		(0.0056)		(0.0028)
Ln(Population)	0.0020	0.0014	0.0027	0.0016	0.0033	0.0033	-0.0016	-0.0015
	(0.0024)	(0.0024)	(0.0032)	(0.0028)	(0.0062)	(0.0062)	(0.0039)	(0.0039)
Ln(Income)			-0.0092	-0.0079			0.0088	0.0089
			(0.0111)	(0.0106)			(0.0080)	(0.0080)
Council-Manager	-0.0004	-0.0016	0.0017	-0.0004				
	(0.0057)	(0.0044)	(0.0066)	(0.0047)				
Home-rule	0.0005	0.0003	-0.0015	-0.0022				
	(0.0044)	(0.0049)	(0.0051)	(0.0058)				
City&Year FE	No	No	No	No	Yes	Yes	Yes	Yes
R-squared	0.053	0.076	0.138	0.149	0.904	0.904	0.913	0.913
N	1609	1609	951	951	1609	1609	951	951

Table 20: Summary of TEL effects on revenue structure: Comparison between the binary variable approach and TEL leeway

Dependent Variable	Hypothesized relationship with TEL stringency	(lack of) TEL Leeway	**Binary Approach**			
			Levy limit	Rate limit	Assessment limit	Rate* Assessment
Share of property taxes	-	no effect	no effect	-	+	-
Share of sales taxes	+	-	+	+	+	-
Share of user fees	+	+	+	-	-	+
Tax revenue diversification	+	-	-	+	-	+
User fee diversification	+	-	+	+	+	-

Table 21: TEL effects: Comparison between the binary variable approach and TEL leeway

Panel 1: Median of TEL leeway by TEL type

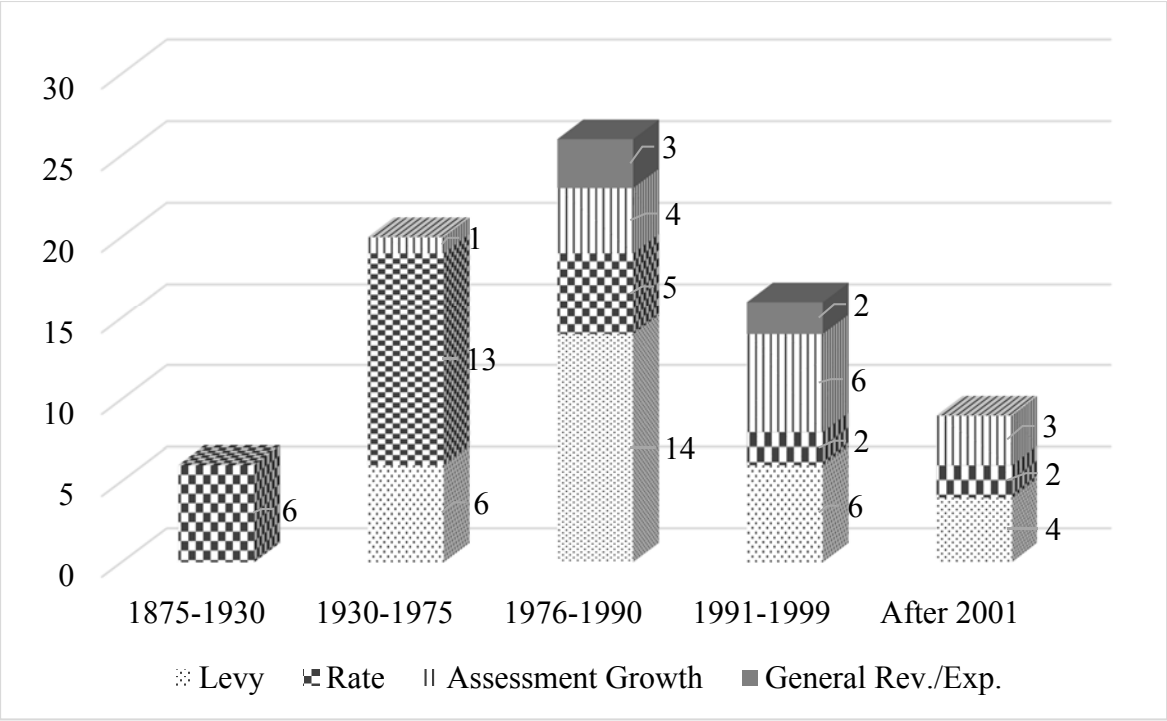
	Levy	**Rate**	**Assess**	**Rate*Assess**
Median (TEL type =0)	0.40	-0.01	0.2	0.147
Median (TEL type =1)	-0.03	0.20	0.01	0.014
Difference	**0.43**	**-0.21**	**0.19**	**0.133**

Panel 2: Magnitudes of TEL effects: Binary variables vs. TEL Leeway

	Without Income		With Income	
	TEL Type by Binary	by TEL Leeway	TEL Type by Binary	by TEL Leeway
Reliance on Property Taxes				
Levy	0.0036	-0.0002	0.0026	-0.0010
Rate	-0.0068	0.0001	-0.0165	0.0005
Assessment	0.0433	-0.0001	0.0313	-0.0005
Rate*Assessment	-0.0145	-0.0001	-0.0007	-0.0003
Reliance on Sales Taxes				
Levy	0.0210	0.0006	0.0343	0.0014
Rate	0.0273	-0.0003	0.0297	-0.0007
Assessment	0.0169	0.0003	0.0280	0.0006
Rate*Assessment	-0.0076	0.0002	-0.0126	0.0004
Reliance on User Fees				
Levy	0.0069	-0.0008	-0.0023	-0.0012
Rate	-0.0085	0.0004	-0.0304	0.0006
Assessment	0.0186	-0.0004	-0.0273	-0.0006
Rate*Assessment	0.0457	-0.0003	0.2445	-0.0004

Note: Estimates are simulated based on panel regression models with city- and year-fixed-effects.

Figure 1: Number of TELs enacted by type (1875-2013)



For the states that impose multiple TELs on municipalities, they are counted multiple times in this graph. For example, New Jersey is one of the three states that imposed a limit on general revenue and expenditure between 1976 and 1990, and is also one of the four states that imposed the levy limit after 2001.

Figure 2: Number of TEL-referencing laws introduced (1978-2013)

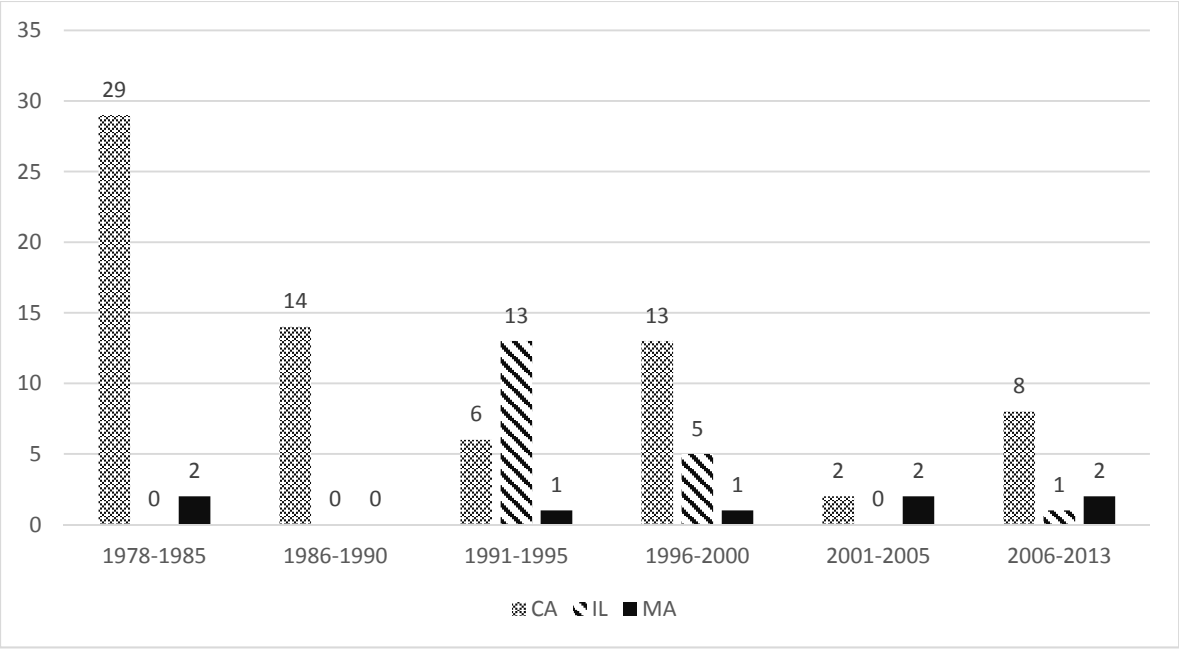
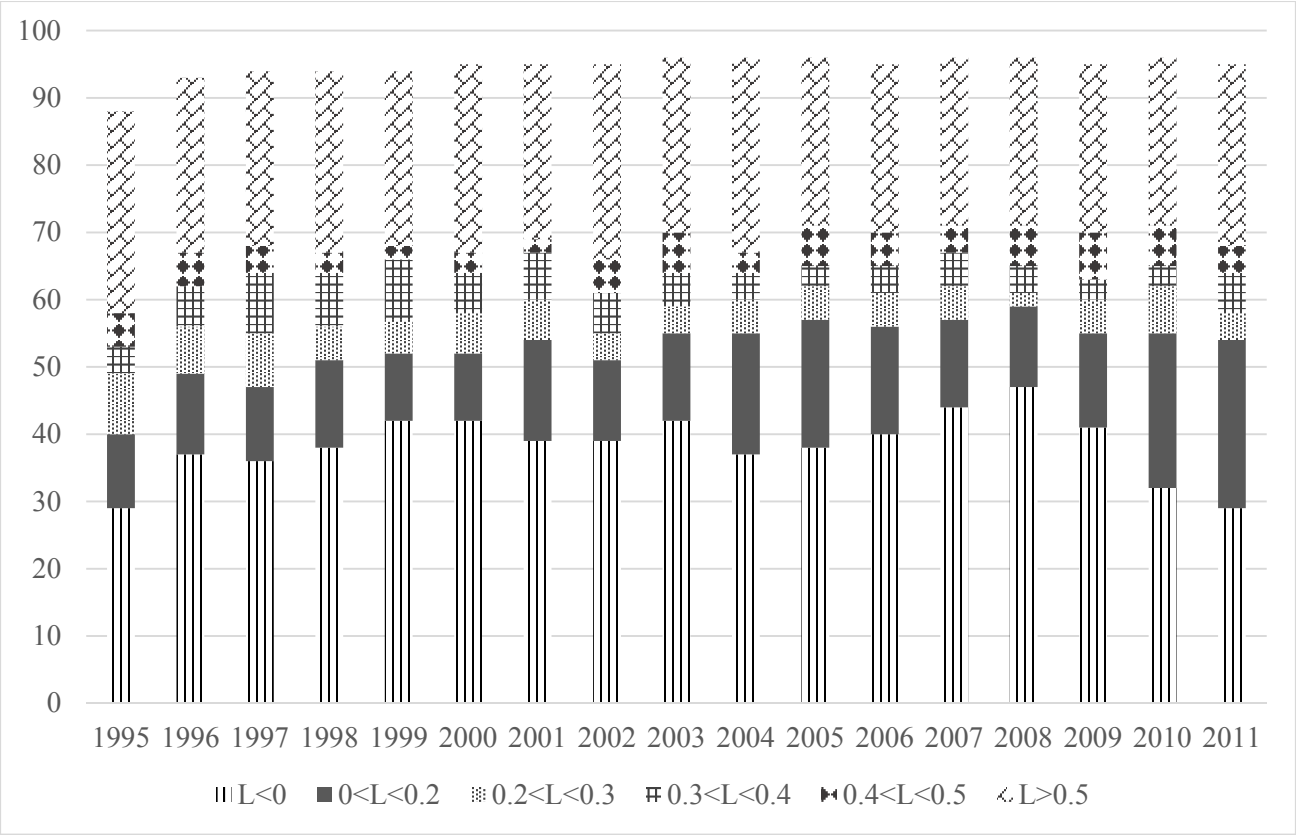
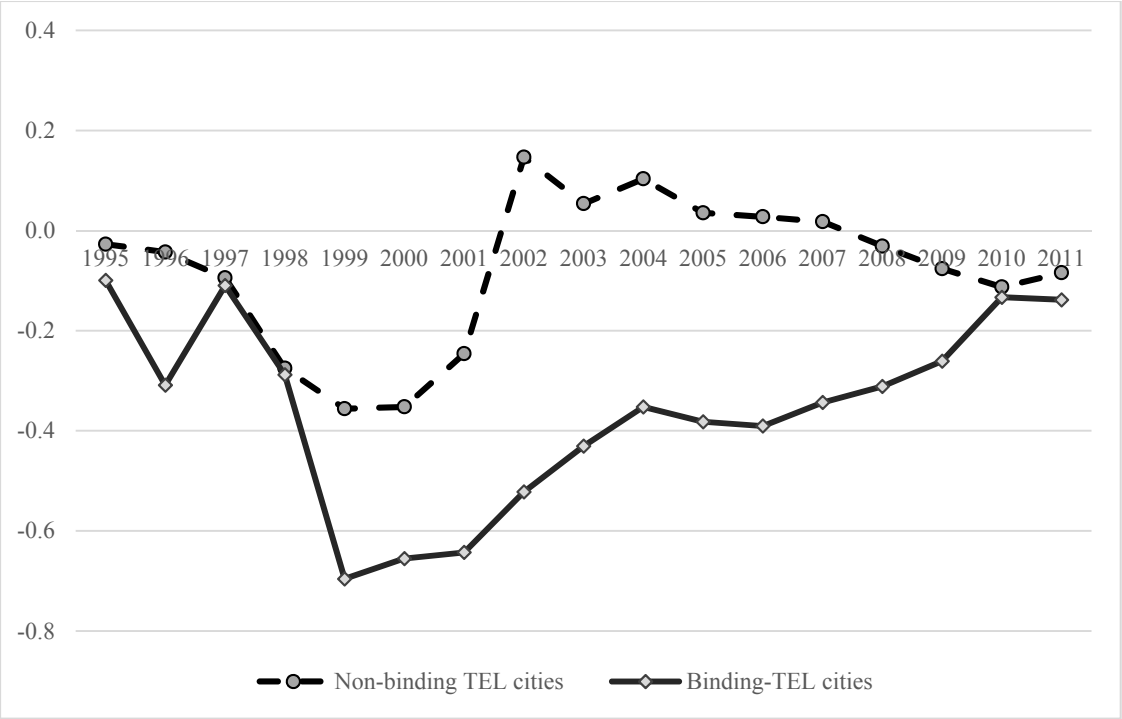


Figure 3: Number of Cities by TEL leeway bracket (1995-2011)



TEL leeway (or "L" in the chart) is divided into six brackets. Despite some fluctuation, there is an increasing amount of cities in the brackets of below zero and between zero and 0.2, indicating that TELs become increasingly stringent over time when the level of actual property tax levy is taken into account. It also suggests that over the course of time, more cities are approaching the legal levy limit, or even managed to exceed it through exemptions or voter override.

Figure 4: TEL leeway by binding/non-binding TELs



Dividing cities into binding and non-binding groups, figure 4 delineates the change in the average TEL leeway from 1995 to 2011. During this period, cities subject to non-binding TELs or with no TELs have had greater means of TEL leeway compared to the ones for the binding-TEL cities. The period of 2001-2007 also witnesses positive means of TEL leeway in the non-binding cities, whereas the mean of TEL leeway for binding-TEL cities remain negative throughout the study period, indicating the exhaustion of TEL leeway. This figure provides suggestive evidence that binding TELs are more restrictive because they give municipalities less leeway for additional property tax growth.

Appendix A: TEL Cap Rates by States

State	Type	Year	Codification	Max. Allowable Rate	Citation
AK	Levy	1985	S	• $1500 per resident, or • (225% of the average per capita assessed full value)*(number of resident)	Alaska Stat. § 29.45.090
AK	Rate	1985 1994 (amd.)	S	• 1st class cities[15]: 3% • 2nd class cities: 0.5% (1985-1994) 2% (after 1994)	Alaska Stat. § 29.45.090
AL	Rate	1875	C	Varies by municipality (see appendix)	Alabama Const. Art. XI, Sec. 216
AR	Levy	1981	C/S	10%	Ark. Const. Art. 16, § 14 A.C.A. § 26-26-402
AR	Rate	1883	C/S	0.5%	Ark. Const. Art. 12, § 4 A.C.A. § 26-25-102
AZ	Assessment Growth[16]	1997 2009 (amd.) 2013 (amd.)	S	• Max (10%, 25% (full cash value of current year - limited value of previous year) (1997-2008) • 5% (after 2012)	A.R.S. § 42-13301
AZ	General Rev./Exp.	1980	C	• the implicit price deflator for GNP, or • An alternative cost of living measure approved by 2/3 of each house of the legislature	A.R.S. Const. Art. IX, § 20
AZ	Levy	1997	C/S	2%	A.R.S. § 42-17051 A.R.S. Const. Art. IX, § 19
AZ	Rate	2012?	C	1%	A.R.S. Const. Art. IX, § 18
CA	Assessment Growth	1979	C/S	Min (2%, Change in CA CPI)	Cal Const, Art. XIII A § 2 Cal Rev & Tax Code § 51 Stats 1997 ch 940 § 4
CA	General Rev./Exp.	1979	C	State population change	Cal Const, Art. XIII B § 1-4 Cal Gov Code § 7902; 7911

[15] Both 1st and 2nd class cities are general law cities. Cities with more than 400 permanent residents are 1st class cities.

[16] Property is not reassessed when it changes ownership.

State	Type	Year	Codification	Max. Allowable Rate	Citation
CA	Levy	1980	S	amount needed to make annual payments for the interest and principal on GO or other voter-approved indebtedness	Cal Rev & Tax Code § 93
CA	Rate	1978	C	1%	Cal Const, Art. XIII A § 1
CO	General Rev./Exp.	1992	C	% change in the CPI for Denver-Boulder	Colo. Const. Art. X, Section 20
CO	Levy	1989	S	5.5% for non-home rule cities	C.R.S. 29-1-301
FL	Assessment Growth	1980	C/S	• Min (3%, state CPI) for homestead residential • 10% for non-homestead residential	Fla. Const. Art. VII, § 4d Fla. Const. Art. VII, § 4h Fla. Stat. § 193.155
FL	Rate	1976 2013 (amd.)	C	• 1% (1976-2013) • 5% (for non-homestead, after 2013)	Fla. Const. Art. VII, § 9
GA	Assessment Growth	2009	S	0% (for 2010 only)	2009 Ga. ALS 163 O.C.G.A. § 48-5B-1
IA	Assessment Growth	1980	S	• 4% (Agricultural & residential) • 8% (Commercial)	Iowa Code § 441.21(4)-(5)
IA	Rate	1972	S	• 0.338% for agricultural or horticultural purposes; • 0.81% for general fund	Iowa Code § 384.1
ID	Levy	1996	S	3% of the highest of the property taxes in any of the prior three-year budget	Idaho Code § 63-802
ID	Rate	1967 1995 (amd.)	S	• 0.45% (1967-1995) • 0.9% (after 1995)	Idaho Code § 50-235
IL	Levy	1991	S	Min (5%, Change in IL CPI) for non-home rule cities	35 ILCS 200/18-185 35 ILCS 200/18-205
IL	Rate	1967	S	1%	§ 65 ILCS 5/8-3-7
IN	Levy	1983	S	See appendix	6-1.1-18.5-2
IN	Rate	1975	S	See appendix	Ind. Code Ann. § 6-1.1-18-3
KS	Levy	1999	S	0%	K.S.A. § 79-2925b

State	Type	Year	Codification	Max. Allowable Rate	Citation
KY	Levy	1965 1990 (amd.)	S	• 0% (1965-1990) • 4% over the compensating rate[17] (after 1990)	KRS § 132.027
KY	Rate	1994	C	• 1.5% for population >15,000 • 1% for population between 10,000 and 15,000 • 0.75% for population <10,000	Ky. Const. § 157
LA	Levy	1980	C	0%	La. Const. Art. VII, § 23
LA	Rate	1974	C/S	• 0.7% for municipalities • 1% for municipalities exempt from the payment of parish taxes or maintain own public schools • New Orleans is exempt	La. Const. Art. VI, § 27 La. R.S. 33:2801
MA	Levy	1980	S	2.5%	ALM GL ch. 59, § 21C
MD	Assessment Growth	1957	S	10% to only owner-occupied residential properties	Md. Tax-Property Code Ann. § 9-105
MD	Levy	1957	S	0%[18]	Md. Tax-Property Code Ann. § 2-205
ME	Levy	2005	S	Combination of average real personal income, inflation, & property growth factor (See Appendix)	30-A M.R.S. § 5721-A
MI	Assessment Growth	1995	C/S	Min (5%, MI CPI)	MCLS Const. Art. IX, § 3 MCLS § 211.27a
MI	Levy	1978	C/S	MI CPI	MCLS Const. Art. IX, § 31 MCLS § 211.34d
MI	Rate	1973	C/S	1.5% (non-home rule) 2% (home-rule cities)	MCLS Const. Art. IX, § 6 MCLS § 117.3
MN	Assessment Growth	1993 1997 (amd.) 1999 (amd.)	S	• 1993-1997: max (10%*previous-year assessment, 1/3 * (current-prior assessment)) • 1997-1999: max (10% *previous-year, 25% (current-	Minn. Stat. § 273.11(1a)

[17] "Compensating tax rate" is defined as "rate which, rounded to the next higher one-tenth of one cent ($0.001) per one hundred dollars ($100) of assessed value and applied to the current year's assessment of the property subject to taxation by a taxing district, excluding new property and personal property, produces an amount of revenue approximately equal to that produced in the preceding year from real property."

[18] The limit is reflected on the property tax rate, called "constant yield tax rate."

State	Type	Year	Codification	Max. Allowable Rate	Citation
		2003 (amd.) 2010 (repealed)		prior assessment)) • 1999-2002: max (8.5%* previous-year, 15% (current-prior assessment)) • 2002: max (10%* previous-year, 15% (current-prior assessment)) • 2003: max (12%* previous-year, 20% (current-prior assessment)) • 2004-2006: max (15%* previous-year, 25% (current-prior assessment)) • 2007: max (15%* previous-year, 33% (current-prior assessment)) • 2008-2009: max (15%* previous-year, 50% (current-prior assessment)) • 2010: No limit	
MN	Levy	2002	S	• (1+increase in deflator[19])(1+increase in number of household)(1+50% increase in market value due to new construction of class 3 property) (2002-2008) • (1+min(increase in deflator, 3.9%)(1+50% increase in number of household)(1+50% increase in market value due to new construction of class 3 property) (after 2008)	Minn. Stat. § 275.71
MO	Levy	1980	C/S	Min (5%, MO CPI)	Mo. Const. Art. X, § 22 § 137.073 R.S.Mo.
MO	Rate	1875	C/S	1%	Mo. Const. Art. X, § 11b-c § 94.250 R.S.Mo.
MS	Levy	1980	S	10%	Miss. Code Ann. § 27-39-320

[19] Implicit price deflator = the implicit price deflator for government consumption expenditures and gross investment for state and local governments by BEA

State	Type	Year	Codification	Max. Allowable Rate	Citation
MT	Levy	2001	S	1+0.5*(3-year average US CPI)[20]	15-10-420, MCA
NC	Rate	1973	S	1.5%	N.C. Gen. Stat. § 160A-209
ND	Rate	1929	S	3.8%[21]	N.D. Cent. Code, § 57-15-08
NE	General Rev./Exp.	1998	S	2.5% (revenue of restrictive funds, including property tax, payments, sales tax, motor vehicle tax, state aid, transfer, and surplus)	R.R.S. Neb. § 77-3446 R.R.S. Neb. § 13-519
NE	Levy	1978	S	Per local voters' petition	R.R.S. Neb. § 77-3402
NE	Rate	1957 1996 (amd.) 2001 (amd.)	S	• 1957-1996: 0.875% for cities not within the boundaries of a municipal county; • 1.5%: for cities for within the boundaries of a municipal county • 1996-2001: 0.45% for cities not within the boundaries of a municipal county; 0.9% for cities for within the boundaries of a municipal county • After 2001: 1% for all cities	R.R.S. Neb. § 19-1309
NJ	General Rev./Exp.	1976	S	min (2.5%, Implicit Price Deflator for State & Local Government Purchases of Goods & Services)	N.J. Stat. § 40A:4-45.2-4
NJ	Levy	2007	S	2%[22]	N.J. Stat. § 40A:4-45.44-46
NM	Assessment Growth	2001	S	Max (3% of prior year, 6.1% of two years prior)[23]	N.M. Stat. Ann. § 7-36-21.2 N.M. Const. art. VIII, § 1

[20] The maximum millage that may be imposed is established by calculating the number of mills required to generate the amount of property tax actually assessed in the prior year based on the current year taxable value, less any new property, plus 1/2 the average rate of inflation for the prior 3 years.

[21] Cities with a population of over five thousand may levy an additional 0.05% for each additional one thousand population in excess of five thousand, up to a maximum levy for general city purposes of 4%.

[22] Excludes municipality that had a municipal purposes tax rate of $ 0.10 or less per $ 100 for the previous tax year.

[23] Applies only to residential property

State	Type	Year	Codification	Max. Allowable Rate	Citation
NM	Levy	1978	S	min (5%, Implicit Price Deflator for State & Local Government Purchases of Goods & Services)	N.M. Stat. Ann. § 7-37-7.1
NM	Rate	1987	S	0.765%	N.M. Stat. Ann. § 7-37-7 N.M. Const. art. VIII, § 2
NV	Levy	1933 1983 (amd.)	C	• 5% (1993-1983) • 6% (after 1983)	Nev. Const. Art. 10, § 2
NY	Assessment Growth	1981	S	6% and less than 20% for 5 years[24]	NY CLS RPTL § 1805
NY	Levy	1938	C	2% (2.5% for City of New York)	NY CLS Const Art VIII, § 10
OH	Rate	1975	S	1%	ORC Ann. 5705.02
OK	Assessment Growth	1997	C	5%	Okl. Const. Art. X, § 8B
OK	Rate	1933	C	1.5%	Okl. Const. Art. X, § 9
OR	Assessment Growth	1997	C/S	3%[25]	Ore. Const. Art. XI, § 11 ORS § 310.210~218 ORS § 310.222, 228, 236~238
OR	Rate	1991	S	1%	ORS § 310.150
PA	Levy	1943	S	• 10% of 2nd & 3rd class cities[26] • Repealed in 2011	72 P.S. § 5453.601-608
PA	Rate	1965	S	1.2%	53 P.S. § 6924.320
RI	Levy	1985 2008 (amd.)	S	• 5.5% (1985-2008) • 5.25% (2008) • 5% (2009)	R.I. Gen. Laws § 44-5-2

[24] Improvements to property cannot increase the assessment by more than 1/3.

[25] Measure 50 established a permanent operating tax rate limit. This rate was rate set by a formula set out by the constitutional amendment based on tax levies and rates in place in 1997 and the tax cuts required by Measure 50.

[26] Pennsylvania classifies municipalities based on their population as follows: First class cities (population>one million), First A class (250 thousand to one million), Second class (30 thousand to 250 thousand), Third class (five thousand to 30 thousand), and Fourth class (less than five thousand).

State	Type	Year	Codification	Max. Allowable Rate	Citation
				• 4.75% (2010) • 4.5% (2011) • 4.25% (2012) • 4% (2013)	
SC	Assessment Growth	2007	C/S	15% for every five years	S.C. Const. Ann. Art. X, § 6 S.C. Code Ann. § 12-37-3140
SC	Rate	2007	S	max (CPI + Growth in population, 0)	2007 S.C. Acts 116
SD	Levy	1995	S	min (3%, SD CPI)	S.D. Codified Laws § 10-13-35
SD	Rate	1939	S	2.7%	S.D. Codified Laws § 10-12-32
TX	Assessment Growth	1995	C/S	10%[27]	Tex. Const. Art. VIII, § 1 Tex. Tax Code § 23.23
TX	Rate	1979 1987 (amd.) 1997 (amd.) 1999 (amd.) 2005 (amd.)	C/S	• 3% (1979-1987) • min (3%, roll-back rate[28]) (1987-1997) • Roll-back rate (1997-1999) • min(3%, roll-back rate) (1999-2005) • Roll-back rate (after 2005)	Tex. Tax Code § 302.001 Tex. Tax Code § 26.05
UT	Levy	1995	S	0	Utah Code §59-2-25(3)(a)
UT	Rate	1929	S	0.7%	Utah Code §59-2-919
WA	Levy	1971 2002 (amd.)	C/S	• 6% (1971-2002) • 1% (after 2002)	Rev. Code Wash. § 84.55.010
WI	Levy	2005 2007 (amd.)	S	• % change in equalized value (2005-2007) • 2% (after 2007)	Wis. Stat. § 66.0602

[27] The limitation is only applicable to homestead properties.

[28] The rollback tax rate is one that equals effective maintenance and operations rate multiplied by 1.08 plus current debt rate

State	Type	Year	Codification	Max. Allowable Rate	Citation
WV	Levy	1990	S	1%[29]	W. Va. Code § 11-8-6e
WV	Rate	1933	S	• Class I (Population>50,000): 0.5% • Class II (10,000-50,000): 1% • Class III (2,000-10,000): 1.5% • Class IV (<2,000): 2%	W. Va. Code § 11-8-6
WY	Rate	1890	C/S	0.8%	Wyo. Stat. § 39-13-104 Wyo. Const. Art. 15, § 6

[29] When an annual appraisal, triennial appraisal, or general valuation of property would increase total property taxes by 1% or more, using current regular levy rates, the rate shall be reduced proportionately between the county commission and the municipalities and for all classes of property.

Appendix B: TEL Exemption Conditions by State

State	Debt Service & Capital Projects	Voters' Approval for Override
AK	Taxes levied or pledged to pay or secure the payment of the principal and interest on bonds	Unknown
AL	• Additional 0.75% for Mobile • Additional 0.5% for other selected cities • Additional 0.75% for public schools for Montgomery, Decatur, New Decatur, and Cullman • Special tax not exceeding 0.05% for public library purposes • Total levy cannot exceed 1.5% increase from the prior year	A simple majority affirmative vote of the qualified electors voting at a special election
AR	Additional tax not exceeding five mills	A simple majority affirmative vote of the qualified electors voting at a special election
AZ	Equalization orders	• Allow local governments to change the limitation with a 2/3 majority of affirmative votes of registered voters for four years. • In the 4th year the voters should vote again otherwise the state limitation becomes effective.
CA	• Acquisition or improvement of real property • Pension cost • Retirement system in charter cities • Projects for the construction, maintenance, or operation of water conservation, treatment, or distribution facilities • Payments to other public agencies for the use of water • Streets & highways • Costs mandated by the federal or state government • Governmental reorganization	• To override TELs on property taxes: a 2/3 majority of affirmative votes of registered voters • To override limits on general revenue: o By the electors of a government entity o Not to exceed four years
CO	• State/federal mandates • Special funds for oil, and gas production • One-time nonrecurring expenditure for road/bridge projects • Temporary loans are allowed for excess expenditures. • Loan shall not exceed 2-mill levy on the total assessed valuation	2/3 majority of affirmative votes of the governing board members

State	Debt Service & Capital Projects	Voters' Approval for Override
FL	• School facility improvements • Public parks • Voted millage for debt service must be treated as debt service millage. o If there is excess revenue after paying the debt, the revenue is treated as general millage and must be included within the 10-mill limitation.	• By simple majority vote of qualified electors • Referendum also may be initiated by submission of a petition to the governing body of the municipality containing the signatures of 10 percent of those persons eligible to vote in such referendum • The increase may not exceed 2 years
IA	Capital project funds imposed by a library board	Simple majority referendum
ID	Special levies for construction projects as mandated in statutes	Unknown
IL	• Full faith pledged by local government • Building commission lease • School facility development Special education • Pension for school teachers and firefighters • Economic development • Projects for library, hospital, public health, recreation grounds and museum purposes • Street maintenance; cemetery improvement • The tax rate should not exceed the greater of 0.057% and the rate limit in effect on 9/1/1967	• A simple majority of voters voting on the issue approves the adoption of the increase • Referenda approved by majority of voters in a regularly scheduled election
IN	• General & water, sewerage, parking, senior citizen housing • Additional rate cannot exceed 0.0133% • Additional 0.05% for Interlocal cooperation by cities not within the boundaries of a municipal county	A simple majority of voters voting on the issue approves the adoption of the increase
KY	• Urban renewal taxes • to pay for charges assessed by a joint fire department	Simple majority referendum
LA	GO bonds for: • Downtown development district of the city of Baton Rouge, not to exceed 1%, expire in 50 years • St. Martinville Downtown Development District, not to exceed 1%	2/3 majority of affirmative votes of members of a taxing authority

State	Debt Service & Capital Projects	Voters' Approval for Override
	• Alexandria Central Economic Development District, not to exceed 1.5% • Downtown Economic Development District of the City of Monroe, not to exceed 1%, expire in 50 years • Pineville Downtown Development District, not to exceed 1.5% • Downtown Development District of the City of Ruston, not to exceed 1%, expire in 50 years • Bastrop Downtown Development District, not to exceed 0.5%, expire in 50 years	
MA	• Capital improvements • Construction projects	• 2/3 majority of affirmative votes required for additional levy to be deposited into stabilization fund, a fund that can be transferred to other funds • Simple majority of affirmative votes required if additional levy is less than 50% of the reduction needed to bring the levy to the limited level
MD	GO bonds	• Can be changed by an enactment of the General Assembly • Allow $25,000 difference in revenue generated between the levy set by the limit and the actual levy.
ME	Additional levy allowed to make up the exact amount decreased in state-municipal revenue sharing	Unknown
MI	• Capital improvements • Construction projects • The new limitation cannot exceed 50 mills or go beyond a period of 20 years at any one time.	Unknown
MN	Special levies for construction projects as mandated in statutes	Simple majority referendum
MO	GO bonds	• 2/3 of affirmative votes of qualified electors • Additional rate not to exceed 3 mills • Not to exceed four years

State	Debt Service & Capital Projects	Voters' Approval for Override
MS	• Exact amount of promissory notes issued to offset estimated budget shortfall • Additional property tax can be levied to repay the indebtedness o Not to exceed the greater of 110.2% of the limit and the maximum levy in the past ten years • Not to exceed five years • Must not exceed 25% of the budget • Indebtedness must be repaid in full in 3 years after the issuance.	• Super majority of electors • Not to exceed five years
MT	• To support a study commission on alternative form of government • To support a newly established regional resource authority • Support of airports	• Simple majority of qualified electors
NC	GO bonds	By referendum
ND	GO bonds	Unknown
NE	Public airport	• 2/3 affirmative vote of registered voters • Additional rate not to exceed 10 mills The increase not to exceed five years
NJ	• Liability/worker's insurance • Pension contributions by 2% • Health care costs by 2% • Public library • Fair Housing Act • Recycling tax on solid waste facility • Domestic Security • Interlocal agreement/Joint Contract	• Simple majority of affirmative votes of registered voters • By referendum • No further appeal or review if rejected
NM	GO bonds	Unknown

State	Debt Service & Capital Projects	Voters' Approval for Override
NV	• As supplement when revenue from city-county relief tax is less than $1.15 per $100 of assessed valuation of the county • Additional levy not to exceed $4.5 on each $100 of assessed valuation, including all overlapping rates • Rate limit exemption: Not to exceed 5 years • A higher millage rate is allowed when both criteria are met: o Cities within counties whose population <45000 o Combined rate certified by the NV Tax Commission is at least $3.5 per $100	• 2/3 affirmative votes of registered voters • Not to exceed 30 years • Not to exceed the product of the difference between actual revenue and 115% assessed valuation times the proportion for the local government determined in city-county relief tax
NY	GO bonds	• 2/3 affirmative votes of registered voters
OH	GO bonds	Determined by the legislative authority of municipality, no vote needed for increases within ten mills
OK	GO bonds	Unknown
OR	• Pension & disability plan obligations • Exemptions allowed to fund capital projects • Cannot exceed the lesser of the expected useful life and 10 years • Additional rate limit not to exceed 10 mills	• A "double majority"; that is, a majority of voters approve a ballot measure at an election in which at least 50 percent of the registered voters cast ballots. • The double majority requirement does not apply to the general election held in November of an even-numbered year. • Cannot exceed five years
PA	GO bonds	Unknown
RI	GO bonds	4/5 of affirmative votes of registered voters
SC	• To comply with federal or state mandates • Purchase of undeveloped real property near an operating US military base • Additional levy in the amount 50% or more of its current budget is allowed	2/3 of affirmative votes of registered voters

State	Debt Service & Capital Projects	Voters' Approval for Override
SD	GO bonds	• 4/5 of affirmative votes of registered voters • Note to exceed 6 mills
TX	GO bonds	Unknown
WA	GO bonds	2/3 of affirmative votes of registered voters
WI	• Intergovernmental cooperation • Amount 1st class city levies for school purposes • to make up municipal general fund revenue shortfall due to the sale of water or another commodity to a manufacturing facility	By referendum specifying the amount and duration
WV	Determined by Tax Commissioner as indispensable to the orderly discharge of the governmental functions	• 3/5 of affirmative votes of registered voters • To override rate limit, increase of the maximum rate not to exceed by 50%, and not to exceed three years • To override levy limit, the increased rate cannot produce total property tax revenue greater than 110% of prior year
WY	Additional rates can be levied by various special districts	Unknown

Appendix C: Definition of Fiscal Emergencies for Overriding TELs

State	Type	Definition of Emergency	Restriction
AZ	General Rev./Exp.	Natural or man-made disaster	Excess revenue collected only in the fiscal year in which the disaster is declared or in the succeeding fiscal year
CA	General Rev./Exp.	• Conditions of disaster or of extreme peril to the safety of persons and property within the state • Attack or probable or imminent attack by an enemy of the United States • Fire, flood, drought, storm, civil disorder, earthquake, or volcanic eruption	• For one year only • The appropriations limits in the following three years are reduced accordingly to prevent an aggregate increase in appropriations resulting from the emergency
CO	General Rev./Exp.	Emergency taxes shall also meet all of the following conditions: (a) A 2/3 majority of the members of each house of the general assembly or of a local district board declares the emergency and imposes the tax by separate recorded roll call votes. (b) Could not have been reasonably foreseen at the time of adoption of the budget (c) Emergency tax revenue shall be spent only after emergency reserves are depleted, and shall be refunded within 180 days after the emergency ends if not spent on the emergency.	Emergency property taxes are prohibited.
FL	Rate	Municipality of special financial concern	2/3 vote of the governing body of the municipality
IN	Levy	Any civil taxing unit that determines that it cannot carry out its governmental functions for an ensuing calendar year under the levy limitations may appeal to the department of local government finance for relief from those levy limitations.	

State	Type	Definition of Emergency	Restriction
ME	Levy	Emergency defined as one of the following: • Catastrophic events such as natural disaster, terrorism, fire, war or riot; • Unfunded or underfunded state or federal mandates; • Citizens' initiatives or other referenda; • Court orders or decrees; or • Loss of state or federal funding.	• Do not apply to changes in economic conditions, revenue shortfalls, increases in salaries or benefits, new programs or program expansions that go beyond existing program criteria and operation • Additional levy only allowed for the emergency year.
MT	Levy	An emergency levy authorized under 10-3-405, 20-9-168, or 20-15-326;	• Must be unanimous vote of the governing body • Must not exceed 0.2% on the taxable valuation. • Excess revenue shall remain in a separate emergency fund designated for future emergencies.
NC	Rate	• Deficit • Civil disorders	
ND	Rate	Declare tax insufficient to provide adequate service	• Must not exceed one year • Must not exceed 50% over and above the legal limitation
NJ	General Rev./Exp.	• To meet a pressing need for public expenditure to protect or promote the public health, safety, morals or welfare or to provide temporary housing or public assistance prior to the next succeeding fiscal year • By regulation promulgated by the Commissioner of the Department of Community Affairs, in consultation with the Commissioner of Education	
NV	Levy	• Any unexpected occurrence that requires immediate action by the governing body to: o Prevent or mitigate a substantial financial loss to the local government, or o Enable the governing body to provide an essential service to the residents of the local government	Executive Directors takes over local financial management Reviewed by a panel consisting of three members of the Nevada Tax Commission and hold a public hearing

State	Type	Definition of Emergency	Restriction
RI	Levy	when the city or town experiences or anticipates health insurance costs, retirement contributions or utility expenditures which exceed the prior fiscal year's health insurance costs, retirement contributions or utility expenditures by a percentage greater than three times the percentage increase	
SC	Rate	• Prior year's deficiency • Catastrophic event • Lose of major taxpayer that decreases revenue by at least 10%	
WI	Levy	Emergency declared by the governor	

Appendix D: The Sources of Data

	Variables	**Data Source**
TEL laws	TEL terms and conditions	Lexis Legal
Fiscal Growth Factors	Consumer Price Index of Denver (Urban-consumers)	Bureau of Labor Statistics
	Consumer Price Index of California	California Department of Industrial Relations
	CPI of Michigan	Michigan Department of Treasury
	Consumer Price Index for All Urban Consumers	Bureau of Labor Statistics
	Population change of California	United States Department of Commerce
	Population change of Arizona	United States Department of Commerce
	State and local governmental purchases of goods and services index	Federal Reserve Bank (St. Louis, MO)
TEL Leeway	Assessed Property Values	Comprehensive Annual Financial Reports
	Property Tax Levy	Comprehensive Annual Financial Reports
Revenue Structure	Share of Property Taxes in General Revenue	US Census of Governments
	Share of Sales Taxes in General Revenue	US Census of Governments
	Share of User Fees in General Revenue	US Census of Governments
Controls	Population	US Census of Governments
	Median Household Income	American Community Survey
	Home Rule	City websites & Ordinances
	Council-Manager	City websites & Ordinances

Appendix E: Pooled OLS Models: TEL Leeway Effects on Revenue Structure

Panel 1: Reliance on Property Taxes

	(1)	(2)	(3)	(4)	(5)	(6)
TEL Leeway	0.0036	0.0035	0.0039	0.0049	0.0053	0.0067
	(0.0042)	(0.0041)	(0.0041)	(0.0042)	(0.0044)	(0.0049)
Binding		-0.0036	0.0013	0.0091	0.0106	0.0256
		(0.0207)	(0.0208)	(0.0207)	(0.0217)	(0.0222)
Ln(Population)			-0.0198*	-0.0249**	-0.0258**	-0.0218**
			(0.0110)	(0.0098)	(0.0099)	(0.0101)
Ln(Income)				0.1649***	0.1657***	0.1573***
				(0.0457)	(0.0458)	(0.0456)
Council-manager					-0.0078	-0.0188
					(0.0206)	(0.0212)
Home-rule						-0.0469*
						(0.0269)
R-squared	0.0046	0.0043	0.0245	0.105	0.1053	0.1379
N	1609	1609	1609	951	951	951

Panel 2: Reliance on Sales Taxes

	(1)	(2)	(3)	(4)	(5)	(6)
TEL Leeway	-0.0103	-0.0096	-0.0098	-0.012	-0.0142	-0.0133
	(0.0091)	(0.0097)	(0.0097)	(0.0101)	(0.0099)	(0.0098)
Binding		0.0466**	0.0444*	0.0427*	0.0346	0.0442*
		(0.0225)	(0.0228)	(0.0224)	(0.0223)	(0.0262)
Ln(Population)			0.0091	0.0106	0.0158	0.0184
			(0.0123)	(0.0115)	(0.0113)	(0.0117)
Ln(Income)				-0.1052**	-0.1100**	-0.1154***
				(0.0454)	(0.0419)	(0.0433)
Council-manager					0.0420*	0.035
					(0.0217)	(0.0246)
Home-rule						-0.03
						(0.0343)
R-squared	0.0333	0.0686	0.0714	0.0987	0.1255	0.1356
N	1609	1609	1609	951	951	951

Panel 3: Reliance on User Fees

	(1)	(2)	(3)	(4)	(5)	(6)
TEL Leeway	0.0021	0.0031	0.0032	0.0039	0.0022	0.0026
	(0.0031)	(0.0026)	(0.0026)	(0.0032)	(0.0035)	(0.0034)
Binding		0.0708***	0.0720***	0.0791***	0.0729***	0.0768***
		(0.0189)	(0.0190)	(0.0214)	(0.0224)	(0.0237)
Ln(Population)			-0.0048	-0.0031	0.0009	0.002
			(0.0121)	(0.0141)	(0.0145)	(0.0147)
Ln(Income)				-0.0066	-0.0102	-0.0125
				(0.0394)	(0.0379)	(0.0377)
Council-manager					0.0326	0.0297
					(0.0214)	(0.0205)
Home-rule						-0.0123
						(0.0206)
R-squared	0.0012	0.1142	0.115	0.123	0.1412	0.1425
N	1609	1609	1609	951	951	951

Panel 4: Tax Revenue Diversification

	(1)	(2)	(3)	(4)	(5)	(6)
TEL Leeway	0.002	0.0024	0.0022	0.0024	0.0019	0.0013
	(0.0018)	(0.0014)	(0.0013)	(0.0018)	(0.0020)	(0.0019)
Binding		0.0238**	0.0213**	0.0194*	0.0176*	0.0105
		(0.0092)	(0.0094)	(0.0106)	(0.0105)	(0.0110)
Ln(Population)			0.0101**	0.0104**	0.0116**	0.0096*
			(0.0050)	(0.0050)	(0.0049)	(0.0049)
Ln(Income)				-0.0043	-0.0053	-0.0013
				(0.0210)	(0.0211)	(0.0203)
Council-manager					0.0094	0.0146*
					(0.0087)	(0.0085)
Home-rule						0.0222*
						(0.0112)
R-squared	0.0067	0.0592	0.0825	0.0775	0.0842	0.1167
N	1609	1609	1609	951	951	951

Panel 5: User Fee Diversification

	(1)	(2)	(3)	(4)	(5)	(6)
TEL Leeway	-0.0008	-0.0009	-0.0009	-0.0015**	-0.0016*	-0.0015*
	(0.0007)	(0.0007)	(0.0006)	(0.0007)	(0.0009)	(0.0009)
Binding		-0.0071	-0.0076	-0.008	-0.0084	-0.0079
		(0.0053)	(0.0053)	(0.0066)	(0.0072)	(0.0073)
Ln(Population)			0.0022	0.0023	0.0026	0.0027
			(0.0022)	(0.0027)	(0.0031)	(0.0032)
Ln(Income)				-0.0087	-0.0089	-0.0092
				(0.0104)	(0.0109)	(0.0111)
Council-manager					0.0021	0.0017
					(0.0068)	(0.0066)
Home-rule						-0.0015
						(0.0051)
R-squared	0.0029	0.0172	0.0201	0.0179	0.0178	0.0171
N	1609	1609	1609	951	951	951

Appendix F: Reliance on Sales Taxes (Only cities with sales tax authority)

	Pooled OLS		Fixed Effect		2SLS		2SLS: negative leeway=0	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
TEL Leeway	-0.0181***	-0.0177***	-0.0004	0.0001	0.0104	0.1569	0.0104	0.0114
	(0.0039)	(0.0055)	(0.0019)	(0.0023)	(0.0510)	(0.1253)	(0.0524)	(0.1152)
binding	0.1093***	0.0946**	-0.0309*	-0.1503**	-0.031	-0.8857*	-0.0318	-0.2492***
	(0.0351)	(0.0394)	(0.0174)	(0.0739)	(0.0293)	(0.5073)	(0.0278)	(0.0082)
Ln(Population)	-0.0231*	-0.0093	0.001	-0.0093	-0.0182	-0.0082	-0.0189	-0.0095
	(0.0130)	(0.0136)	(0.0308)	(0.0201)	(0.0235)	(0.0216)	(0.0237)	(0.0193)
Ln(Income)		-0.1817***		-0.0248		-0.0618		-0.0246
		(0.0507)		(0.0482)		(0.0596)		(0.0437)
Council-Manager	-0.0291	-0.0254						
	(0.0228)	(0.0198)						
Home-rule	-0.0654	-0.0616						
	(0.0434)	(0.0430)						
City fixed effect	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	No	No	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.2828	0.3382	0.9179	0.911	0.9201	0.5566	0.9214	0.911
N	895	551	895	551	886	551	886	551

Appendix G: TEL Effects on Tax Revenue Diversification (Only cities with sales tax authority)

	Pooled OLS		Fixed Effect		2SLS		2SLS: negative leeway=0	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
TEL Leeway	0.0037**	0.0040**	0.0032*	-0.0001	0.0185	-0.0545	0.0193	-0.0368
	(0.0016)	(0.0016)	(0.0017)	(0.0014)	(0.0271)	(0.0854)	(0.0289)	(0.0919)
binding	0.0105	0.0044	0.0254**	0.0786**	0.0372	0.209	0.0362	-0.0113***
	(0.0131)	(0.0143)	(0.0120)	(0.0296)	(0.0233)	(0.3467)	(0.0222)	(0.0037)
Ln(Population)	0.0063	0.0036	-0.008	0.0009	-0.0058	-0.0006	-0.0071	0.0011
	(0.0047)	(0.0043)	(0.0120)	(0.0083)	(0.0121)	(0.0074)	(0.0118)	(0.0075)
Ln(Income)		0.0423**		0.0292		0.042		0.0285*
		(0.0192)		(0.0176)		(0.0288)		(0.0161)
Council-Manager	0.0033	0.0021						
	(0.0095)	(0.0082)						
Home-rule	0.0323**	0.0398***						
	(0.0157)	(0.0138)						
City fixed effect	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	No	No	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.2943	0.3547	0.879	0.8903	0.8668	0.631	0.8789	0.8913
N	895	551	895	551	886	551	886	551

Appendix H: TEL Effects on Tax Revenue Diversification (Only cities with income tax authority)

	Pooled OLS		Fixed Effect		2SLS		2SLS: negative leeway=0	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
TEL Leeway	-0.0036**	-0.0109**	-0.0014**	-0.0083	0.0289	-11.2167	-0.5377	-3.9079
	(0.0017)	(0.0044)	(0.0005)	(0.0077)	(0.0343)	(929.9010)	(0.4195)	(5.3112)
binding	0.0329*	0.0299	-0.0108*	0.0226	-0.1608	55.3524	0.1392	-0.0962
	(0.0157)	(0.0187)	(0.0054)	(0.0180)	(0.1656)	(4600.0000)	(0.1674)	(0.1357)
Ln(Population)	0.0189**	0.0152*	0.0300**	0.0506***	0.0448**	-4.8181	-0.0155	0.0636*
	(0.0071)	(0.0080)	(0.0109)	(0.0142)	(0.0229)	(405.5478)	(0.0480)	(0.0326)
Ln(Income)		0.0126		-0.0639*		-0.4102		-0.1271
		(0.0352)		(0.0361)		(29.7731)		(0.1517)
Council-Manager	0.0269*	0.0266						
	(0.0138)	(0.0182)						
Home-rule	0.0286**	0.0444**						
	(0.0114)	(0.0154)						
City fixed effect	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	No	No	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.3174	0.2701	0.7336	0.7155	.	.	0.1224	.
N	324	195	324	195	320	195	320	195

Appendix I: Effects of Local Political Culture and Demand

	Share of Property Taxes (1)	Share of Sales Taxes (2)	Share of User Fees (3)	Tax r-HHI (4)	User fee r-HHI (5)
binding	0.0109	0.0601**	0.0533**	0.0081	-0.0039
	(0.0251)	(0.0265)	(0.0220)	(0.0129)	(0.0059)
TEL Leeway	0.0038	-0.0129*	-0.0019	0	-0.0007
	(0.0055)	(0.0072)	(0.0027)	(0.0016)	(0.0008)
Ln(Population)	-0.0169	0.0278**	0.013	0.0081	0.0012
	(0.0130)	(0.0116)	(0.0143)	(0.0059)	(0.0032)
Ln(Income)	0.0465	-0.0799	-0.1236**	0.0145	0.0225*
	(0.0695)	(0.0592)	(0.0474)	(0.0315)	(0.0135)
Homeownership	-0.3945**	0.0175	0.1606	0.1297	-0.0336
	(0.1738)	(0.1566)	(0.1332)	(0.0783)	(0.0439)
% Elderly	0.0755	0.6118	-1.1009**	-0.4303	0.2613*
	(0.7740)	(0.5356)	(0.5120)	(0.3182)	(0.1425)
Poverty Rate	-0.5814**	-0.1308	-0.5278**	0.1772	0.1335
	(0.2304)	(0.2332)	(0.2193)	(0.1080)	(0.0861)
Council-Manager	0.0059	0.0249	0.0024	0.0042	0.0069
	(0.0245)	(0.0262)	(0.0236)	(0.0083)	(0.0094)
Initiative	-0.0426	0.0181	0.0712***	0.0298*	-0.0124**
	(0.0298)	(0.0429)	(0.0259)	(0.0178)	(0.0056)
Home-rule	-0.0283	-0.0202	0.0136	0.0103	-0.0067
	(0.0287)	(0.0348)	(0.0248)	(0.0125)	(0.0079)
Year2010	0.0532***	0.0025	0.0450***	-0.0114*	-0.0100**
	(0.0130)	(0.0149)	(0.0122)	(0.0068)	(0.0043)
R-squared	0.1488	0.1649	0.2329	0.1437	0.0191
N	154	154	154	154	154

Curriculum Vitae
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EDUCATION

Ph.D.	Public Administration University of Illinois at Chicago	Expected May, 2015
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B.A.	Political Science, Renmin University of China	2006

RESEARCH INTERESTS

Fiscal federalism; Intergovernmental relations; State and local finance; Urban governance

PUBLICATIONS

Wang, S., & Feeney, M. K. Determinants of information and communication technology use in local governments. Accepted for publication at ***American Review of Public Administration.***

Wang, S., & Mastracci, S. (in press). Gauging social justice: A survey of indices for public management. ***Public Administration Quarterly.***

Wang, S. (2006). The interaction between the Chinese government and NGOs in China: A case study of Children's Hope International (CHI), ***Political Science Digest*** (in Chinese).

MANUSCRIPTS IN WRITING PHASE

Wang, S., Merriman, D. F., & Chaloupka, F. Relative tax rates, proximity and cigarette tax avoidance: Evidence from a national sample of littered cigarette packs. In preparation for submission to ***National Tax Journal.***

Crosby, A. W., Merriman, D. F., **Wang, S.**, & Barker, D. New evidence of cigarette tax avoidance in the U.S. using littered packs. In preparation for submission to ***Tobacco Control.***

Wang, S., & Pagano, M. A. Effects of TEL on municipal revenue structure: A closer look at the technical structure. In preparation for submission to ***Public Finance Review.***

Wang, S., & Merriman, D. F. Variations in cigarette packing: Observations of tobacco regulation compliance from five cities. In preparation for submission to ***Tobacco Control.***

MANUSCRIPT IN ANALYSIS PHASE

Wang, S. Effects of tax and expenditure limitations on municipal spending: The mediating roles of tax revenue diversification and charges for services.

TRANSLATED WORK

Friedman, E. (2007). *Rousseau, multiple modernities, and a political philosophy for the human species: "Nei wai you bie"?* (**S. Wang**, Trans.). ***Special Issue in honor of Benjamin Schwartz***, *East China Normal University*. (2007).

CONFERENCE PRESENTATIONS

Wang, S., & Pagano, M. A. (2014, October). *Exploring the effect of TELs on city fiscal behavior.* Paper to be presented at the **Association of Budgeting and Financial Management Annual Meeting,** Grand Rapids, MI.

Pagano, M.A., & **Wang, S.** (2014, October). *Constructing clusters of similarly-constrained cities.* Paper to be presented at the **Association of Budgeting and Financial Management Annual Meeting,** Grand Rapids, MI.

Pagano, M. A., & **Wang, S.** (2014, August). *State aid to municipalities and state constraints on municipal fiscal authority: A new equilibrium?* Paper presented at the **American Political Science Association Annual Meeting**, Washington D.C.

Wang, S., & Pagano, M. A. (2013, November). *Effects of TEL on municipal revenue structure.* Paper presented at the **National Tax Association Annual Meeting**, Tampa, FL.

Wang, S., & Pagano, M. A. (2013, October). *Institutional constraints' effects on municipal revenue structure.* Paper presented at the **Association of Budgeting and Financial Management Annual Meeting,** Washington D.C.

Hoene, C., Pagano, M. A., **Wang, S.**, & Shi, Y. (2012, October). *The fiscal policy space of municipalities.* Paper presented at the **Association of Budgeting and Financial Management Annual Meeting**, New York, NY.

Wang, S., & Mastracci, S. (2012, June). *Measuring social equity.* Poster accepted at the **American Political Science Association Annual Meeting,** New Orleans, LA. (Meeting canceled due to Hurricane Issac).

RESEARCH EXPERIENCE

Research Assistant

Professor David Merriman 2012-Present
Institute of Government and Public Affairs, University of Illinois at Chicago
Monitoring and assessing the impact of tax and price policies on US tobacco use
(Funded by National Cancer Institute & Food and Drug Administration)

Professor Michael A. Pagano 2012-Present
Department of Public Administration, University of Illinois at Chicago
Fiscal policy space of municipalities
(Funded by MacArthur Foundation)

Steve Schlickman 2011-2012
Urban Transportation Center, University of Illinois at Chicago
Debt financing for Illinois high speed rail
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Professor Mayling E. Birney
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Woodrow Wilson School of Public and International Affairs
Princeton University
Public participation of local government election in China

TEACHING EXPERIENCE

Instructor

Introduction to Policy Process (Undergraduate level) Fall, 2014
Department of Urban and Public Affairs
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State & Local Finance (Graduate level) Spring, 2014
Department of Public Administration
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Human Resource Management in the Public Sector (Undergraduate level) Spring, 2014
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Tutor Spring, 2014
Advanced Data Analysis (Graduate level)
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PROFESSIONAL DEVELOPMENT

Structural Equation Modeling 2014
Center for the Advancement of Research Methods and Analysis (CARMA)
Wayne State University, Detroit, MI

Meta-analysis & Systematic Review 2014
Center for the Advancement of Research Methods and Analysis (CARMA)
Wayne State University, Detroit, MI

Multi-Level Modeling 2013
Interuniversity Consortium for Political and Social Research (ICPSR)
University of Michigan, Ann Arbor, MI

HONORS & AWARDS

C. Lowell Harriss Dissertation Fellowship, *$10,000 USD awarded* 2014-2015
Lincoln Institute of Land Policy

University Fellowship*, $25,000 awarded annually for four years* 2011-2015
University of Illinois at Chicago

Merit-based Scholarship 2008-2011
Illinois Institute of Technology

Scholarship for Excellent Student Performance 2005
Renmin University of China

WORK EXPERIENCE

Financial Analyst 2009-2011
Chicago Transit Authority

Consultant 1/2008-5/2008
Mid-Atlantic Coastal Ocean Observing Regional Association

STATISTICAL PROGRAMS

SPSS, Stata, SAS, Mplus

PROFESSIONAL AFFILIATIONS

American Political Science Association
American Society for Public Administration
Association for Budgeting and Financial Management
National Tax Association

References and teaching evaluations available on request.