ABSTRACT

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User charges have emerged as one of the major revenue sources for municipal governments in the United States since the late 1970s. Meanwhile, a majority of states have adopted tax and expenditure limitations (TELs) in an attempt to constrain the revenue and spending levels of local governments including municipalities. In the era of TELs, how user charges perform their multiple roles in promoting local autonomy, political accountability, allocative efficiency, horizontal equity, and responsive government deserves considerable attention in the field of public finance. This dissertation explores the causes and consequences of the increased use of user charges by American municipalities.

First, I provide an overview of fiscal trends in American municipalities. Chapter 1 discusses the context in which municipal revenue policy is made, the definitions of user charges, the salience of the issue, and the aims and organization of the dissertation.

Chapter 2 investigates the effect of TELs on municipal reliance on user charges. The analysis is based on a sample of 724 cities for the period of 1970 to 2004. I employ fixed effects regression techniques to help control for the unobserved city-level characteristics that vary across cities but are time invariant. Results indicate that the implementation of TELs leads to a substantial increase in per capita user charges. The effect becomes even more pronounced when the endogoneity of TELs is taken into account using a two-stage least squares model. This finding implies that TELs may have unintended consequences and lead to a bigger government. Results also suggest that the restrictiveness and the number of TELs make a difference and different types of TELs generate varying effects on user charge reliance.

Chapter 3 examines the impact of user charge financing on municipal expenditure levels. Using a panel of 686 cities for the sewer service and 715 cities for the parks and recreation service between 1972 and 2004, I find strong evidence that a greater reliance on user charges to finance government services leads to a reduction in municipal expenditures. Finally, I conclude with a discussion of policy implications in Chapter 4.

MUNICIPAL USER CHARGES IN THE ERA OF TAX AND EXPENDITURE LIMITATIONS

By

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Dedication

To my parents, Sanrong and Yanbin

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Chapter 1: Overview of Fiscal Trends in Municipalities

Municipalities play an essential role in the American federal system shaping the lives of local residents in nearly every social, economic and political aspect. According to the *2007 Census of Governments*, there are 19,431 municipalities in the United States, in which nearly 175 million people or 61% of the U.S. total population reside (U.S. Census Bureau, 2005). Municipal governments, which include cities, towns, boroughs and villages,[1] provide education, hospital care, public health and welfare programs, police and fire protection, sewerage and sanitation, basic transportation infrastructure, and numerous other public services. Years of public opinion polling show that many Americans favor local governments, including municipal governments, more than either the federal or state government and believe that local governments provide more services for their tax dollar than these higher levels of government (Conlan, 1998; Kincaid & Cole, 2001). Despite the considerable public support given to local governments, reductions in federal aid, regional recessions, and the adoption of tax and expenditure limitations (TELs) by state governments have put considerable obstacles to the traditional revenue sources of municipal governments—principally property taxes and intergovernmental revenue. In order to continue financing local public services, user charges have emerged as a salient source of municipal revenue. Accordingly, the implementation of user charges appears particularly appealing to municipal

[1] For Census Bureau statistics, municipal governments are defined as political subdivisions within which a municipal corporation has been established to provide general services for a specific population concentration in a defined area. This includes all sub-county general purpose governmental units officially designated as cities, boroughs (except in Alaska), towns (except in the six New England states, Minnesota, New York, and Wisconsin), and villages. For simplicity, this study uses "city" as an interchangeable term with "municipality" thereafter unless otherwise specified.

administrators who seek to maximize necessary public services while maintaining fiscal and political accountability. Indeed, user charge is one of the few areas in which most municipal governments can still autonomously exercise their taxing authority without significant state government interventions—although in some places (e.g., Colorado and Michigan) user charges do face legal constraints and increasing resistance from the local public (Reed, 1999).

As a result of these fiscal challenges and with public demands for greater accountability on the part of public officials, municipal government reliance on user charges has increased significantly over the past several decades. As of 2002, user charges accounted for 42% of municipal total own-source revenue while property taxes only generated 23% of total own-source revenue for municipalities in the United States, compared with 33% versus 37% in 1972 (see Figure 1.1). In other words, for every $1 in property taxes collected, municipal governments, on average, received $1.83 in revenue from user charges in 2002, compared with $0.89 in 1972. In addition, per capita municipal user charges in real terms have been almost doubled over the past three decades (U.S. Census Bureau, 1978, 2005).

1.1 Context of Municipal Revenue Policy

In principle, a municipal revenue structure should address four key concerns: (1) a municipal government revenue structure should reflect the preferences of the citizens within the jurisdiction; (2) a municipal government revenue structure must provide a stable and reliable source of funds; (3) a municipal government revenue structure must display financial self-sufficiency; and (4) a municipal government revenue structure must

promote cost efficiency (Bland, 2005). In practice, however, municipal revenue policies are significantly shaped by the ever-changing political and economic environment in which they operate. Since the end of World War II, many municipal governments have experienced several major challenges, challenges that have forced them to alter their revenue structures.

Perhaps the most profound challenge confronting municipalities is tax revolts. Anti-tax sentiments, of course, are not new in the American political experience. But at the heart of these contemporary revolts is a strange paradox. Although public opinion polls consistently indicate that citizens regard local governments as making the most of their tax dollars, the polls also reveal a long-standing distrust of government on the part of average citizens (Bland, 2005). During the period of stagflation, American citizens became even more skeptical of government. California's Proposition 13 (in 1978) and Massachusetts' Proposition 2 ½ (in 1980) are two of the most prominent tax revolts in recent American history. In response, many state governments imposed TELs on local governments, including municipalities, restricting local discretion in raising property taxes or increasing spending levels. As of 2004, 46 states have implemented certain forms of TELs on local governments, of which, 42 states have limitations on their municipalities (Mullins & Wallin, 2004). As a result of these limitations, many local government officials are hesitant to raise property tax collections for fear of provoking a citizen reaction like the Proposition 13 tax revolt or of driving businesses and households away into lower tax jurisdictions. This is true even when there are no legally established TELs in these jurisdictions (Pascal, 1986).

In addition to the tax revolt challenge, demographic changes are proving to be a significant challenge for municipal governments. At the beginning of the 21st century, property tax revenue is in considerable jeopardy due to a rapidly aging population. As a result of longer life spans and declining birth rates, the U.S. senior population is projected to reach 71.5 million or 20% of total population by 2030 (U.S. Administration on Aging, 2006). Traditionally, senior citizens have been averse toward property taxes because real estate values often increases at a faster rate than does income, which, in turn, imposes a greater property tax burden for elderly homeowners on fixed incomes (Brunori, 2003). Current property tax relief programs such as "circuit breakers" (i.e., limiting the amount of property taxes paid based upon current family income), homestead exemptions, and deferrals help to temporarily alleviate this situation, but these approaches do not constitute a long-term solution for revenue requirements in a society characterized by a rapidly aging population.

Besides tremendous pressure from local residents, municipal revenues are also challenged by the policy of the upper level governments—namely, the "New Federalism" movement. New Federalism, also known as "devolution revolution" or "fend-for-yourself" federalism, was first introduced by President Richard Nixon in the 1970s as an attempt to devolve national programs and policy priorities to state and local governments (Conlan, 1988; Krane, 1990). This initiative was later adopted and expanded by the Reagan Administration as part of a broader strategy to reduce the role of government at all levels. In the 1990s, the Clinton Administration's National Performance Review (NPR) and the Republican Congress' "Contract with America" attempted to continue the principles of the New Federalism and the devolution of policy making and

implementation down to the states, as did President George W. Bush's three tax cuts since 2001 (Anders & Shook, 2003). As a consequence, federal aid to municipal governments diminished significantly from about 15% of municipal government total general revenue in 1977 to 5% in 1988 and remained in this proportion until 2002. The total amount and per capita amount (in real terms) of federal aid to municipal governments also declined during this period, although at a less dramatic rate than the percentage change. In contrast, during the same period, state aid to municipal governments showed a steady increase in terms of absolute real values (total amount and per capita amount), which offset the loss of federal aid. However, the percentage share of state aid in municipal general revenue remained around 21% over the years (U.S. Census Bureau, 1967-2004). This trend implies that municipal governments have collected more revenues from their own sources rather than heavily relying on upper level government assistance. This shift may be driven by the overall increasing cost of providing public services, requirement of matching fund to the state grants, and/or growing awareness of the importance of local fiscal autonomy among local government officials.

In addition to continuing citizen resistance to property taxes and declining federal aid, increasing economic uncertainty caused by business cycles has further challenged and, accordingly, changed municipal revenue structures. Moreover, as the U.S. economy is moving away from manufacturing sector towards information and service based economy, municipal revenue bases are drying up further. That is, municipal governments, as with states, are losing sales tax revenues from tangible goods and find themselves in need of capturing revenue from intangible goods and services and internet sales. Furthermore, to withstand the national and regional business cycles, and especially to

avoid fiscal crises caused by economic recessions, cities need to maintain a stable revenue system which depends in a large part on the degree of diversification in both tax bases and revenue sources (National Advisory Council on State and Local Budgeting (NACSLB), 1998; U.S. Advisory Commission on Intergovernmental Relations (ACIR), 1987). All these challenges have intensified the intergovernmental competition between municipalities. Many municipal administrators are willing to lower tax burdens and provide certain economic incentives in order to lure business investments to their jurisdictions, and thus sustain a healthy revenue base while maintaining quality service provisions.

1.2 Definitions

While the term "user charges" has been widely used by governments and scholars, there is no universal agreement on what exactly should be included in the concept. In a narrow sense, user charges are prices charged by governments for voluntarily purchased and publicly provided goods or services that are closely associated with basic government responsibilities (Mikesell, 2007). Common examples of state and local user charges include, but are not limited to, air transportation charges, public school and college tuition, public hospital charges, highway tolls, parking fees, parks and recreation charges, solid waste management charges, and sewerage charges. Some scholars argue that regulatory fees and utility revenues should be excluded from the list of user charges in that regulatory fees are paid for privileges granted by governments (not publicly provided goods or services) and utility revenues are public prices levied on pure private (not public) goods that governments choose to provide. Impact fees and special

assessments, though related to public goods, are also excluded either because their primary use is to finance infrastructure and not to pay for current government services or because they are purchased compulsorily (i.e., not voluntarily) (Zorn, 1991).

In a broad sense, however, user charges refer to prices charged by governments not only for utilizing specific services but also for the privilege of undertaking some activities (Fisher, 2007). By this definition, license and permit fees, impact fees and special assessments can also be classified as user charges. Furthermore, the now defunct United States Advisory Commission on Intergovernmental Relations (ACIR) and several scholars also include utility revenues into their research on user charges, thus extending the term toward a much broader understanding.[2]

For working purposes, this study employs a definition of user charges that includes what the Census Bureau calls "current charges" and "utility revenues." According to the Census Bureau, "current charges" are charges imposed for providing current services that benefit the person charged and for the sale of products in connection with general government activities such as highway tolls and sewerage charges, while "utility revenues" are receipts from sales and directly related services and by-products of water supply, electric power, gas supply, and public mass transit systems. These utility systems "must be either owned and operated by a government, or owned and operated under contract by a private firm where the government maintains day-to-day financial oversight" (U.S. Census Bureau, 2006, pp. 2-1). License and permit fees are categorized as taxes, while impact fees and special assessments are reported as miscellaneous general revenues (including proceeds from sale of property, interest earnings, fines and forfeits, rents and royalties, etc.) by the Census Bureau, and thus, are excluded from this study.

[2] See ACIR, 1987; Netzer, 1992.

By including current charges and utility revenues into the study of user charges, it is possible to avoid some of the inherent ambiguities in defining benefit-related charges. The working definition proposed here reflects a common distinguishing characteristic of these revenue sources; that is, they both are voluntary payments based on direct and measureable consumption of publicly provided goods and services. These types of goods may come in several forms. For instance, these goods could be pure private goods such as power, gas and water utilities that governments choose to provide or regulate with the intention of protecting the general public from the manipulation of natural monopolies (assuming that government itself does not exploit its position). Or these goods could be merit goods such as after-school recreation programs which are enjoyed by identifiable individuals but generate benefits that could spill over to the community at large (e.g., reducing juvenile delinquency). Finally, these types of goods could be toll goods, such as certain highways and bridges that are exclusive to toll payers but no one individual's use of the goods detracts from anyone else's benefit. All in all, the beneficiaries of the government services financed by these types of charges are identifiable individuals, rather than the general public, and non-payers could be excluded from receiving the benefits of these services (ACIR, 1987).

Other related concepts are defined as follows. "Total revenue," based on the Census Bureau's classifications with modification, includes general revenue (taxes, intergovernmental revenue, current charges, and miscellaneous general revenue) and utility revenue. "Total own-source revenue" comprises general own-source revenue (taxes, current charges, and miscellaneous general revenue) and utility revenue. These concepts are consistent with all state, local, county, and municipal governments referred

in this study. Liquor stores revenue and social insurance trust revenue (including retirement and social insurance contributions and net earnings on investments for insurance trusts) are excluded from the study due to their unique nature (related to special government services), minimal magnitudes (accounting for approximately 2% of total municipal revenue from all sources), and little relevance to the research topic.[3]

In addition, it is essential to clarify that tax and expenditure limitations can be authorized or enforced at different levels of government. "State-level TELs" are TELs that are imposed on the state government by the state itself. As of 2008, 30 states had at least one type of such TELs restricting state spending levels (23 states), or revenue levels (four states), or both (three states) (Waisanen, 2008). "State-imposed TELs" refer to those tax and expenditure limitations that are imposed on local governments and authorized by the state. Additionally, several local governments also operate under "locally-imposed TELs." These are TELs that are put into practice in order to provide a degree of self-regulation on the part of the local government in question (Brooks & Phillips, 2009). The last two levels of TELs are especially important for municipalities. The focus of the study is on state-imposed TELs, and thus the following use of the term "TELs" will refer to this level of TELs only, unless otherwise specified.

1.3 Salience of User Charges

As indicated, increased reliance on municipal user charges is widely perceived as a result of tax and expenditure limitations, federal fiscal devolution, and demographic and

[3] Liquor stores revenue, by Census definition, refers to revenues generated from sale of goods and associated services and products (excluding license fees and liquor taxes) in liquor stores owned and operated by local governments. As of 2005, local governments in only seven states collect such revenue (see U.S. Census Bureau, 2006).

economic changes. No matter what level of government they are applied to, TELs are often considered as a necessary means to protect the general public from higher levels of taxes and government expenditures than what the public actually prefers. Moreover, TELs are in accord with modern democratic practice and self-government, given that they function to promote political accountability on the part of public officials—a condition especially important at the local level. As noted earlier, to date 42 states have implemented certain forms of fiscal limitations on municipal expenditures and/or revenues, predominantly property taxes. When these fiscal institutions are imposed by a higher level of government on a lower level of government, the implication of the policy becomes complex. One of the most critical concerns is that this type of TELs may hinder local political autonomy in terms of taxing authorities. Local governments are considered the most efficient providers of certain public services. Supporters of localism claim that since local governments are closer to the citizens they can better reflect citizen desires and encourage them to participate in public affairs, thus, promoting democratic values and practices (Brunori, 2003; Frug, 1980). Hence, in the era of tax and expenditure limitations, one area of local pubic finance that deserves considerable attention is how municipal governments restore local autonomy as well as promote political accountability through user charges.

User charge financing is different from general tax financing in that user charge financing restores a direct relationship between the service received and tax payment, while under general tax financing the consumption-payment link is less clear or indirect at best. Due to the nature of a consumption-payment link with the user charge financing, theoretical discussions predict that a properly structured charge pricing system can

provide cost signals that enable consumers to properly evaluate the service thereby discouraging excessive or wasteful consumption of the service. Based on this line of reasoning, scholars have proposed that a greater degree of reliance on user charge financing should lead to a more efficient service provision than tax financing method (Bailey, 1994a; Wagner, 1976).

There are, however, issues of regressive levies and fairness associated with user charges. On one hand, based on the "benefit-received" principle or the notion of "horizontal equity," user charges might be considered equitable and in the public's best interest in that the recipients of identifiable benefits from a public service are held responsible for the support of that service. On the other hand, based on the "ability-to-pay" principle or the notion of "vertical equity," user charges may disadvantage lower-income people, who tend to be net gainers under a traditional tax-financed system. By linking payments directly to benefits, however, user charges would take away some of the benefits the lower-income people would otherwise have enjoyed in the tax-financed system and would even make some goods or services unaffordable to these people. In addition, shifting to user charge financing for services can make local revenue systems more regressive—namely, low-income households may pay a greater proportion of their income for user charges than do higher income households, especially if everybody is subject to flat fees that ignore ability to pay. Thus, balancing out the demands of efficient use of public resources with concerns over social justice and fairness remains an ongoing concern.

Finally, from the perspective of public management, under a charge-financed system, citizens tend to be treated as "customers" who choose service suppliers that best

satisfy their needs, rather than "clients" who depend on their vendors for protection or patronage. Accordingly, public managers are expected to become directly responsive to the needs of the citizen in the manner of managers of private firms serving private consumers. The customer-service orientation of user charge financing is consistent with the central theme of the New Public Management movement that aims to improve efficiency and responsiveness in the public sector (Denhardt & Denhardt, 2003; Kaboolian, 1998).

1.4 Aims and Organization of the Dissertation

Despite the growing importance of user charges in municipal finance, there is, at this time, a lack of academic literature on the topic of user charges in general. Discussions of user charges that do exist have typically concentrated on the advantages, drawbacks and the types of services feasible for user charge financing (Bailey, 1994a; Bierhanzl & Downing, 1998; ACIR, 1987), formulas and costs function used in charging fees (Hirsch, 1965; Johnson, 1969), and revenue potential of user charges (Downing, 1992). To date very few studies have discussed the causes and consequences of user charge financing for local public services.

This dissertation provides one of the first integrated efforts to examine the causes and effects of municipal user charges. Following this introductory chapter which overviews the fiscal trends in American municipalities and the saliency of user charges in the field of public finance, Chapter 2 examines whether state-imposed TELs affect municipal reliance on user charges. The units of analysis are 724 American municipalities with populations over 25,000 in 1970 during the period of 1970-2004. The

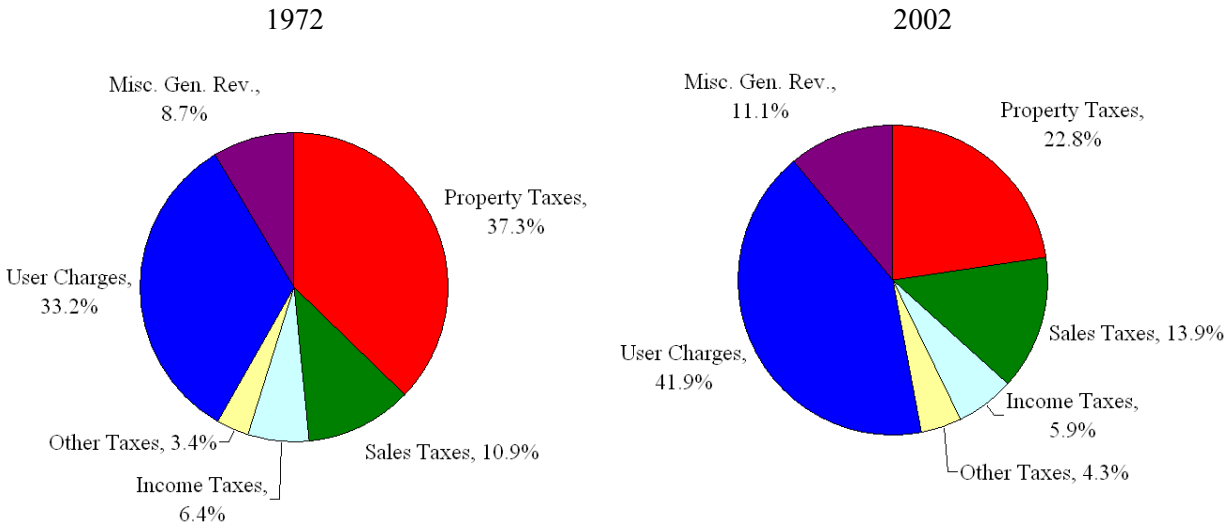
analysis includes city-fixed effects to control for unobserved factors that vary across cities but remain constant over time. It also employs a two-stage lease squares (2SLS) model to address potential endogeneity problem of the TELs. Regression results reveal that the implementation of TELs leads to a substantial increase in per capita user charges. Model specifications that neglect the endogeneity of TELs could lead to serious underestimates of the impact of this policy. The positive effect of TELs on municipal revenues may be an unintended consequence for many states. The results also suggest that the effects of TELs vary depending on the restrictiveness of the policy, the total number of limitations, and different types of TELs imposed on the municipality.

Chapter 3 investigates whether the employment of user charges to finance certain local public services affects municipal expenditure levels for delivering these services. In particular, the analysis chooses sewer service and parks and recreation service as the focuses of the study for comparative reasons. Sewer services are heavily dependent on user charge financing while the use of user charges in parks and recreation services are moderate. Using two national samples based on the one developed in Chapter 2, the analysis suggests that a greater degree of user charge reliance of the charge-financed services results in a lower level of the expenditure for the services.

Based on the findings presented in Chapters 2 and 3, the dissertation concludes with a discussion of policy implications in Chapter 4. As one of the first integrated efforts to examine the causes and effects of municipal user charges, this study contributes to our current understanding of the user charge financing instrument. Furthermore, since most previous studies have focused on individual municipalities within a single state, or are limited to municipal data aggregated at the county level (e.g., total amount of taxes

collected by all the municipalities within the county), this study may provide additional insights into the research topic by examining disaggregated data (i.e., data for each individual municipality) for a large number of national sample cities over an extended time period. Finally, this study is also vital to policy discussions of citizen participation in the policymaking process, political accountability and local autonomy, and efficiency versus equity in terms of taxation at the municipal level.

Figure 1.1 Municipal Own-Source Revenues by Source



Source: Author's calculations from U.S. Census Bureau, *Annual Survey of State and Local Government Finances and Census of Governments* (1972-2002).

Chapter 2: User Charges and Tax and Expenditure Limitations

2.1 Introduction

With the significant social, political and economic changes taking place in the United States over the past four decades, property taxes are no longer considered the most reliable revenue source for many American municipal governments. In their place user charges have become increasingly preferable by many local officials. As shown in Figure 2.1, the share of user charges in municipal own-source revenue increased by 9 percentage points from 33% to 42% between 1972 and 2002 while the share of property taxes decreased by 14 percentage points from 37% to 23% during the same time period. Figure 2.1 also reveals a moderate increase in local sales taxes and miscellaneous general revenues. This implies that many American municipalities have been attempting to utilize more user charges, sales taxes and miscellaneous general revenues to compensate for the loss of property taxes.

The upward trend of user charges and the downward trend of property taxes can be traced back to the early 1970s. However, it was not until the late 1970s and early 1980s that dramatic changes occurred in both revenue sources. One striking event happened during that time was the massive enactment of tax and expenditure limitations. While tax and expenditure limitations on local governments can be traced back to the late 19th century, the most significant development of the limitations took place in the aftermath of California's Proposition 13 (in 1978) and Massachusetts' Proposition 2 ½ (in 1980). The change in user charge reliance and the trend of TELs raise the question of whether TELs are in fact the major driven force of increasing reliance on user charges.

Specifically, do state-imposed TELs affect municipal reliance on user charges? Do different mechanisms or designs of TELs such as restrictions on tax rates, assessment, or total levy matter? Do the effects of TELs vary among local jurisdictions under different social-economic conditions?

Previous studies identifying the causes of user charge reliance have been sparse. As one of the few such efforts, Netzer's (1992) study found that differences in the mix of local expenditure, increased user charge financing for specific functions, personal income, and the ability to export business taxes were the main determinants of government reliance on user charges by local governments. Nevertheless, his study did neither examine the possible impacts of TELs nor the effects of federal fiscal devolution. In addition, the focus of his study was primarily on aggregated state and local revenues rather than revenues from individual municipalities. On the other hand, previous studies on the effect of TELs in general have found that TELs lead to increased use of state aid and increased reliance on the aggregate of user charges and miscellaneous revenue sources as opposed to local broad-based taxes (Hoene, 2004; Johnston, Pagano, & Russo, 2000; Shadbegian, 1999). However, none of these studies specifically examined the effect of TELs on user charges. In addition, these studies either focused on municipalities within a single state or were limited to the aggregated or disaggregated county level data in a national sample. That is, no analysis has yet been undertaken to directly assess the link between TELs and municipal user charges using a national sample for an extended time period.

This study attempts to fill in the research gap in studying causes of increased user charge reliance through an examination of 724 American cities with populations over

25,000 in 1970 during the period of 1970 to 2004. It investigates the impact of state-imposed TELs on municipal user charge reliance in the United States. Given that user charges are particularly important in financing sewerage, hospitals, solid waste management, utilities, and other essential services that municipal governments typically provide, a better understanding of the causes of user charge reliance is essential.

Regression results indicate that the adoption of TELs leads to an increase in per capita user charges in municipalities. This effect becomes more substantial when the endogoneity of TELs is taken into consideration using the passage rate of citizen initiatives along with other social-economic variables as the instruments in a 2SLS model. The substantial increase in user charges is accompanied by the increases in sales taxes, license taxes, miscellaneous general revenue and total municipal expenditures. This suggests that the TEL policy may have caused unintended consequences and lead to a bigger government. Possible explanation includes that fiscal devolution may have resulted in the shift of responsibilities towards local governments. Increased expenditures (or responsibilities) require more local revenues. Since most TELs only restrict property taxes, other sources of revenues have been increasingly utilized by municipalities.

In addition, the stronger effects of 2SLS estimation imply that some unobserved factors that vary across municipalities and change over time may decrease per capita user charges. These factors could include citizen resistance against user charges, legal obstacles, and fiscal capacities of implementing user charges, and so forth.

Furthermore, a more detailed examination finds that the restrictiveness and the number of TELs matter and application of TELs on tax rates, levy, spending, or other

areas produces varying effects with some limitations having greater overall effects than do others.

The remainder of this chapter is organized as follows. The next section provides a brief review of previous studies on TELs. Section 2.3 explains the data and methodology employed in this study and section 2.4 presents empirical research findings. The chapter concludes in section 2.5 with a discussion of the regression results and suggestions for future research.

2.2 Literature Review

2.2.1 Theoretical Arguments

A. The Leviathan Model of TELs

Many studies on TELs have implicitly or explicitly assumed a Leviathan model of government (Abrams & Dougan, 1986; Bails, 1982; Cutler, Elmendorf, & Zeckhauser, 1999; Howard, 1989; Joyce & Mullins, 1991; Nelson, 1986). The central hypothesis of the Leviathan model is that it is only by imposing constitutional constraints on both government expenditure levels and sources of revenue that it becomes possible to curb the seemingly insatiable appetite of government officials for public spending, thereby limiting the growth of the public sector (Mueller, 2003, p. 382). Governments under the Leviathan model act as monopolies, with bureaucrats spending some proportion of total government revenues on specified public goods and services that benefit taxpayers. That is,

$$G = \alpha R, \tag{2.1}$$

where:

G is public goods and services provided by the government;

R is total government revenues; and

α is the proportion of the revenue used for taxpayers, and $0 < \alpha < 1$.

The residual revenue R-G, referred to as the surplus, S, is available for the discretionary use of the government officials, which can be expressed as:

$$S = R - G, \text{ or} \tag{2.2}$$

$$S = (1- \alpha) R. \tag{2.3}$$

Leviathan government, however, always aims to maximize the surplus for the benefit of the government officials. Since the more the total revenue collected, the larger the amount of surplus that goes to benefit government officials, the maximization of surplus becomes a matter of maximizing total revenue. Total revenue is subject to the tax base, b, tax rate, r, and competitive environment, c. Thus the task of the Leviathan government can be described as to maximize:

$$R = R (b, r, c). \tag{2.4}$$

By applying the Leviathan model, Brennan and Buchanan (1980) interpreted TELs and other fiscal rules in terms of social contract theory. Since political competition (e.g., party competition and interest group competition) is viewed as being ineffective on constraining the expansion of government due to the rational ignorance of voters, the uncertainties inherent in majority rule cycling and outright collusion among elected officials, citizens often demand constitutional arrangements to limit government revenues. Hence, if citizens were given a choice in the matter, particularly in the initial establishment of the government, citizens would choose certain constitutional limits on the power and scope of government. These constitutional limits, according to Brennan

and Buchanan, amount to a social contact of the Rawlsian type (Brennan & Buchanan, 1980, pp. 3-4; Rawls, 1971). In theory, once such constitutional limits on government action have been put in place, citizens recede into the background allowing politicians and bureaucrats to maximize government revenues within such constrains. Hence, it can be argued that if citizens had a say in the initial establishment of government, TELs would form an important limitation on government taxing and spending powers.

Today TELs have three primary functions. First, TELs can restrict the tax rate that governments are allowed to impose—such as setting a limit on specific property tax rates. Second, TELs can constrain the tax base—such as imposing a limit on the assessment of property value. Finally, TELs can confine the total amount of tax levies or government expenditures. A Leviathan government has to operate under such limits and choose a combination of various tax bases and different rate structures that can best strengthen their competitiveness with other jurisdictions, ultimately helping the government in question achieve the goal of maximum revenue (and hence maximum spending).

According to the Leviathan model, government's capacity to tax citizens is weaker under a narrowly-defined tax base than under a broader one. On can thus assume that citizens would prefer to restrict government revenue sources that have broad tax bases, such as income taxes and property taxes, while remaining open to those sources that have narrow tax bases, such as sales taxes and user charges. The Leviathan model further indicates that from a government's perspective, in order to maximize revenues within a fixed amount and to minimize the degree of distortion of economic behavior at the same time, an optimal tax should be the one that has the most inelastic source of revenue such as property taxes (Mueller, 2003). However, in practice, as Groves and

Kahn (1952) has observed, as income grows income-elastic tax bases will also grow but at a higher speed than does income, therefore more income-elastic tax bases will have more growth potential over time. The Leviathan model predicts that citizens who want control over their government will be willing to impose constrains on those taxes with inelastic tax bases and limit government revenues to taxes that have more elastic tax bases. In addition, to prevent the government from granting interest groups special tax concessions, citizens, when initiating TELs, may require that the government impose tax schedules that are uniform across the jurisdiction. It is this aspect of TELs that provides the prospect of promoting political accountability, horizontal equity and, thus, limiting the government's monolithic role in a society.

B. The Rent-Seeking Model of TELs

An alternative view of TELs is based on a rent-seeking model and is best illustrated by Poulson and Kaplan (1994). As indicated, the rent seeking approach borrows the ideas from the interest group theory of politics and assumes that self-interested politicians will attempt to minimize the political costs associated with expanding a given budget or revenue source (Hettich & Winer, 1984). Political costs arise from political conflict between taxpayers who oppose taxes and special interest groups who look to government for privileges or favorable policy outcomes, such as tax loopholes, that benefit their groups. Politicians can minimize these costs by shifting the tax burden to the party that is less sensitive. In the public choice literature privilege seeking by special interest groups is referred to as "rent seeking." Rents are defined as excess returns over opportunity costs. Rent-seeking interest groups attempt to redistribute

the rights or entitlements to such returns through political actions. This type of activity was first discussed systematically by Tullock (1967) but it was Krueger (1974) that first used the term "rent seeking" to describe the activity in question.

Poulson and Kaplan's (1994) seminal work was one of the few efforts of applying the rent-seeking model to the context of TELs. Instead of viewing TELs as an exogenous event as discussed in the Leviathan model, Poulson and Kaplan treated TELs as a result of complex decision making process in which the taxpayers, the rent-seeking interest groups, and politicians interact with each other to make fiscal choices. The design and implementation of TELs depend on how politicians respond to the efforts of the taxpayers to protect themselves from rent-seeking special interests, and to the efforts of these rent-seeking groups to pursue or defend their rent rights.

One possibility is that politicians support taxpayers' demands by constraining tax revenues and government expenditures at the expense of the special interests. It is possible that some politicians truly identify with taxpayers' ideology and are motivated by such beliefs to improve the efficiency and effectiveness of government; likewise, politicians may be animated by a sense of altruism in the pursuit of the general interest or public good. However, politicians may also act purely out of self-interest, appearing, ostensibly, to be satisfying the general interest but, in fact, simply pursue their own self-interest, in order to remain in office and enhance their wealth and prestige.

Another possibility is that politicians respond to the request of the rent-seeking groups and co-design TELs that actually benefits special interests. These preemptive TELs make politicians appear to be fiscally prudent thus precluding taxpayers from demanding TELs that may contain added and tougher restrictions on government. By

giving some benefits to the special interests, these types of TELs also reduce the incentives for further rent-seeking from the special interest groups. Using this strategy, politicians can reduce the pressure from both sides of the political battles and, ultimately, maximize their own self-interest. However, the impact of these preemptive TELs on rent-seeking interest groups is rarely uniform. Politicians may design TELs that benefit some interest groups at the expense of other interest groups in one area, and reverse this preference in another area (Spindler, 1990). This explains the various compositions of government revenues and expenditures. For instance, a TEL may be imposed on a subset of government spending, but exempt the earmarked portion from the limit. Another example is that a TEL may limit the growth of residential property levy but leave the commercial property levy unconstrained. The dynamics of this rent-seeking process makes the fiscal outcome uncertain. If the taxpayers dominate in the process, one could expect that the politicians would adopt the TELs that contain stricter budget constraints and effectively limit rent-seeking activity. On the other hand, if special interest groups control the process, one could expect a weak and ineffective TEL that grants opportunities for rent-seeking (Poulson & Kaplan, 1994).

From what has been discussed, the Leviathan model is probably more appropriate for describing the constitutional TELs originated through citizen initiatives and referenda, while the rent-seeking model is more applicable for statutory constraints introduced by politicians. The Leviathan model basically ignores how TELs are created by the citizens—it simply assumes that citizens are averse to monolithic government and the costs of such a government. TELs may be approved unanimously, by a simple majority vote, or by a super majority vote (usually two thirds of vote) by the legislative body. The

model does not explicitly discuss these possibilities. Rather, most of its attention has been given as to how politicians react to the established TELs, that is, how politicians maximize the revenue and budget within limits created by TELs. The Leviathan model treats the passage and implementation of TELs as a linear movement in which TELs and revenue maximization are two consecutive events, one following the other. In contrast, the rent-seeking model focuses on the complex process of decision making involving citizens, special interest groups and politicians. Politicians do not simply take a passive position as described in the Leviathan model, but play a rather active role in the design and implementation of the TELs. The rent-seeking model assumes that politicians maximize their self-interest but does not differentiate whether this maximization is realized trough revenue-maximization, vote-maximization, or both.

One crucial problem associated with both models is that they treat government as a unified unit. These models may be adequate in explaining "state-level TELs" passed by the state government and imposed on the state government itself, or "locally-imposed TELs" that are adopted by and imposed on the local government itself. But these models remain open to questions concerning the application of "state-imposed TELs" passed by the state government and imposed on local governments. State and local governments are certainly not one unified unit. Even though local governments are creatures of the states, local governments are often on the defensive against state actions that impinge upon their autonomy (Anders & Shook, 2003). The National League of Cities (2006) also noticed a decline in intergovernmental partnerships and announced an emerging crisis of fiscal federalism. One solution to this problem associated with two models is to treat local governments as one type of rent-seeking groups who participate in the statewide

bargaining process of the TELs along with other interest groups and taxpayers. Nevertheless, no matter which theoretical model one believes best describes the enactment of TELs, the fiscal impact of TELs should not be altered by the theory in any significant way.

2.2.2 Empirical Analysis

Considerable attention has been devoted in the literature to the topic of state-imposed TELs. ACIR (1986) classified seven types of state-imposed TELs according to their content, including (1) "overall property tax rate limits" which apply to the aggregate tax rate of all local governments; (2) "specific property tax rate limits" which apply to specific types of local jurisdictions or narrowly-defined service areas; (3) "property tax levy limits" which confine the maximum amount of property tax revenue or annual percentage increase in the levy; (4) "limits on assessment increases" (or assessment increase limits) which restrict the growth rates in the assessment of property values; (5) "general revenue limits" which apply to all local tax proceeds and may apply to state aid as well; (6) "general expenditure limits" which apply to all local government expenditures except debt service, state and federal mandates, emergency expenditures, and so forth; and (7) "full disclosure" (or truth-in-taxation) which requires advertisement or announcement of new tax proposals and the involvement of public hearings and discussions on proposed tax increases.

In theory, these limits vary in the extent to which they restrict local government taxing and spending levels although none of them is absolutely restrictive in practice. With this consideration, Joyce and Mullins (1991) further divided state-imposed TELs

into two broad categories according to their potential effects on government fiscal outcomes: potentially binding TELs and non-binding TELs. Potentially binding TELs include (1) overall property tax rate coupled with assessment increase limits, (2) specific property tax rate coupled with assessment increase limits, (3) property tax levy limits, (4) general revenue limits, and (5) general expenditure limits. Non-binding TELs include (1) overall property tax rate limits, (2) specific property tax rate limits, (3) assessment increase limits, and (4) full disclosure. The latter category of TELs is considered less restrictive than the former type in that governments, if attempting to raise property tax revenues, could circumvent the rate limitations by increasing assessment values of the properties and vice versa. This two-category classification, as Joyce and Mullins explained, implies not only a physical ceiling but also public sentiment towards local taxing and spending.

TELs may be adopted by different methods. These methods include citizen initiatives, referenda, legislative action, or constitutional conventions. Moreover, they can be suspended or overridden by simple or super majority votes of legislature, popular referenda, state board approval or court appeal while the limits prescribed may be statutory or constitutional. Most of the limits are designed to offset the growth in inflation, population, personal income, tax base, or can be established at a fixed percentage or dollar amount. Debt services, capital improvement and pension liabilities are usually exempted from TELs. The ACIR's (1995) report *Tax and Expenditure Limits on Local Governments* and Mullins and Wallin's (2004) analysis well-documented these variations.

Previous studies on TELs primarily focused on three areas: reasons for voter support, descriptive summaries, and estimated fiscal impact of TELs. For example, based on a statewide survey of Massachusetts residents in 1980, Ladd and Wilson (1982) suggested that TELs reflect voters' desire for less taxes, quality service, and improved efficiency in government, rather than reduction in the public sector. Stein, Hamm, and Freeman (1983), by examining the petition signing of 1,459 citizens in Milwaukee, Wisconsin in 1978, found that voters support TELs out of their own self-interest, that is, those whose tax burdens most likely to be affected tend to support these limitations. Also with a focus on Massachusetts, Cutler, Elmendorf, and Zeckhauser (1999) took a unique approach by evaluating agency loss theory, regret or mission accomplished theory, personal finance theory, and demographic differences theory, and revealed two reasons for the Massachusetts Proposition 2 ½ 's support: people perceived agency losses from the difficulty of monitoring government, and people judged government to be inefficient because their tax burden was too high. Besides single state case studies, Alm and Skidmore (1999) used aggregated state-level data in all states over the period of 1978 to 1990 and found that the passage of TELs was more related to economic growth, increases in property taxes or local revenues relative to state revenues than to demographic or political features of the state.

Descriptive summaries indicated that 46 states have currently imposed some forms of TELs on local governments but that these TELs are not evenly distributed across regions—they are most prevalent in Western states and least employed in the Northeast region (Mullins & Wallin, 2004). Scholars also documented the implementation of the TELs in terms of allowable growth, exclusions and override provisions (Mullins &

Wallin, 2004; Raimondo, 1983). A number of descriptive studies compared the average revenues and expenditures in states that have TELs with the averages of all states nationwide and described the changes in local fiscal structures from pre-TELs era to post-TELs era (Hoene, 2004; Joyce & Mullins, 1991; Saxton, Hoene, & Erie, 2002).

There is a substantial empirical literature examining the various effects of TELs on local public finance. However, only one study used disaggregated individual municipal data in a national sample. With respect to the impacts of TELs on local government size, previous studies produced mixed results largely due to different measures utilized to determine the actual size of government. Using public spending level as a measure of government size, some researchers concluded that TELs have little effect on the overall size of the local public sector (Galles & Sexton, 1998; Gold, 1979; Joyce & Mullins, 1991; Lowery, 1983; Mullins & Joyce, 1996). For instance, Saltzstein (1986) revealed that after Proposition 13, spending levels were not reduced among 25 large California cities in the early 1980s—only spending priorities had changed. However, using employment as a measure of government size, Poterba and Rueben's (1995) study suggested some evidence that TELs might have in effect reduced government size. Based on individual-level data on wages and worker characteristics in the periods covering 1979-1980 and 1990-1991 and percentage change in per capita local government employment between 1980 and 1991, Poterba and Rueben found that TELs slowed down local government employment growth for both men and women and depressed the wages paid to local government employees. Alternatively, the studies by Preston and Ichniowski (1991) and Shadbegian (1998) used government revenue as an indicator of government size and offered further evidence that TELs can affect local government budgets when

controlled for the effects of income and population. As the only analysis to date that has focused on individual municipalities nationwide, Preston and Ichniowski developed a panel of 1,368 municipalities over a ten-year period (1977-1986). They found that property tax rate limit, when coupled with assessment limits, can reduce the growth of property taxes and municipal own-source revenue per capita by 45% and 13%, respectively. Shadbegian (1998), using a dataset on local government budgets aggregated to the state level for the period of 1972 to1992, found similar evidence as in Preston and Ichniowski's study and showed a reduction of 6% in the level of own-source revenue per capita, 8% in own expenditures per capita, and 3% in property taxes per capita.

Previous studies generally suggested that TELs facilitated the changes in local revenue compositions, resulting in decreased use of taxes, shifts toward non-tax general revenues, as well as expanded relative fiscal role for state governments (Johnston et al., 2000; Mullins & Joyce, 1996; Shadbegian, 1999; Sokolow, 2000). However, none of the existing studies specifically examined the impact of TELs on user charges levied by municipal governments. These studies simply treated user charges as one of the non-tax revenue sources (along with miscellaneous general revenue) and examined the overall impact of TELs on aggregate non-tax revenues. Furthermore, existing studies do not differentiate user charges collected by municipal governments from those collected by other types of local governments such as counties, special districts, or school districts.

Among those studies that focused on county revenues or combined local government revenues, Shadbegian's (1999) work stands out in that it treats TELs as endogenous rather than as in other studies. Using data on 2,955 U.S. counties from six Census of Government years (1962, 1967, 1972, 1977, 1982, and 1987), and aggregating

all local government budgets, including municipal governments, to the county level, Shadbegian found that for each $1 reduction in taxes per capita there is a corresponding $0.27 increase in non-tax general revenue (including user charges and miscellaneous revenues) per capita. By taking into consideration the stringency of TEL laws (i.e., a state is considered having more stringent TELs when local property taxes are restricted to fiver percent growth or less, and less stringent otherwise), however, he found that this substitution effect (though less than dollar-for-dollar) only occurs in local governments facing less stringent TEL laws and not in those facing more stringent TEL laws. That is, local governments facing more stringent TEL laws suffer reductions in tax revenues but do not raise any additional non-tax general revenue to offset such loss. Therefore more stringent TELs reduce more own-source revenue than do less stringent TELs. Shadbegian, however, did not offer explanations about this interesting result.

Using data from comprehensive annual financial report surveys (CAFRs) for either 1997 or 1998, Johnston, Pagano and Russo (2000) examined 107 counties within 44 states and found that state-imposed revenue constraints—TEL restrictiveness combined with general taxing authority—mitigate county tax reliance and related resident tax burdens but also lead to increased reliance on user fees and charges (county-levied) and higher fee burdens for county residents. Their analysis suggested that states provide more financial assistance to those counties most constrained by restrictive TELs. Furthermore, using pooled cross-sectional time-series techniques and local government finance data aggregated at the state-level, Mullins and Joyce (1996) reached a similar conclusion on decreased use of local taxes and increased use of state aid and other non-tax revenues (i.e., user charges and miscellaneous revenue combined), all in terms of a

percentage of local general revenue. They also found that potentially binding TELs initially reduce local reliance on non-tax revenues but the effect becomes positive over time. One explanation offered by Mullins and Joyce was that higher charges and miscellaneous revenue collections were offset by the increased state aid followed immediately after the enactment of potentially binding TELs. Although these studies might serve as a good reference for studies on municipal revenue structures, they do not directly answer the question of how municipalities respond to the TELs.

Other studies have focused on the impact TELs have on the composition and structure of local government revenues and how this impact may vary across jurisdictions. For example, David Merriman (1986) conducted a study on 108 New Jersey municipalities from 1977 to 1980 and found that high tax capacity and low density municipalities experienced the most severe spending cuts as a result of TELs. Using data on 255 Colorado municipalities from 1975 to 1996, Brown (2000) also found that smaller-sized municipalities were more constrained by the TELs compared with larger municipalities.

Controlling for a number of demographic, social-economic, and structural characteristics of the individual county areas, and for broader national trend and state-specific effects on the dependent measures, Mullins (2004) provided one of the first analyses with regard to the effects of TELs on fiscal disparities of the local governments across the U.S. using a multi-state, cross-sectional time series dataset. Specifically, he investigated 31,804 units of local governments in 787 metropolitan counties within the contiguous 48 states at five-year intervals in the period between 1972 and 1997. Dependent variables used to represent local fiscal disparities are coefficients of variation

in per capita general revenues and expenditures of general purpose local governments and school districts within each county area. His findings imply that the fiscal impact of TELs is not uniform across local jurisdictions, with increased variation greatest within counties comprising the urban core and those with relatively more disadvantaged populations. This result raises the concern that TELs may constrain the ability of local governments to serve less well-off populations. However, this study, as with most of other studies, does not address the impact of TELs specifically on municipal user charges.

Finally, a relatively smaller number of scholars attempted to estimate the distributional effects of TELs, but research findings remain uncertain (De Tray & Fernandez, 1986; Downes, Dye, & McGuire, 1998; O'Sullivan, Sexton, & Sheffrin, 1994; Sexton, Sheffrin, & O'Sullivan, 1999; Waters, Holland, & Weber, 1997). Some estimated that TELs may have benefited lower income homeowners (De Tray & Fernandez, 1986; O'Sullivan et al., 1994), while others found that lower income communities experienced larger reductions in educational outcome from TELs and TELs may have actually benefited higher income taxpayers (Downes et al., 1998; Waters et al., 1997).

In terms of the scope of the studies, as mentioned above, most previous studies focused on single states such as California, Massachusetts, Colorado, Oregon, New Jersey and Michigan (Brown, 1999, 2000; Courant, Gramlich, & Rubinfeld, 1980; Cutler et al., 1999; Figlio, 1998; Galles & Sexton, 1998; James & Wallis, 2004; Kim, 1992; Merriman, 1986; Thompson & Green, 2004; Waters et al., 1997). Cross-state studies on state-imposed TELs tended to use individual counties as units of analysis, or more often, use local government data that are either aggregated at the state-level or county-level for analyses. Studies on individual municipalities were limited to a single state (Johnston et

al., 2000; McCabe, 2000; Mullins, 2004; Mullins & Joyce, 1996; Shadbegian, 1999). With an exception of the study by Preston and Ichniowski (1991), no other longitudinal research on the effect of TELs has employed a national sample with individual municipalities as units of analysis. However, Preston and Ichniowski's study only examined a short period of time that immediately followed the massive enactment of TELs, 1977 to 1986. The long-term impact of state-imposed TELs on user charge reliance in American municipal governments throughout the nation remains unsolved and is worth of further investigation.

2.3 Data and Methods

2.3.1 Data and Unit of Analysis

This study analyzes the effects of TELs on user charge reliance for a panel of 724 sample cities with populations of at least 25,000 in 1970 for the period of 1970 through 2004. Since most states with potentially binding TELs enacted their TELs after 1980, the inclusion of data from 1970 to1980 increases the variation in the critical TEL variable.

Data used in this study came from several sources. Financial data were collected from the Census Bureau's *Annual Survey of Local Government Finances* and *Census of Governments* (1970-2004); social, demographic, and economic data were collected from Census Bureau's *County and City Data Book* (1972, 1977, 1983, 1988, 1994 and 2000); institutional and geographic data were collected from the ICMA's *Municipal Form of Government Survey* (1981, 1986, 1991, 1996 and 2001) and *Municipal Year Book* (1971, 1974 and 1977); and data on TELs were collected and updated from the ACIR's (1995)

report *Tax and Expenditure Limits on Local Governments*, Mullin & Wallin's (2004) article "Tax and Expenditure Limitations: Introduction and Overview" and other web sources. All monetary terms have been adjusted for inflation using the Consumer Price Index (CPI) with 2004 as the base year.

The Census Bureau conducts a Census of Governments every five years in years ending in 2 and 7 and an annual survey for the intervening years. While the Census of Governments reports financial data for all units of governments, the annual surveys contain either strictly sample units or both the sample and nonsample units (in states with central collection arrangements). Thus the number of records available for each year varies. In addition, effective with fiscal year 2002, records with imputed data are no longer available to the public. Hence, the number of records in 2002 does not represent the actual number of government units.[4]

There were 837 municipalities (including Washington, DC) with populations over 25,000 identified by the *1972 Census of Governments* (U.S. Census Bureau, 1972), among which, around 100 cities failed to report consistently in the *County and City Data Books* and a number of cities were not found in the ICMA's datasets. Thus, I derive a sample of 724 cities that have fairly consistent financial, social-economic and institutional data available. The 724 sample cities represent approximately 86% of the actual number of municipalities with populations over 25,000 in 1970. Washington, DC is excluded because the focus of the study is on a state-implemented policy. Furthermore, some sample cities were missing in the *Annual Survey of Local Government Finances* and *Census of Governments* for at least one year during the study period. Therefore, the dataset is an unbalanced panel with 23,012 observations or 91% of the possible city-

[4] See User Notes number 5, 12 and 20 in the accompanying "User Guide" in the Census datasets.

years. Table A.1 and A.2 in Appendix A provide detailed information on the number of sample cities for each year and for each state. Table A.1 indicates that more than 91% of the sample cities have consistent data from 1970 to 1997 but the number of sample cities drops sharply since 1998, a 30-55% loss of sample cities each year from 1998 to 2004 due to missing financial data in the Census survey.

Table 2.1 presents the distribution of 724 sample cities by region, population size, metro status and government structure for the years of 1972 and 2000. Given that the *1972 Census of Governments* identifies 171 (20%) cities with populations over 25,000 in the Northeast region, 266 (32%) in the Midwest, 210 (25%) in the South, and 190 (23%) in the West, the sample represents very closely the actual share of cities in each region. The table also clearly shows that the population size of cities is growing especially among cities with populations between 25,000 and 249,999; about 60% of the cities are central cities, almost twice the number of suburban cities; and over 90% of the sample cities have mayor-council or council-manager forms of governments.[5]

Table 2.2 summarizes TELs and user charges by region in 1997, the most recent year before the sample size shows significant drops (similar comparison for 2004 is reported in Appendix A, Table A.3). The sample consists of 719 cities in 1997. Compared with the full sample of 724 cities (as shown in Table 2.1), each region and all 50 states are well represented in the 1997 sample. As of 1997, only eight states have no active TELs on municipal governments including Connecticut, Delaware, Hawaii,

[5] Under the mayor-council form of government, both mayor and the council are elected; the council is the legislative body and the mayor is the chief executive who possesses budgetary, administrative, and appointive powers. Under the council-manager form of government, the elected council hires a city manager who carries out the policies set by the council. Under the commission form of government, the elected council performs both legislative and executive duties. Other forms of government include town meeting and representative town meeting which are rarely used (ICMA, 2001; ACIR, 1993).

Kansas, Maine, New Hampshire, Vermont, and Wisconsin. There are 1,247 municipalities (excluding Washington, DC) with populations over 25,000 identified by the *2002 Census of Governments* (U.S. Census Bureau, 2002), among which, 94% have TELs. By region, 83% of the cities in the Northeast, 88% in the Midwest, 99% in the South, and 100% in the West are subject to TELs (see Appendix A, Table A.4). The widespread trend of TELs is well captured in the sample as shown in Table 2.2. The table clearly indicates that 92% of the sample cities are subject to TELs and almost all the cities (more than 99%) in the South and West regions have TELs. In addition, 542 or 75% of the sample cities have potentially binding TELs including 174 cities with only potentially binding TELs and 368 cities with both potentially binding and non-binding TELs. On average, a municipal government collected approximately $91 million in user charges in 1997, which accounts for about 39% of municipal own-source revenue. Cities in the South demonstrate a greater degree of user charge reliance than their counterparts in other regions, collecting $875 in per capita user charges and generating about 49% of own-source revenue from user charges.

Figures 2.2 through 2.4 illustrate the historical trends of the implementation of TELs in the United States. Specifically, Figure 2.2 indicates the number of cities subject to TELs (or "TEL cities") and the number of limitations imposed on cities over the decades from 1970 to 1997; Figure 2.3 examines, in particular, the trend of potentially binding TELs; and Figure 2.4 disaggregates the trend into seven types of TELs and reveals the detail for each type of limitations. As shown, by 1970, 54% of the sample cities were subject to TELs but only 5% were subject to potentially binding TELs. The percentage of cities that have TELs jumped to 92% in 1980 and remained at this level

until the present. During the same time period, the percentage of cities that are constrained by potentially binding TELs increased to 55% in 1980 and continued to grow to 75% in 1997.

In addition, over the past three decades an increasing number of municipalities have been subject to more than one type of TELs. As shown in Figure 2.2, in 1970, most of the TEL cities were only restricted by one type of limitations, while by 1997, a significant number of cities were restricted by four types of limitations and a few of them were even subjected to five types of TELs. Over the years, property tax levy limits have been the most popular type among the potentially binding TELs and general revenue limits the least used (see Figure 2.3). In fact, only three states have ever implemented general revenue limits—namely, Colorado (suspended in 2005), Minnesota (repealed in 1993), and Nevada (repealed in 1989). As indicated in Figure 2.4, among all seven types of TELs, specific property tax rate limits have been the most prevalent.

Figure 2.5 compares cities with TELs versus cities without TELs (or "non-TEL cities") in 1997. In contrast to those without TELs, TEL cities, on average, rely more on user charges, sales taxes, income taxes, and "other" taxes, while relying less on property taxes. Interestingly, a comparison between cities with potentially binding or non-binding TELs, as shown in Figure 2.6, reveals a different pattern; namely, cities with potentially binding TELs rely more on property taxes and less on user charges than do their counterparts. This seems not only against our intuition but also to some extent contrary to previous studies that claimed potentially binding TELs resulted in increases in local reliance on non-tax revenues (Mullins & Joyce, 1996). It should be noted that here I define "cities with non-binding TELs" as those subject to non-binding TELs only and

"cities with potentially binding TELs" as those subject to potentially binding TELs including those may be also subject to non-binding TELs. It is also important to acknowledge that the size of the sample cities for each comparison varies substantially. Figure 2.5 compares the averages of 663 TEL cities with those of 56 non-TEL cities, while Figure 2.6 compares the averages of 542 cities with potentially binding TELs (including 174 cities with only potentially binding TELs and 368 cities with both potentially binding and non-binding TELs) with those of 121 cities with only non-binding TELs. On average, user charges in the 368 cities with both potentially binding and non-binding TELs accounted for about 39% of municipal own-source revenue in 1997.

In addition, simple t-tests (not reported here) on data from 1970 to 1997 show that, on average, cities with TELs collect more in per capita user charges and rely more on user charges as a percentage of own-source revenue than do cities without TELs, while cities with potentially binding TELs collect less in per capita user charges and rely less on user charges as a percentage of own-source revenue than do cities with non-binding TELs. These results, however, do not explain how much impact TELs have on user charge reliance and whether different designs of TELs result in different fiscal outcomes. More importantly, the differences reported by t-tests do not control for various factors (other than TELs) that may affect user charge reliance. Regression analyses, therefore, are needed.

2.3.2 Variables and Model

To estimate the impact of TELs on user charge reliance in municipalities, this study employs two measures of user charge reliance: user charges per capita, and user

charges as a percentage of municipal own-source revenue. To differentiate the effects of TELs according to their potential restrictiveness on fiscal outcomes and their application (for example, on tax rates, tax levy, or assessment), this study also develops four measures for the TEL policy: (1) TELs, (2) potentially binding TELs and non-binding TELs, (3) specific types of TELs, and (4) total number of TELs. Thus, the analysis consists of two dependent variables and four sets of policy variables (i.e., key explanatory or independent variables). The definitions of variables are given in Table 2.3.

I propose the following hypotheses: (1) the presence of a TEL leads to an increase in municipal reliance on user charges; (2) potentially binding TELs have a greater positive influence on user charge reliance than do non-binding TELs; (3) different types of TELs generate varying effects on municipal user charge reliance; and (4) the larger the number of limitations, the greater the increase on user charge reliance in municipalities.

Considering that large cities may possess distinctive characteristics that distinguish them from small cities (e.g., racial composition, occupational segregation, income inequality, service structure and quality, and so forth), this study has created two subsamples drawn from the 724-city full sample: a large-city subsample on cities with populations over 250,000 in 2004 and a small-city subsample on cities with populations below 50,000 and above 25,000 in 2004. The large-city subsample consists of 65 cities (2,273 observations) and the small-city subsample contains 100 cities (3,220 observations). Running regressions on three different sets of samples allows me to compare and contrast the results and to reveal the detail.

Thus, the impact of TELs on municipal user charge reliance is examined through eight regressions using different samples. The general equation for the regressions can be expressed as:

$$UC_{it} = \alpha_1 TEL_{it} + F_{it}\alpha_2 + X_{it}\alpha_3 + \delta_i + \varepsilon_{it}, \quad (2.5)$$

where:

UC_{it} is user charge reliance measured by user charges per capita or as a percentage of municipal own-source revenue for municipality i in year t;

TEL_{it} is a dummy for municipality i in year t (1= municipality i in year t subject to TELs; 0 = municipality i in year t not subject to TELs); this variable is replaced by potentially binding TELs and non-binding TELs, specific types of TELs, and the number of TELs in other model specifications;

F_{it} is a vector of fiscal variables for municipality i in year t, including taxes per capita or percentage (TAX), intergovernmental revenue per capita or percentage (IGR), debt per capita or percentage (DEBT), expenditure mix (EXPMIX), optional tax (OPTION), and special districts (DISTRICT);

X_{it} is a vector of social-economic and institutional variables for municipality i in year t that reflect the characteristics of the municipalities including population (in log form), personal income (in log form) and form of government;

δ_i is a city-specific intercept; and

ε_{it} is the error term.

The inclusion of fiscal variables is intended to account for municipal expenditure and revenue policies. Specifically, total taxes per capita or as a percentage of municipal own-source revenue represents the taxing capacity of a municipal government.

Municipalities showing greater taxing capacity are expected to rely less on user charges for revenues. Similarly, IGR allows for the possibility that municipal governments substitute federal and state monies for own-source revenue. Therefore it is expected to be negatively associated with user charge reliance. Debt per capita and debt percentage (debt-revenue ratio) reflect the long-term solvency of a municipal government. Many municipal governments issue bonds for transportation projects, and water, sewer, and gas facilities where user charges play a significant role as a financing tool. On the other hand, municipalities with higher level of debt may have fewer needs for user charges or greater capacity for collecting user charges.

Expenditure mix controls for intercity variations in providing services that have traditionally depended heavily on user charges for financing. Based on the national average of percentage of expenditures covered by user charges for specific services (i.e., user charge revenue collected from a specific service divided by total expenditure for delivering such service) using aggregated data on total U.S. cities from 1972-2002, ten municipal functions are identified as "charge-heavy" service areas (for further information, see Chapter 3, Table 3.1). These areas include sewerage, hospitals, airports, solid waste management, parking, water transport, water supply, electricity supply, gas supply, and public transit. A higher percentage of expenditure mix indicates that cities devote a greater portion of total government expenditures to functions for which user charges play a significant role nationwide.

The optional tax, a dummy variable where municipalities generate revenue from local sales and/or income taxes, represents municipal capacity in raising non-property tax revenues and is thus expected to be negatively associated with user charge reliance. As of

2006, local governments, including counties and municipalities, in 33 states have access to local option sales taxes, among which, 22 states have authorized municipalities to collect local option sales taxes (Federation of Tax Administrators, 2006). In addition, a few states have granted municipalities the authority to levy local income taxes. Approximately 73% of the observations in the full sample contain revenues from local sales taxes, and 11% have revenues from local income taxes.

Since certain charge-financed services, such as sewer service, parks and recreation service, as well as utilities, are provided through special districts rather than municipal governments in some regions, the number of special districts within the county where the municipality is located is also included.[6]

Population (in log form) and per capita personal income (in log form) are included to account for differences in citizen's preferences or demands for public goods and costs of providing such goods across jurisdictions. In addition, a dummy variable—council-manager city—is included to capture possible impacts of governance structure. The literature suggests that professional city managers in a council-manager government are more likely to provide services efficiently than do their counterparts in other forms of municipal governments (Booms, 1966; Clark, 1968; Lineberry & Fowler, 1967; Stumm & Corrigan, 1998). It is expected that professionally managed council-manager cities tend to rely more on user charges for efficiency gains.

[6] It would be ideal to identify the exact number of special districts serving the municipality. However, such data are unavailable and difficult to calculate due to the fact that many special districts serve areas across city or even county boundaries. Therefore, the number of special districts within a county area is used as a proxy for the number of special districts serving a municipality.

Table 2.4 reports the descriptive statistics for the full sample. For further information on descriptive statistics of the large-city and small-city subsamples, refer to Appendix A, Tables A.5-A.6.

Given that city characteristics are unlikely a random assignment to cities, I employ city-fixed effects (FE) regression models for estimation. The FE model helps control for those unobserved factors that vary across cities but remain constant over time such as unique political cultures and historical circumstances for each municipality, thereby ensuring that the effects of TELs are identified using only within-city variations over time. In addition, the FE estimates are adjusted with cluster-robust standard errors in an attempt to control for heteroscedasticity and autocorrelation problems. Since all municipalities within a single state receive the same value for TELs in a given year, that is, the policy variable, TELs, has repeated values on municipalities within a state, the standard errors are clustered on the variable identifying each state (rather than each municipality) to account for intra-state clustering of errors over time and across municipalities within the state.

2.3.3 Endogeneity of TELs

Existing studies on TELs often assume that tax and expenditure limitations are exogenous events randomly assigned across states (Johnston et al., 2000; Mullins, 2004; Mullins & Joyce, 1996). However, a number of researchers raise questions about this assumption and warn that a possible endogeneity problem may exist and thus bias estimates of the effects of TELs (Poterba & Rueben, 1995; Rueben, 1996; Shadbegian, 1999). This argument is based on a concern that some unobserved voter attributes may

affect both the enactment of TELs and fiscal policy outcomes. The passage of TELs may simply reflect voters' preferences for a lower level of expenditure and/or revenue or different financing mechanisms. Thus, a positive or negative correlation between TELs and user charge reliance may not indicate a causal relationship per se. If citizens want to shift the municipal revenue structure from a traditional tax-based structure towards a user charge-based structure by voting for a TEL that restricts the use of taxes, then a positive correlation between TELs and user charge reliance could be found. On the other hand, if citizens in a state with less use of user charges and more use of taxes are more likely to vote for a TEL, then a negative correlation between TELs and user charge reliance could be found. However, in neither case does a causal relationship exit.

To solve the endogeneity problem of TELs, we need to exploit instrumental variables that generate plausibly exogenous variation in the incidence of TELs. A valid instrumental variable ("instrument") must meet two requirements: first, the instrument must be relevant, that is, the variation in the instrument is related to variation in the endogenous regressor; second, the instrument must be exogenous, that is, the variation in the instrument is not related to the error disturbance (Stock & Watson, 2003). Applied to this study, the instruments must be directly related to the possibility of a state passing a TEL (i.e., "instrument relevance") but not directly related to other unobserved factors affecting the degree of user charge reliance (i.e., "instrument exogeneity"). In other words, instrumental variables must affect user charge reliance only indirectly through the passage of TELs.

Rueben (1996) used direct legislation rules (i.e., provisions within a state's constitution that allow for citizens to propose and pass initiatives, referenda and recalls)

as an instrument for the passage of a TEL and found that the estimated impact of state-level TELs on state fiscal outcomes changed substantially compared with the estimates treating TELs exogenously. However, as Shadbegian (1999) argues, direct legislation rules are time invariant and thus Rueben's model does not allow the use of FE estimators which are important in a panel data analysis of this topic. To alleviate this problem, Shadbegian proposed another instrument, the rate at which voters are able to pass citizen initiatives or referenda (on any subject matter), in the research. The underlying assumption is that the states where citizens are more successful in passing their initiatives or referenda are more likely to adopt TELs, no matter if they are originated through citizen initiatives, referenda or are introduced by state legislators. Higher passage rate may put heavier pressure on the legislators to introduce a TEL. Using this instrument in a FE model Shadbegian found that the negative impacts of TELs on local property taxes and non-tax revenue are smaller than when TELs are assumed exogenously. He also found that more stringent TELs (which restrict the growth of property taxes to five percent or less) reduce local own-source revenue by more than less stringent TELs but do not raise any additional non-tax revenue to offset the loss in taxes as do less stringent TELs.

I consider Shadbegian's approach is more appropriate, thereby adopting the passage rate of initiatives (PASS) as an instrument in the analysis. Data on passage rate of citizen initiatives from 1967 to 2004 were provided by the Initiative and Referendum Institute (IRI) at the University of Southern California (IRI, 2008). However, information on passage rate of referenda is not available and thus excluded.

Further examination of the independent variables raises the concern that taxes, IGR, and expenditure mix are also potentially endogenous since these fiscal aspects often depend on local socioeconomic conditions. I thus include eight more variables—the log form of land area (LAND), the log form of gross business receipts (RECEIPT), unemployment rate (UNEMP), the percentage of population that is non-white (NONWHITE), the percentage of population under the age of 18 (AGE18), the percentage of population over the age of 65 (AGE65), the percentage of owner-occupied housing units (HOUSE), and central city (CENTRAL)—as additional instruments along with the passage rate. The definitions of instrumental variables are given in Table 2.3.

If all proposed instruments are valid, that is, they satisfy the conditions of instrument relevance and exogeneity, the coefficients on endogenous variables from Equation (2.5) can be estimated using a 2SLS model. The first stage begins with four Ordinary Least Squares (OLS) regressions with city-fixed effects (θ_i) that link each of the four endogenous variables (i.e., TEL, TAX, IGR, and EXPMIX) and the entire set of instrumental variables along with other exogenous variables in Equation (2.5). That is,

$$\begin{aligned} & TEL_{it}\,(TAX_{it} / IGR_{it} / EXPMIX_{it}) \\ & = \beta_1 PASS_{it} + \beta_2 \ln LAND_{it} + \beta_3 \ln RECEIPT + \beta_4 UNEMP + \beta_5 NONWHITE \\ & + \beta_6 AGE18 + \beta_7 AGE65 + \beta_8 HOUSE + \beta_9 CENTRAL + \beta_{10} DEBT_{it} \\ & + \beta_{11} OPTION_{it} + \beta_{12} DISTRICT_{it} + X_{it}\beta_{13} + \theta_i + \mu_{it} \end{aligned} \tag{2.6}$$

The second stage of 2SLS is to regress UC_{it} on $\hat{TEL}_{it}$, $\hat{TAX}_{it}$, $\hat{IGR}_{it}$, and $\hat{EXPMIX}_{it}$, the predicted value obtained from the first-stage regressions, along with other exogenous variables in Equation (2.5). The city-fixed effects (λ_i) are also included. The second-stage regression, thus, is expressed as:

$$UC_{it} = \gamma_1 \hat{TEL}_{it} + \gamma_2 \hat{TAX}_{it} + \gamma_3 \hat{IGR}_{it} + \gamma_4 \hat{EXPMIX}_{it} + \gamma_5 DEBT_{it} + \gamma_6 OPTION_{it} + \gamma_7 DISTRICT_{it} + X_{it}\gamma_8 + \lambda_i + \upsilon_{it} \quad (2.7)$$

The 2SLS approach is applied to model specifications using TELs and the number of TELs as the independent variables of primary interest, respectively.

2.4 Research Findings

2.4.1 TELs Treated Exogenously

A. Effects of TELs

Tables 2.5 through 2.7 report regression results of the effects of TELs on user charges per capita and user charges as a percentage of municipal own-source revenue, assuming that TELs are an exogenous event. Specifically, results in Table 2.5 are obtained from regressions on 724 sample cities; results in Table 2.6 are drawn from 65 large cities; and results in Table 2.7 are based on 100 small cities. Each table includes the OLS with FE estimators.

As expected, the results show that the presence of TELs is associated with an increase in user charges per capita in municipalities, measured by a $130 increase in 724 sample cities, a $178 increase in large cities, and a $172 increase in small cities, all other things being equal. Since the average amount of user charges per capita among the 724 sample cities is about $470 (see Table 2.4), the $130 increase would account for 28% of the sample average, which suggests that the magnitude of this effect is considerably large. That is, cities with TELs, on average, collect $130 more in per capita user charges

annually than do cities without TELs, holding all other factors constant. This effect has a greater scale in both large cities and small cities where the increases account for 31% and 34% of the sample average of per capita user charges, respectively (see Appendix A, Tables A.5 and A.6). On average, total per capita municipal expenditure is $1,514, $2,060 and $1,575 in the full sample, large cities, and small cities, respectively. Compared with per capita municipal expenditures, the increases in user charges account for about 9% in the full sample and large cities and 11% in small cities.

When user charge reliance is measured as a percentage of municipal own-source revenue, however, the effect of TELs seems less certain. As indicated in column (2) in each of the three tables, the estimated coefficients on TELs fail to achieve statistical significance at any conventional level.

Considering that the considerable loss of the sample size between 1998 and 2004 may bias the regression results, I also run regressions using 724 sample cities for the period of 1970 to 1997. The results are reported in Appendix A, Table A.7. As shown, the results using the sample during 1970 and 1997 are consistent with the ones using the sample from 1970 to 2004. Thus, I conclude that the implementation of TELs leads to a substantial increase in user charges per capita but does not affect the share of user charges in municipal own-source revenue.

B. Effects of Potentially Binding and Non-Binding TELs

A further analysis of the impact of TELs takes into consideration the stringency or restrictiveness of the TEL policy—potentially binding TELs and non-binding TELs. The results are reported in Tables 2.8. In an attempt to capture the possible interactive effects

between the two categories of TELs, I also include an interaction term, "both TELs," indicating the simultaneous existence of both potentially binding and non-binding TELs. The first panel of the table shows coefficients for the full sample, the second panel for the large-city sample, and the third panel for the small-city sample. For brevity, Table 2.8 presents only the estimated coefficients on potentially binding TELs and non-binding TELs.

As displayed in Table 2.8, potentially binding TELs increase per capita user charges by $76 in the full sample (=156-80), by $114 in the large-city sample, and by $43 (=168-125) in the small-city sample, holding all other factors constant. Non-binding TELs show a similar positive impact in both large-city and small-city samples, $149 and $30 (=156-126), respectively, but this effect fails to reach statistical significance at any conventional level in the full sample. Additional t-tests reveal that the effects of potentially binding and non-binding TELs on per capita user charges are statistically indistinguishable. Furthermore, when both categories of TELs coexist, that is, when a city is subject to both potentially binding and non-binding TELs, the changes in per capita user charges are negative in both full and small-city samples. This suggests that potentially binding and non-binding TELs counteract with each other in terms of their effects on user charge reliance in the full and small-city samples.

On the other hand, when using user charges as a percentage of municipal own-source revenue as the dependent variable, only potentially binding TELs show a statistically significant impact on user charges. This impact is evident in the large and small cities but not in the full sample. Specifically, among cities with populations below 50,000, user charges as a percentage of own-source revenue in cities with potentially

binding TELs are 1.9 percentage points higher than cities without potentially binding TELs. Nonetheless, this positive impact among cities with populations above 250,000 is not sizable (an increase of 0.05 percentage points) and thus not practically meaningful.

Overall, the above findings suggest that the restrictiveness of TELs matters in the full sample, in particular the middle-sized cities with populations above 50,000 and below 250,000, regarding to the dollar amount of per capita user charges and in small cities with populations below 50,000 in terms of the share of user charges in own-source revenue. However, the restrictiveness of TELs does not make a difference in the large and small cities regarding to per capita user charges since both categories of TELs could facilitate the increases in per capita user charges and the effects are not statistically discernable. There is also some evidence that the effects of potentially binding and non-binding TELs may offset against each other depending on the population size of the cities.

C. Effects of Specific Types of TELs

The study also provides a detailed examination of each specific type of TELs using the full sample, large-city sample and small-city sample. Seven dummy variables indicate seven types of TELs with non-TEL cities serving as the reference category. Since overall property tax rate limits, assessment increase limits and general expenditure limits are highly correlated with each other as shown in Table 2.9, I create a new dummy variable indicating the presence of any of the three types. The new dummy variable along with other four dummy variables—specific property tax rate limits, property tax levy limits, general revenue limits, and full disclosure—enter in the model specifications.

Tables 2.10 through 2.12 report regression results for the effects of specific types of TELs. To be concise, the estimated coefficients on control variables are not reported here. Columns (1) of the tables indicate that specific property tax rate limits and full disclosure have positive impacts on user charges per capita and the effects are consistent in all three samples. That is, specific property tax rate limits lead to an increase in per capita user charges by $88 in the full sample, by $61 in the large-city sample, and by $109 in the small-city sample, and full disclosure increases per capita user charges by $112 in the full sample, by $238 in the large-city sample, and by $119 in the small-city sample, holding all other factors constant. The results also show some evidence of positive effects of overall property tax rate limits, assessment increase limits, general expenditure limits, and property tax levy limits on user charges per capita but the effects vary depending on the population size of the cities. General revenue limits are the only type of TELs that has a negative impact on user charges per capita especially in the full and large-city samples.

When using user charges as a percentage of own-source revenue as the dependent variable, the results (columns 2) become complicated. None of the seven types of limitations demonstrates any statistically significant impacts on user charge reliance using the full sample. However, focusing on the large cities and small cities reveals that specific property tax rate limits, property tax levy limits, overall property tax rate limits, assessment increase limits and general expenditure limits may lead to moderate increases in the share of user charges (by 1.4-1.9 percentage points).

In short, these findings suggest that specific types of TELs produce varying effects on user charge reliance with specific property tax rate limits and full disclosure having the greater overall effects than do others.

D. Effects of Total Number of TELs

As indicated earlier, among cities with TELs, the number of limitations ranges from 1 to 5 based on the classification of seven types of TELs. Specifically, about 36% of the observations in the sample have one type of TELs, 33% have two types, 23% have three types, 8% have four types, and less than 1% of the observations have five types of TELs. Table 2.13 describes the variation in the number of TELs by state. Eleven states have experienced no changes in the number of limitations over the past 35 years. I expect that cities subject to a larger number of TELs rely more on user charges than do their counterparts. Table 2.14 presents the estimated coefficients on the number of TELs for the full sample using user charges per capita and user charges as a percentage of own-source revenue as the dependent variable, respectively.

Column (1) of the table indicates that, among cities with TELs, for each additional type of limitations, user charges per capita increase by $57, all other things being equal. This linear relationship between the number of TELs and per capita user charges is confirmed in that when adding a square term of the number of TELs into the model the square term fails to reach statistical significance and, thus, is dropped from the model specification. In contrast, an increase in the number of limitations seems to lead to a decrease in the share of user charges in total own-source revenue. However, this negative effect reverses when the number of limitations exceeds 2 (because

1.109/(0.269*2)=2.06). Simple calculations based upon the coefficients on the number of TELs and on its square term reveal that when the number of TELs increases from 0 to 1, user charges as a percentage of own-source revenue *decreases* by 0.8 percentage points; when the number increases from 1 to 2, user charge percentage *decreases* by 0.3 percentage points; when the number increases from 2 to 3, user charge percentage *increases* by 0.2 percentage points; when the number increases from 3 to 4, user charge percentage *increases* by 0.8 percentage points, and when the number increases from 4 to 5, user charge percentage increases by 1.3 percentage points, holding all other factors constant.

Since cities with five types of limitations account for less than 1% of the sample observations, which reduces the practical meaning of their sizable statistical effect, I conclude that TELs have the most substantial effect on cities with none or three types of TELs if the state government imposes an additional limitation on municipal taxing and spending. Nevertheless, the directions of the effects are opposite to each other: a negative impact in cities with no existing type of TELs, and a positive impact in cities with three existing types of TELs. The magnitude of the effect, however, is minimal.

2.4.2 TELs Treated Endogenously

Since endogeneity is one of the major concerns of this study, I also examine the effects of TELs using the 2SLS regressions that treat TELs endogenously and then compare the results with the ones obtained from previous OLS models treating TELs exogenously. Ideally one would like to conduct corresponding tests for all the four OLS model specifications above. However, due to the difficulty of finding appropriate

instruments for potentially binding and non-binding TELs and for each specific types of TELs, I only apply the 2SLS approach to the investigation of the effects of the presence of TELs and the number of TELs. Both OLS and 2SLS models include city-fixed effects.

A. Effects of TELs

Tables 2.15 and 2.17 report the estimated effects of TELs on user charge reliance using the 2SLS approach with city-fixed effects, assuming that TELs are an endogenous event. Specifically, Table 2.15 presents the results of the 2SLS regressions using the full sample; Table 2.16 uses the large-city sample; and Table 2.17 uses the small-city sample. All three models treat TELs, taxes, IGR, and expenditure mix as endogenous regressors and employ a set of variables including passage rate, land area (in log form), business receipts (in log form), unemployment rate, non-white, age 18, age 65, owner-occupied housing, and central city as the instruments.

As indicated in Table 2.15, the first-stage F-statistics in both models exceed 10, which suggest that the instruments are not weak, that is, the instruments satisfy the relevance requirement discussed in Section 2.3.3. Furthermore, the overidentification tests show that the *J*-statistic is 4.508 with a *p*-value of 0.479 when using user charges per capita as the dependent variable, and 7.856 with 0.164 when using user charge percentage as the dependent variable. This implies that all the instruments are exogenous.

The 2SLS regression results using the full sample show that the implementation of TELs leads to approximately a $1,080 increase in per capita user charges and a 7.5 percentage point increase in user charges as a percentage of own-source revenue, all others being equal. This estimate is much larger in magnitude than the OLS with FE

estimates when TELs are treated exogenously (see Table 2.5). The OLS models estimate a $130 increase in per capita user charges and no statistically significant effect on user charge percentage in cities with TELs. Further, applying the Hausman test of endogeneity, I find that the null hypothesis that an OLS with FE approach would yield consistent estimates is rejected at the 1% significance level. This rejection indicates a possible endogeneity among the regressors that has caused the OLS with FE estimates inconsistent. Thus the instrumental variables FE estimator (i.e., 2SLS with FE) should be employed for estimation (Wooldridge, 2009).

Using the large-city sample and small-city sample, the 2SLS regressions produce similar results regarding to the effects of TELs on user charges per capita. As shown in Tables 2.16 and 2.17, the presence of TELs leads to a $574 increase in per capita user charges in large cities and a $1,088 increase in small cities. These effects are much larger compared with the estimates from the OLS models (see Tables 2.6 and 2.7). The predicted effect of TELs on user charge percentage is positive in both large and small cities, but fails to reach statistical significance in large cities and is significant only at the 10% level. In addition, the first-stage F-statistics are below 10 in both samples. This suggests that the effects of TELs on user charge percentage are uncertain in the large cities and small cities.

Alternative test using the 724 sample cities for the period of 1970 through 1997 reveals a substantial increase in per capita user charges and no statistically significant impact on user charge percentage (see Appendix A, Table A.8).

In short, results from the 2SLS approach strongly suggest that the effect of TELs on user charge reliance is seriously underestimated when the endogeneity of TELs is

neglected. The estimate of the 2SLS using the full sample is about eight times the estimate of the OLS and accounts for about 71% of total per capita municipal expenditures ($1,514), which seems implausibly large. I have further experimented with a number of different model specifications using different sets of control variables and instruments. The results are somewhat sensitive in that the estimates on the TEL coefficients vary over a certain range. Nonetheless, the coefficients are always positive, larger than the OLS estimates, and statistically significant at the conventional level. Hence, it is safe to conclude that TELs do indeed lead to greater reliance on municipal user charges and some omitted variables bias downward the coefficients on the TEL policy obtained in the specifications treating TELs exogenously. These omitted variables may include unobserved factors that vary across municipalities and change over time such as citizen resistance against user charges, legal obstacles, and fiscal capacities of implementing user charges.

Besides the policy variable, TELs, a brief discussion of the predicted effects of the control variables is also worthwhile. Although most of the control variables seem to affect user charge reliance in the OLS models that treat TELs exogenously, they fail to achieve statistical significance in the 2SLS models. Based on the results from Tables 2.15, 2.16, 2.17 and A.8, municipal debt seems to increase user charges per capita and decrease user charge percentage, but these effects are not sizable in magnitude. Population shows negative impacts on user charge reliance, which suggests that municipalities may prefer to increase taxes or revenues other than user charges when facing a growing population. Contradictory to our expectation, expenditure mix, optional

tax, per capita personal income and council-manager form of government do not affect user charge reliance in municipalities.

B. Effects of Total Number of TELs

Table 2.18 summarizes the 2SLS regression results on the effects of total number of TELs. As indicated in column (1), for an additional type of TELs, cities collect $212 more in per capita user charges, all others being equal. The Hausman endogeneity test indicates the presence of endogeneity and the first-stage F-statistic and overidentifying test suggest the validity of the instruments. This effect is about four times the effect estimated from the OLS model assuming TELs are exogenous (see Table 2.14). However, the effect of the number of TELs on user charge percentage is not statistically significant. In sum, this finding is consistent with the findings from the model specifications using TELs as the independent variable. Both model specifications clearly indicate a positive relationship between the TEL policy and the utilization of user charges in municipalities.

Further investigations of the effects of TELs find that TELs not only lead to the increases in user charges, but also to the increases in sales taxes, miscellaneous general revenues, and other taxes (rather than sales, income and property taxes). Only property taxes show reductions under the TEL policy. The overall increase in own-source revenues is accompanied by the increase in total expenditures. This result may be an unintended consequence of the TEL policy. In the era of fiscal devolution, municipal governments may be required to take more responsibilities, hereby increasing total

expenditures. Since most TELs target at property taxes, other sources of revenues may become more appealing to municipal administrators.

2.5 Discussion and Suggestions for Future Research

Since the late 1970s, user charges have emerged as one of the major revenue sources for municipal governments in the United States. A common perception is that this increased use of user charges is associated with the adoption of state-imposed tax and expenditure limitations on local governments. However, the existing literature on public budgeting and finance has produced little evidence that TELs have caused the increases in local use of user charges (i.e, general charges and utility revenue)—the research is especially weak in a municipality setting. This study provides the first rigorous empirical analysis of the linkage between TELs and the increased use of municipal user charges. By investigating a nationwide sample of 724 cities over the period of 1970 through 2004, this study addresses the question of whether the implementation of the TEL policy increases user charge reliance at the municipality level. It employs the fixed-effects estimation techniques for predicting the effects of TELs and adopts instrumental variables in the 2SLS models to alleviate the potential endogeneity of TELs.

The proceeding analysis, in general, supports the four hypotheses proposed earlier but also reveals several important findings in regard to the effects of TELs. First, the analysis strongly suggests that the implementation of TELs leads to a greater amount of user charge revenue per capita; the influence of TELs on user charges is even more striking when taking into account the potential endogeneity of TELs. Using the passage rate of citizen initiatives in all 50 states from 1970 to 2004 along with other social-

economic variables as the instruments, the 2SLS fixed effects regression estimates that, on average, per capita user charges in cities with TELs are about $1,080 higher than those collected by cities without TELs. However, when user charge reliance is measured by a percentage of municipal own-source revenue instead, the fiscal outcome becomes less consistent. The OLS with fixed effects model suggests a negative impact of TELs on user charge percentage but fails to reach statistical significance. The 2SLS model produces a positive effect of TELs on user charge percentage in the full sample, but not in the large-city and small-city samples (the positive impact in the small cities is not reliable because of the weak instruments). Since the endogeneity of TELs is likely to occur for the reasons discussed above, I consider the result of the 2SLS regression is more reliable.

Second, the analysis on the restrictiveness of TELs yields mixed results. Potentially binding TELs lead to substantial increases in per capita user charges in all samples, while non-binding TELs only show positive impacts in large cities and small cities. The effects of the two categories of TELs in both large and small cities are not statistically distinguishable. This means that the restrictiveness of TELs matters in the middle-sized cities with populations between 50,000 and 250,000 but not in large cities with populations over 250,000 and small cities with populations below 50,000 regarding to the effects on user charges per capita. The results also indicate that potentially binding TELs increase the share of user charges by 1.9 percentage points in small cities but not in large cities and the full sample. This finding is different from Mullins and Joyce's previous study which suggested that potentially binding TELs initially decrease the share of user charges but eventually increase the share over time (Mullins & Joyce, 1996). In

addition, I find that these two categories of TELs may counteract with each other in influencing the degree of municipal user charge reliance.

Third, detailed examination of each specific type of TELs reveals that specific types of TELs generate varying effects on user charge reliance with some limitations showing a positive effect while others a negative effect. In general, specific property tax rate limits and full disclosure appear to have greater overall effects than do others. Specific property tax rate limits increase user charge reliance by $88 per capita in the full sample, by $61 per capita in the large-city sample, and by $109 per capita in the small-city sample. Full disclosure increases user charges per capita by $112, $238, and $119 in the full sample, large-city sample, and small-city sample, respectively. It should be pointed out that Joyce and Mullins' previous studies excluded full disclosure from their analyses because of the "procedural rather than revenue or expenditure focus" of the limitation and because of its "relative non-constraining nature" (Joyce & Mullins, 1991; Mullins, 2004, p. 123; Mullins & Joyce, 1996). The present analysis, however, finds strong evidence that full disclosure has a substantial impact on user charge reliance in municipalities. On the other hand, general revenue limits decrease user charges per capita by $71 in the full sample and by $54 in the large-city sample. There is also evidence of increased share of user charges associated with some types of the limitations but the effects are not consistent across different samples.

Finally, the proceeding analysis also shows that cities subject to more types of TELs raise more in the absolute amount of per capita user charges. These findings are consistent in both OLS and 2SLS models. The OLS models also find that cities subject to up to two types of TELs rely less on user charges in terms of their share in total own-

source revenue as the number of limitations increases, while cities subject to more than two types of TELs rely more on user charges as the number of limitations increases. These effects seem most influential in cities with none or three types of TELs. However, the 2SLS model does not find these effects on the share of user charges have any statistical significance.

The conclusions made in this study are still tentative and several issues remain open to scrutiny. Above all, this study does not control for locally-imposed TELs in examining the effects of state-imposed TELs due to the lack of data. Locally-imposed TELs often constrains local ability in raising property taxes and/or sales taxes and thus may force local governments to rely more on user charges. This means that the coefficients on TELs reported here could be biased upward. Based on a survey of 320 American cities, Brooks and Philips (2009) suggests that at least one in eight cities, especially large cities with populations over 100,000, has enacted a locally-imposed TEL. Further research should take into consideration the effect of locally-imposed TELs when data become available.

In addition, this study does not take into account the factor that failed citizen-initiated TELs movements may affect user charge reliance as well in that they could send a signal to local officials showing a demand of lower levels of revenue or changes of revenue mechanism. Also, passing referenda is a lengthy process during which changes in revenues or spending could occur before the TELs take effect. In either case, the coefficients on TELs could be biased downward. Conducting intensive case studies may help capture this kind of influences.

Finally, the 2SLS approach in this study has only been applied to the specifications using TELs and the number of TELs as the independent variables of primary interest. The potential endogeneity problems have not been addressed in the specifications using other measures of TELs such as potentially binding and non-binding TELs, and each specific type of TELs due to the difficulty of finding an appropriate instrument. It is possible that the estimated results on these variables using the 2SLS approach may present a rather different pattern from the one obtained from the approach that treats these measures of TELs exogenously. Since this study finds evidence suggesting the importance of recognizing the endogenous nature of TELs, further research should focus on developing appropriate instruments for the imposition of TELs.

Table 2.1 Distributions of Region, Population Size, Metro Status, and Government Structure of Sample Cities in 1972 and 2000

	1972		2000	
Region				
Northeast	136	(19%)	136	(19%)
Midwest	229	(32%)	229	(32%)
South	188	(26%)	188	(26%)
West	171	(24%)	171	(24%)
Population Size				
Over 500,000	26	(4%)	28	(4%)
250,000-499,999	31	(4%)	38	(5%)
100,000-249,999	97	(13%)	148	(20%)
50,000-99,999	218	(30%)	248	(34%)
25,000-49,999	352	(49%)	262	(36%)
Metro Status				
Central Cities	426	(59%)	434	(60%)
Suburban Cities	222	(31%)	224	(31%)
Independent Cities	76	(10%)	66	(9%)
Form of Government				
Mayor-Council	267	(37%)	294	(41%)
Council-Manager	411	(57%)	417	(58%)
Commission/Others	46	(6%)	13	(2%)

Note: Numbers in parentheses indicate percentage of the total (724) sample cities; percentages may not total 100 due to rounding.

Source: Author's calculations from U.S. Census Bureau, *County and City Data Book* (1977 and 2000), and ICMA, *Municipal Form of Government Survey* (2001).

Table 2.2 TELs and User Charges by Region, 1997

	Northeast	Midwest	South	West	Total
Cities, total	134 (19%)	226 (31%)	188 (26%)	171 (24%)	719 (100%)
Cities with TELs	111 (83%)	195 (86%)	187 (99%)	170 (99%)	663 (92%)
Cities with potentially binding TELs	93 (69%)	175 (77%)	115 (61%)	159 (93%)	542 (75%)
User charges, total ($mil)	$107.7	$45.5	$114.7	$113.2	$91.3
User charges, per capita ($)	$423.8	$421.6	$875.0	$522.9	$564.7
User charges, % of own-source revenue	28.2%	37.0%	48.6%	38.1%	38.6%

Note: Numbers in parentheses indicate percentage of total (719) sample cities or percentage of cities in each region in 1997. All monetary terms have been adjusted for inflation using the Consumer Price Index (CPI) with 2004 as the base year.

Source: Author's calculations from Census data and Mullin & Wallin (2004).

Table 2.3 Definitions of Variables

Variables	Definitions
DEPENDENT VARIABLES	
User charges per capita ($)	User charges divided by population
User charges as a percentage of municipal own-source revenue (%)	User charges divided by municipal total own-source revenue multiplied by 100
INDEPENDENT VARIABLES	
Policy Variables	
TELs	A dummy coded 1 if a municipality is subject to TELs, and 0 otherwise
Number of TELs	Total number of different types of TELs according to the ACIR's seven-type classification
Potentially binding TELs	A dummy coded 1 if potentially binding TELs exist in a municipality, and 0 otherwise
Non-binding TELs	A dummy coded 1 if non-binding TELs exist in a municipality, and 0 otherwise
Specific types of TELs	Dummy variables including overall property tax rate limits, specific property tax rate limits, property tax levy limits, assessment increase limits, general revenue limits, general expenditure limits, and full disclosure
Fiscal Variables	
Taxes per capita ($)	Total taxes divided by population
Taxes percentage (%)	Total taxes as a percentage of total own-source revenue
IGR per capita ($)	Total intergovernmental revenue divided by population
IGR percentage (%)	Total intergovernmental revenue as a percentage of total revenue
Debt per capita ($)	Total debt outstanding divided by population
Debt percentage (%)	Total debt outstanding divided by total own-source revenue multiplied by 100
Expenditure mix (%)	Expenditure for 10 functions for which user charges,

	traditionally, are relatively important (i.e., sewerage, hospitals, airports, solid waste management, parking, water transport, water supply, electricity supply, gas supply, and transit expenditures) divided by total expenditure of the municipal government multiplied by 100
Optional tax	A dummy coded 1 if a municipality collects local income and/or sales taxes, and 0 otherwise
Special districts	The number of special districts in the county where the municipality is located
Social-Economic and Institutional Variables	
Population	Total resident population of the municipality
Per capita income ($)	Aggregate personal income in a municipality divided by the resident population
Council-manager city	A dummy coded 1 if a municipality has a council-manager form of government
INSTRUMENTAL VARIABLES	
Passage rate	A four-year moving average of passage rate, i.e., the percentage of citizen proposed initiatives successfully passed in a state where the municipality is located during the previous four years
Land area	Land area in square miles
Business receipts (mil$)	Total gross receipts of business operations in manufacturing, wholesale, retail, and taxable service industries
Unemployment rate (%)	Percentage of civilian labor force who are unemployed
Non-white (%)	Percentage of population who are non-white
Age 18 and under (%)	Percentage of population who are at or below the age of 18
Age 65 and over (%)	Percentage of population who are at or over the age of 65
Owner-occupied housing (%)	Percentage of occupied housing units that are occupied by the owner
Central city	A dummy coded 1 if a municipality is a core city that is located within a Metropolitan Statistical Area (MSA) defined by the Office of Management and Budget, as opposed to a suburban or independent city

Table 2.4 Descriptive Statistics of the Full Sample

Variables	Mean	Std. Dev.	Min.	Max.
Dependent Variables				
User charges per capita ($)	469.91	562.32	0	7663.13
User charges as % of own-source revenue	36.18	19.74	0	93.93
Independent Variables				
TELs	0.84	0.37	0	1
Number of TELs	1.72	1.18	0	5
Potentially binding TELs	0.53	0.50	0	1
Non-binding TELs	0.73	0.45	0	1
Overall property tax rate limits	0.25	0.43	0	1
Specific property tax rate limits	0.54	0.50	0	1
Property tax levy limits	0.32	0.47	0	1
Assessment increase limits	0.20	0.40	0	1
General revenue limits	0.02	0.15	0	1
General expenditure limits	0.16	0.36	0	1
Full disclosure	0.23	0.42	0	1
Taxes per capita ($)	526.41	362.65	16.23	3622.98
Taxes percentage (%)	51.22	19.75	2.12	100.00
IGR per capita ($)	350.89	367.87	0	4407.58
IGR percentage (%)	23.19	13.52	0	91.35
Debt per capita ($)	1560.63	1544.39	0	20293.87
Debt percentage (%)	142.49	107.98	0	2825.37
Expenditure mix (%)	29.44	18.31	0	98.21
Optional tax	0.80	0.40	0	1
Special districts	34.50	48.18	0	465
Population	130200	369307	25019	8084316
Per capita income ($)	19517.27	5976.26	6716.00	80149.00
Council-manager city	0.57	0.49	0	1
Instrumental Variables				
Passage rate	0.19	0.28	0	1
Land area (square miles)	42.30	90.30	1.00	1732.00
Business receipts (mil$)	13533.90	46900.04	56.36	1623416.00
Unemployment rate (%)	6.01	2.78	0.70	21.10
Non-white (%)	19.22	17.82	0	98.40
Age 18 and under (%)	25.61	4.45	8.70	44.10
Age 65 and over (%)	11.79	4.19	1.50	51.80
Owner-occupied housing (%)	57.54	12.21	13.40	93.90
Central city	0.60	0.49	0	1

Note: Total 23,012 observations. All monetary terms have been adjusted for inflation using the Consumer Price Index (CPI) with 2004 as the base year.

Table 2.5 Effects of TELs on User Charge Reliance in 724 Sample Cities, 1970-2004 (TELs treated exogenously)

	(1) User Charges Per Capita	(2) User Charge Percentage
TELs	130.097	-0.240
	(37.603)***	(0.486)
Taxes [a]	0.327	-0.555
	(0.068)***	(0.035)***
IGR [a]	0.085	0.033
	(0.030)***	(0.014)**
Debt [a]	0.040	-0.017
	(0.012)***	(0.002)***
Expenditure mix (%)	9.374	0.197
	(1.416)***	(0.020)***
Optional tax	98.392	1.115
	(19.782)***	(0.614)*
Special districts	0.062	0.006
	(0.283)	(0.003)*
Population (ln)	139.118	0.536
	(58.494)**	(1.055)
Per capita income (ln)	-8.447	2.409
	(42.654)	(0.572)***
Council-manager city	4.429	-0.298
	(27.441)	(0.605)
Constant	-1736.291	29.990
	(552.298)***	(11.608)**
R-square	0.387	0.874

Note: Total 23,012 observations. Standard errors in parentheses are adjusted for clustering within states; * significant at the 10% level; ** significant at the 5% level; and *** significant at the 1% level. All specifications include city-fixed effects.

[a] Taxes per capita, IGR per capita, and debt per capita for column (1); taxes percentage, IGR percentage, and debt percentage for column (2).

Table 2.6 Effects of TELs on User Charge Reliance in 65 Large Cities, 1970-2004 (TELs treated exogenously)

	(1) User Charges Per Capita	(2) User Charge Percentage
TELs	178.425 (60.061)***	0.317 (0.649)
Taxes [a]	0.266 (0.121)**	-0.564 (0.058)***
IGR [a]	-0.016 (0.069)	0.022 (0.030)
Debt [a]	0.074 (0.014)***	-0.005 (0.004)
Expenditure mix (%)	5.725 (1.360)***	0.103 (0.046)**
Optional tax	-8.909 (46.388)	-2.452 (1.553)
Special districts	0.838 (0.411)*	0.008 (0.004)
Population (ln)	11.879 (90.766)	1.473 (1.301)
Per capita income (ln)	43.385 (49.779)	2.679 (0.735)***
Council-manager city	-17.421 (19.536)	1.066 (0.463)**
Constant	-717.448 (1100.676)	18.208 (18.605)
R-square	0.454	0.855

Note: Total 2,273 observations. Standard errors in parentheses are adjusted for clustering within states; * significant at the 10% level; ** significant at the 5% level; and *** significant at the 1% level. All specifications include city-fixed effects.

[a] Taxes per capita, IGR per capita, and debt per capita for column (1); taxes percentage, IGR percentage, and debt percentage for column (2).

Table 2.7 Effects of TELs on User Charge Reliance in 100 Small Cities, 1970-2004 (TELs treated exogenously)

	(1) User Charges Per Capita	(2) User Charge Percentage
TELs	171.657	0.793
	(35.050)***	(0.859)
Taxes [a]	0.245	-0.519
	(0.075)***	(0.052)***
IGR [a]	0.144	-0.008
	(0.071)*	(0.023)
Debt [a]	0.005	-0.019
	(0.007)	(0.005)***
Expenditure mix (%)	8.213	0.149
	(2.254)***	(0.038)***
Optional tax	109.238	1.878
	(21.279)***	(0.700)**
Special districts	2.358	0.009
	(0.860)***	(0.018)
Population (ln)	145.630	1.958
	(141.705)	(3.507)
Per capita income (ln)	14.326	3.025
	(33.816)	(0.830)***
Council-manager city	24.373	-3.053
	(97.195)	(1.349)**
Constant	-1877.899	10.624
	(1480.890)	(35.542)
R-square	0.426	0.859

Note: Total 3,220 observations. Standard errors in parentheses are adjusted for clustering within states; * significant at the 10% level; ** significant at the 5% level; and *** significant at the 1% level. All specifications include city-fixed effects.

[a] Taxes per capita, IGR per capita, and debt per capita for column (1); taxes percentage, IGR percentage, and debt percentage for column (2).

Table 2.8 Effects of Potentially Binding and Non-Binding TELs on User Charge Reliance

	(1) User Charges Per Capita	(2) User Charge Percentage
Full sample (N=23,012)		
Potentially binding TELs	156.363 (27.243)***	0.368 (0.698)
Non-binding TELs	72.328 (51.161)	-0.291 (0.804)
Both TELs	-80.026 (34.139)**	-0.607 (0.872)
Large-city sample (N=2,273)		
Potentially binding TELs	113.913 (58.744)*	1.374 (0.591)**
Non-binding TELs	149.460 (76.793)*	0.071 (0.789)
Both TELs	-78.709 (81.464)	-1.328 (0.703)*
Small-city sample (N=3,220)		
Potentially binding TELs	168.326 (30.939)***	1.923 (0.738)**
Non-binding TELs	155.913 (52.153)***	-0.248 (1.092)
Both TELs	-125.631 (43.735)***	-1.093 (0.939)

Note: Standard errors in parentheses are adjusted for clustering within states; * significant at the 10% level; ** significant at the 5% level; and *** significant at the 1% level. All specifications include city-fixed effects.

Table 2.9 Correlation Matrix of Seven Types of TELs in 724 Sample Cities

	Overall Property Tax Rate Limits	**Specific Property Tax Rate Limits**	**Property Tax Levy Limits**	**Assessment Increase Limits**	**General Revenue Limits**	**General Expenditure Limits**	**Full Disclosure**
Overall property tax rate limits	1.00						
Specific property tax rate limits	-0.23	1.00					
Property tax levy limits	0.00	0.19	1.00				
Assessment increase limits	0.51	-0.07	-0.18	1.00			
General revenue limits	-0.08	0.14	-0.03	-0.08	1.00		
General expenditure limits	0.52	-0.28	-0.19	0.62	0.02	1.00	
Full disclosure	-0.26	0.23	0.22	-0.12	0.06	-0.20	1.00

Note: Total 23,012 observations.

Table 2.10 Effects of Specific Types of TELs on User Charge Reliance in 724 Sample Cities, 1970-2004

	(1) User Charges Per Capita	(2) User Charge Percentage
Overall property tax rate limits /Assessment increase limits /General expenditure limits	74.523 (17.193)***	0.148 (0.669)
Specific property tax rate limits	87.626 (26.657)***	1.010 (0.882)
Property tax levy limits	64.201 (21.691)***	0.298 (0.801)
General revenue limits	-71.464 (23.797)***	-3.301 (2.576)
Full disclosure	111.700 (28.819)***	-0.363 (0.624)

Note: Total 23,012 observations. Standard errors in parentheses are adjusted for clustering within states; * significant at the 10% level; ** significant at the 5% level; and *** significant at the 1% level. All specifications include city-fixed effects.

Table 2.11 Effects of Specific Types of TELs on User Charge Reliance in 65 Large Cities, 1970-2004

	(1) User Charges Per Capita	(2) User Charge Percentage
Overall property tax rate limits /Assessment increase limits /General expenditure limits	124.374 (32.217)***	1.060 (1.021)
Specific property tax rate limits	61.298 (23.651)**	1.352 (0.594)**
Property tax levy limits	-55.774 (41.254)	-0.132 (0.667)
General revenue limits	-53.599 (28.072)*	-0.749 (1.819)
Full disclosure	237.503 (58.691)***	0.286 (0.595)

Note: Total 2,273 observations. Standard errors in parentheses are adjusted for clustering within states; * significant at the 10% level; ** significant at the 5% level; and *** significant at the 1% level. All specifications include city-fixed effects.

Table 2.12 Effects of Specific Types of TELs on User Charge Reliance in 100 Small Cities, 1970-2004

	(1) User Charges Per Capita	(2) User Charge Percentage
Overall property tax rate limits /Assessment increase limits /General expenditure limits	71.766 (43.588)	1.455 (0.698)**
Specific property tax rate limits	108.971 (57.279)*	-0.633 (1.571)
Property tax levy limits	64.915 (26.599)**	1.864 (0.882)**
General revenue limits	-92.496 (56.293)	-2.164 (1.526)
Full disclosure	119.081 (24.419)***	-1.173 (0.800)

Note: Total 3,222 observations. Standard errors in parentheses are adjusted for clustering within states; * significant at the 10% level; ** significant at the 5% level; and *** significant at the 1% level. All specifications include city-fixed effects.

Table 2.13 Variation in the Number of TELs by State, 1970-2004

State	Obs.	Mean	Std. Dev.	Min.	Max.
Alabama	35	1.94	0.24	1	2
Alaska	35	1.89	0.47	0	2
Arizona	35	3.43	0.92	2	4
Arkansas	35	1.83	0.66	1	3
California	35	2.51	1.46	0	4
Colorado	35	2.74	1.80	1	5
Connecticut	35	0.00	0.00	0	0
Delaware	35	0.00	0.00	0	0
Florida	35	2.17	0.62	1	3
Georgia	35	0.40	0.50	0	1
Hawaii	35	0.00	0.00	0	0
Idaho	35	2.54	0.89	1	4
Illinois	35	2.09	0.85	1	3
Indiana	35	0.91	0.28	0	1
Iowa	35	1.71	0.57	0	2
Kansas	35	1.09	1.01	0	2
Kentucky	35	2.49	0.89	1	3
Louisiana	35	1.66	0.68	0	2
Maine	35	0.00	0.00	0	0
Maryland	35	1.80	0.41	1	2
Massachusetts	35	1.43	0.92	0	2
Michigan	35	2.74	1.15	1	4
Minnesota	35	1.77	0.69	1	3
Mississippi	35	0.71	0.46	0	1
Missouri	35	1.71	0.46	1	2
Montana	35	2.40	0.69	1	3
Nebraska	35	2.11	1.35	1	4
Nevada	35	3.34	1.11	2	5
New Hampshire	35	0.00	0.00	0	0
New Jersey	35	0.83	0.38	0	1
New Mexico	35	3.40	1.06	1	4
New York	35	1.54	0.51	1	2
North Carolina	35	0.91	0.28	0	1
North Dakota	35	1.69	0.47	1	2
Ohio	35	1.83	0.38	1	2
Oklahoma	35	1.26	0.44	1	2
Oregon	35	1.86	1.24	1	4
Pennsylvania	35	1.00	0.00	1	1
Rhode Island	35	1.31	0.87	0	2
South Carolina	35	0.86	0.36	0	1
South Dakota	35	1.00	0.00	1	1
Tennessee	35	0.74	0.44	0	1
Texas	35	2.31	0.96	1	3
Utah	35	2.00	0.00	2	2
Vermont	35	0.00	0.00	0	0

Virginia	35	0.83	0.38	0	1
Washington	35	3.31	0.72	1	4
West Virginia	35	2.43	0.50	2	3
Wisconsin	35	0.00	0.00	0	0
Wyoming	35	1.00	0.00	1	1

Table 2.14 Effects of the Number of TELs on User Charge Reliance in 724 Sample Cities, 1970-2004 (TELs treated exogenously)

	(1) User Charges Per Capita	**(2) User Charge Percentage**
Number of TELs	57.201	-1.109
	(11.361)***	(0.513)**
Number of TELs squared		0.269
		(0.130)**

Note: Total 23,012 observations. Standard errors in parentheses are adjusted for clustering within states; * significant at the 10% level; ** significant at the 5% level; and *** significant at the 1% level. All specifications include city-fixed effects.

Table 2.15 Effects of TELs on User Charge Reliance in 724 Sample Cities, 1970-2004 (TELs treated endogenously)

	(1) User Charges Per Capita	(2) User Charge Percentage
TELs	1080.280	7.545
	(543.163)**	(4.162)*
Taxes [a]	-0.556	-0.283
	(0.650)	(0.149)*
IGR [a]	-1.257	-0.172
	(0.908)	(0.128)
Debt [a]	0.100	-0.011
	(0.038)***	(0.003)***
Expenditure mix (%)	-60.816	0.066
	(37.325)	(0.226)
Optional tax	40.850	0.817
	(50.999)	(1.037)
Special districts	-2.606	-0.016
	(1.551)*	(0.011)
Population (ln)	-325.527	-3.222
	(220.913)	(1.270)**
Per capita income (ln)	155.455	0.815
	(120.111)	(0.923)
Council-manager city	-125.810	-0.686
	(114.545)	(0.835)
First-stage F-statistic	14.280	10.930
Overidentifying restrictions *J*-test and *p*-value	4.508	7.856
	(0.479)	(0.164)
Hausman endogeneity test	118.380***	190.260***
Endogenous variables	TELs, Taxes, IGR, and Expenditure mix	
Instrumental variables	Passage rate, Land area (ln), Business receipts (ln), Unemployment rate, Non-white, Age 18, Age 65, Owner-occupied housing, and Central city	

Note: Total 23,012 observations. Standard errors in parentheses are adjusted for clustering within states; * significant at the 10% level; ** significant at the 5% level; and *** significant at the 1% level. All specifications include city-fixed effects.

[a] Taxes per capita, IGR per capita, and debt per capita for column (1); taxes percentage, IGR percentage, and debt percentage for column (2).

Table 2.16 Effects of TELs on User Charge Reliance in 65 Large Cities (TELs treated endogenously)

	(1) User Charges Per Capita	(2) User Charge Percentage
TELs	574.002 (303.751)*	8.432 (7.814)
Taxes [a]	0.598 (0.433)	-0.363 (0.302)
IGR [a]	-0.556 (0.182)***	-0.153 (0.178)
Debt [a]	0.063 (0.029)**	-0.001 (0.005)
Expenditure mix (%)	-10.490 (17.782)	-0.367 (0.673)
Optional tax	35.856 (89.558)	-2.077 (2.979)
Special districts	0.448 (0.244)*	0.006 (0.008)
Population (ln)	-169.600 (100.533)*	-2.156 (2.506)
Per capita income (ln)	24.580 (91.780)	1.390 (1.589)
Council-manager city	76.831 (88.409)	3.182 (3.114)
First-stage F-statistic	11.290	7.660
Overidentifying restrictions *J*-test and *p*-value	N/A	N/A
Hausman endogeneity test	129.110***	46.680***
Endogenous variables	TELs, Taxes, IGR, and Expenditure mix	
Instrumental variables	Passage rate, Land area (ln), Business receipts (ln), Unemployment rate, Non-white, Age 18, Age 65, Owner-occupied housing, and Central city	

Note: Total 2,273 observations. Standard errors in parentheses are adjusted for clustering within states; * significant at the 10% level; ** significant at the 5% level; and *** significant at the 1% level. All specifications include city-fixed effects.

[a] Taxes per capita, IGR per capita, and debt per capita for column (1); taxes percentage, IGR percentage, and debt percentage for column (2).

Table 2.17 Effects of TELs on User Charge Reliance in 100 Small Cities (TELs treated endogenously)

	(1) User Charges Per Capita	(2) User Charge Percentage
TELs	1087.994	14.748
	(519.853)*	(8.547)*
Taxes [a]	0.316	-0.218
	(0.617)	(0.226)
IGR [a]	-0.857	-0.266
	(0.936)	(0.214)
Debt [a]	0.027	-0.009
	(0.024)	(0.008)
Expenditure mix (%)	4.691	0.399
	(37.392)	(0.420)
Optional tax	54.694	1.313
	(78.612)	(1.152)
Special districts	-5.852	-0.062
	(5.086)	(0.037)
Population (ln)	124.229	1.734
	(176.701)	(4.519)
Per capita income (ln)	-46.749	0.910
	(111.818)	(1.906)
Council-manager city	-44.698	-3.084
	(220.608)	(2.289)
First-stage F-statistic	13.220	7.170
Overidentifying restrictions *J*-test and *p*-value	4.369	4.224
	(0.498)	(0.518)
Hausman endogeneity test	89.860***	25.790***
Endogenous variables	TELs, Taxes, IGR, and Expenditure mix	
Instrumental variables	Passage rate, Land area (ln), Business receipts (ln), Unemployment rate, Non-white, Age 18, Age 65, Owner-occupied housing, and Central city	

Note: Total 3,222 observations. Standard errors in parentheses are adjusted for clustering within states; * significant at the 10% level; ** significant at the 5% level; and *** significant at the 1% level. All specifications include city-fixed effects.

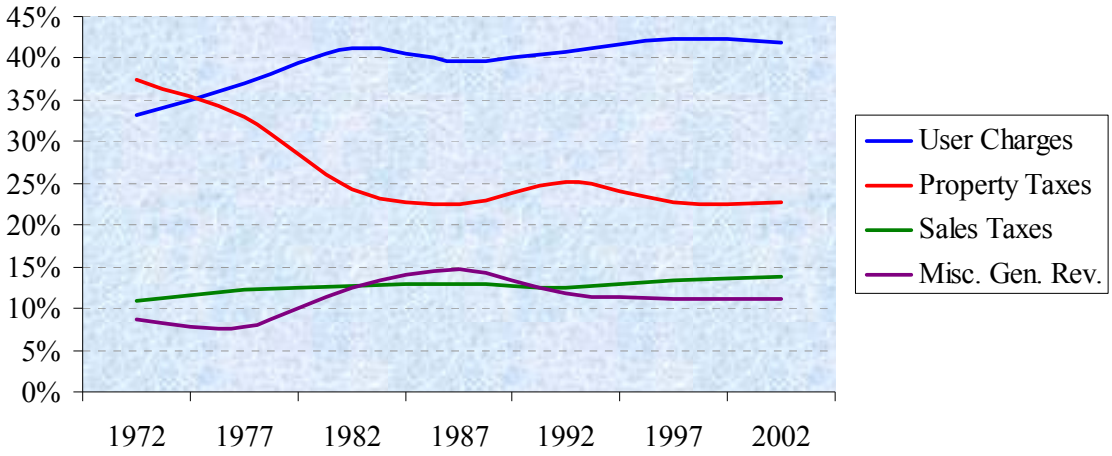
[a] Taxes per capita, IGR per capita, and debt per capita for column (1); taxes percentage, IGR percentage, and debt percentage for column (2).

Table 2.18 Effects of the Number of TELs on User Charge Reliance in 724 Sample Cities (TELs treated endogenously)

	(1) User Charges Per Capita	(2) User Charge Percentage
Number of TELs	212.153	-0.394
	(55.685)***	(0.918)
Number of TELs squared		0.513
		(0.543)
First-stage F-statistic	14.280	15.470
Overidentifying restrictions	1.759	8.548
J-test and *p*-value	(0.881)	(0.128)
Hausman endogeneity test	184.480***	233.820***
Endogenous variables	TELs, Taxes, IGR, and Expenditure mix	
Instrumental variables	Passage rate, Land area (ln), Business receipts (ln), Unemployment rate, Non-white, Age 18, Age 65, Owner-occupied housing, and Central city	

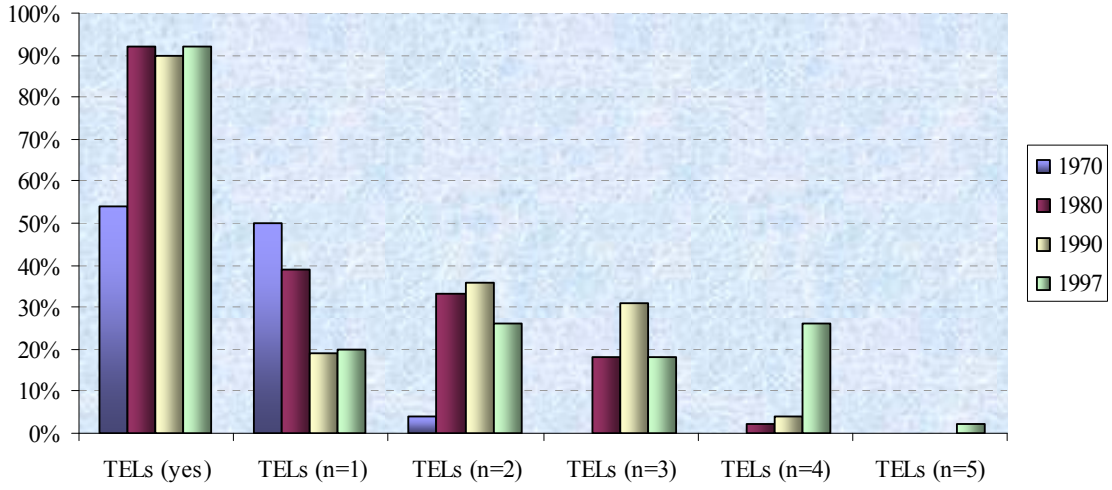
Note: Total 23,012 observations. Standard errors in parentheses are adjusted for clustering within states; * significant at the 10% level; ** significant at the 5% level; and *** significant at the 1% level. All specifications include city-fixed effects.

Figure 2.1 Selected Municipal Revenues as Percentages of Own-Source Revenue



Source: Author's calculations from U.S. Census Bureau, *Annual Survey of State and Local Government Finances and Census of Governments* (1972-2002).

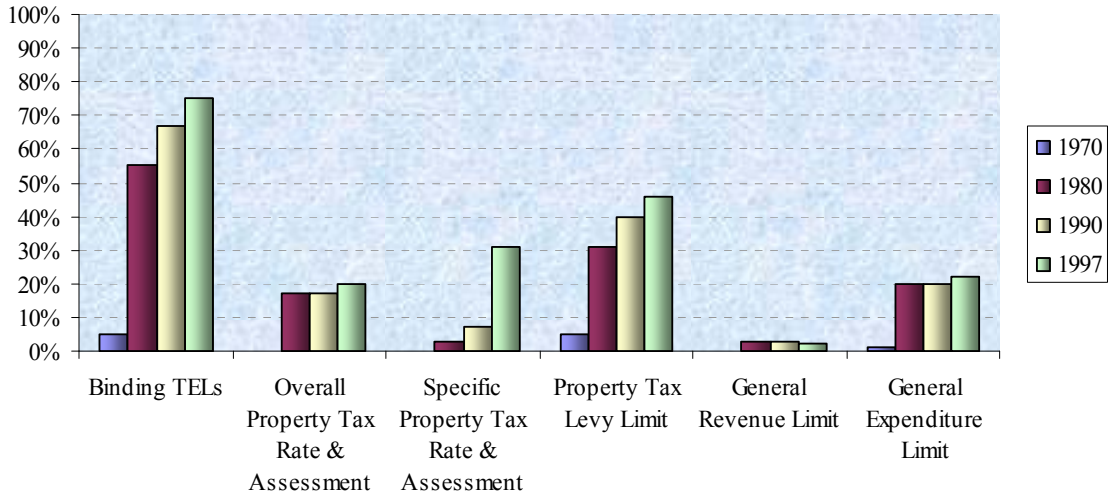
Figure 2.2 Numbers of TELs in Sample Cities



Note: Percentages are based on a sample of 722 cities in 1970, 724 cities in 1980, 708 cities in 1990 and 719 cities in 1997.

Source: Author's calculations from Mullin & Wallin (2004).

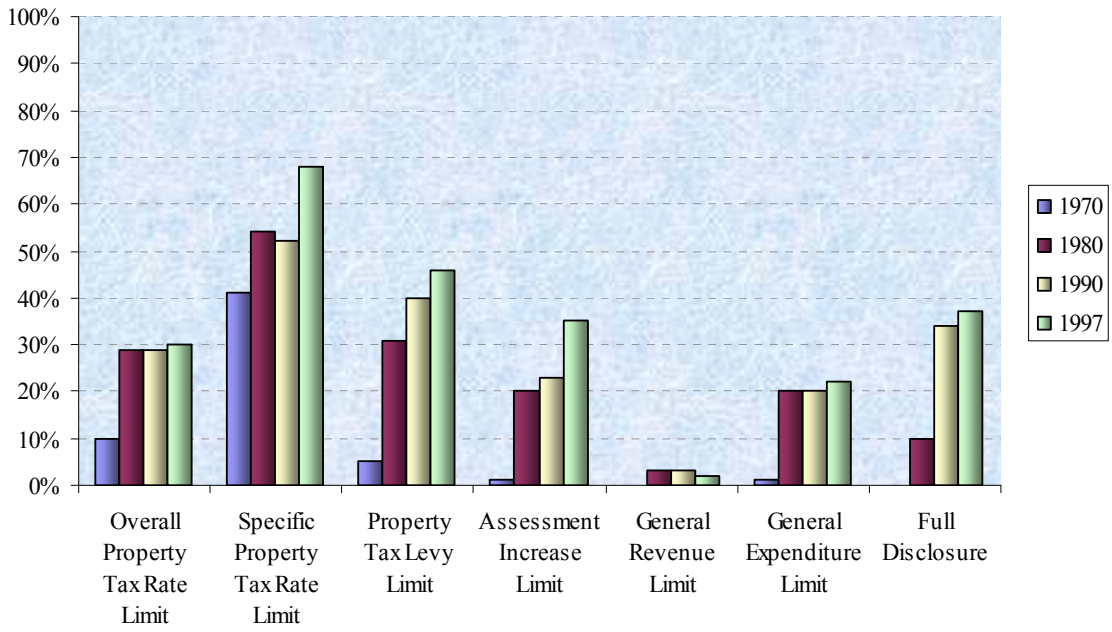
Figure 2.3 Potentially Binding TELs in Sample Cities



Note: Percentages are based on a sample of 722 cities in 1970, 724 cities in 1980, 708 cities in 1990 and 719 cities in 1997.

Source: Author's calculations from Mullin & Wallin (2004).

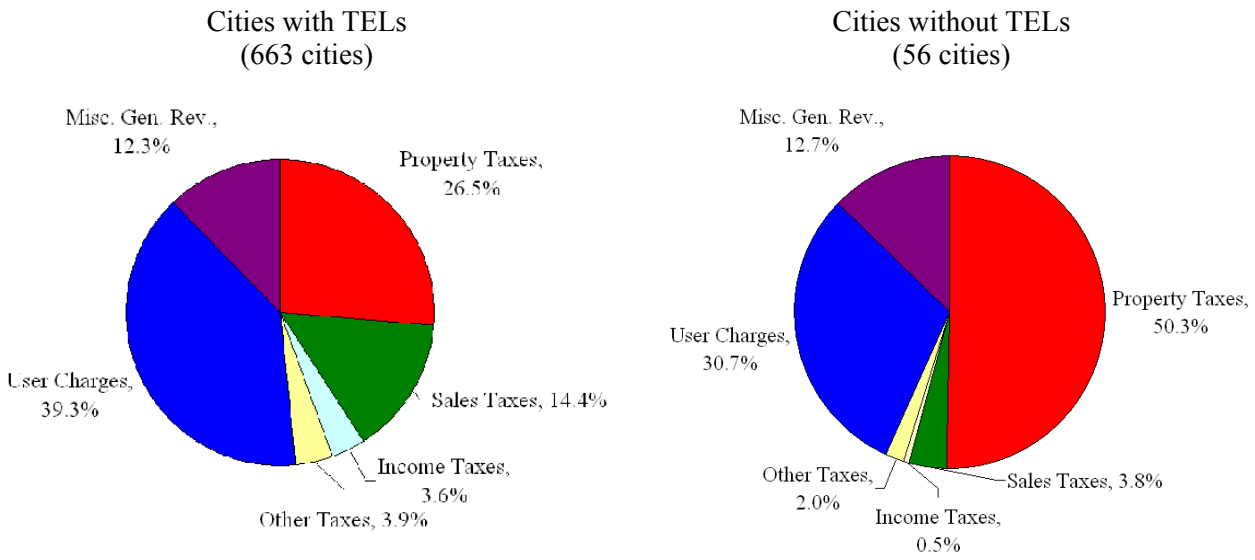
Figure 2.4 Type of TELs in Sample Cities



Note: Percentages are based on a sample of 722 cities in 1970, 724 cities in 1980, 708 cities in 1990 and 719 cities in 1997.

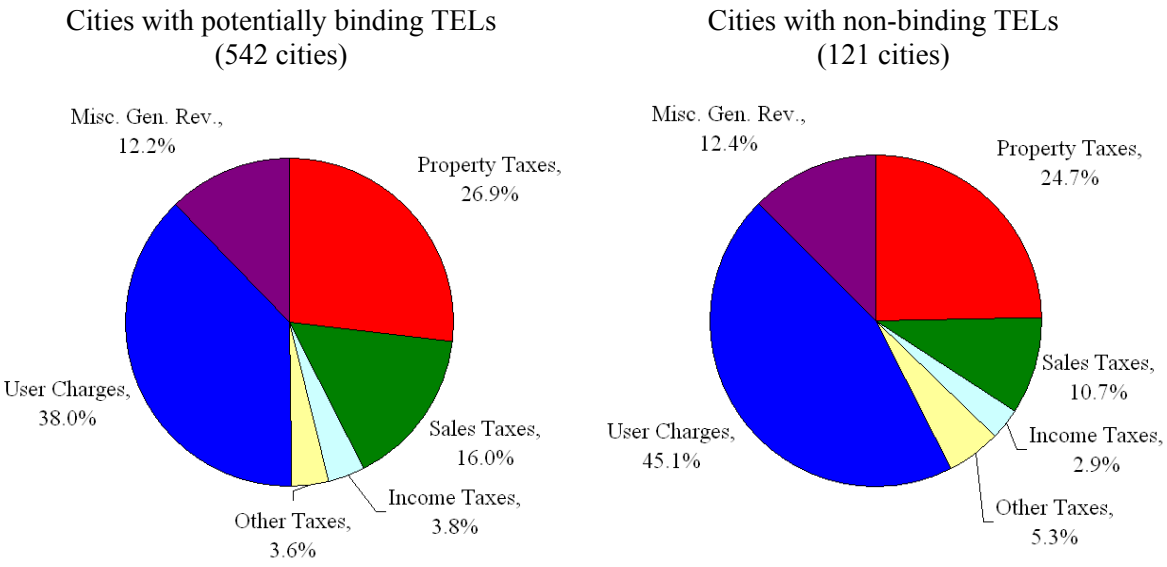
Source: Author's calculations from Mullin & Wallin (2004).

Figure 2.5 Municipal Own-Source Revenues for Cities with or without TELs, 1997



Source: Author's calculations from U.S. Census Bureau, *Annual Survey of State and Local Government Finances and Census of Governments* (1997).

Figure 2.6 Municipal Own-Source Revenues for Cities with Potentially Binding and Non-Binding TELs, 1997



Source: Author's calculations from U.S. Census Bureau, *Annual Survey of State and Local Government Finances and Census of Governments* (1997).

Chapter 3: User Charges and Municipal Expenditures

3.1 Introduction

In the United States, significant variation exists in the types of user charges and fees that are utilized by municipal governments. Netzer (1992), for instance, identified thirteen public service areas that have commonly relied on user charge financing by local governments, grouping these service areas into three categories: transportation activities (highway and parking, transit, air transportation, and water transportation), energy and environmental activities (water supply, electric power supply, gas supply, sewerage, solid waste management, parks and recreation, and natural resources), and selected other activities (hospitals, and housing and community development). Depending on the size and demands of local residents, the presence of special districts, and other factors, different cities choose to provide different packages of charge-financed services.

As with the significant variation in the types of user charges, variation is also observed in the composition of financing methods for charge-financed services among cities. In most cities, charges typically do not cover the full costs (including current operating cost and capital cost) of the service in question except for a few service areas such as parking services and gas and electricity supplies. The remaining costs are usually covered (or subsidized) with a combination of general funds (taxes), intergovernmental grants, and other funding sources (Bierhanzl & Downing, 2004; Downing, 1992; ICMA, 2002). Economic, political and practical considerations are contemplated to determine the extent to which local governments utilize user charges in order to finance various public programs. In economic theory, user charges are applicable where public goods and

services resemble private sector outputs: that is, these goods and services provide significant private benefits to identifiable individuals or business firms, it is feasible to exclude non-beneficiaries, and the costs of services are measurable (ACIR, 1987). In addition, there are political and practical considerations in developing a user charge financing system. These include consumer acceptance, equity issues, externalities, administrative costs, and so forth (Bierhanzl & Downing, 2004). For example, many cities charge nearly full costs of services such as sewerage, sanitation, and water supply since a large portion of the benefits of these services are private and most citizens readily understand and accept user charges for such services. In contrast, since participation in recreation gives the youth an alternative to negative externality-producing activities (e.g., crime), and since excluding the poor from the service by imposing charges for the entry might be inequitable, many municipal governments subsidize their recreation facilities by offering free entry to municipal parks (especially when the administrative cost of a complex fee structure is too high) or charging at a reduced price for youth groups or low-income residents.

Reflecting the above financing considerations, revenues from user charges as a percentage of expenditure for selected services vary widely among different services. Table 3.1 illustrates this variation based on aggregated data on total U.S. cities. On average, for example, municipal user charges for highways appear to cover about 6% of total highway expenditure in 2002, for parks and recreation 22%, for solid waste management 58%, for hospitals 62%, for airports 81%, for sewerage 92%, and for parking 121%. Historically, the importance of user charges for most services remained relatively stable with the exception of sewerage, solid waste management, and public

transit services. Charges for sewerage and solid waste management showed steady increases over the past 30 years while public transit charges experienced a considerable decline. These national average figures provide some insights into the difference between the cost of services and how much citizens have to pay directly as a charge, although variations in service quality may exist across regions and cities.

User charge financing is different from general tax financing in that user charge financing restores a direct relationship between the service received and payment rendered. This enables consumers to properly evaluate the service, thereby discouraging excessive or wasteful consumption of the service. Based on this line of reasoning, scholars have proposed that a greater degree of reliance on user charge financing leads to a more efficient provision of services than does the tax financing (Bailey, 1994a; Wagner, 1976). However, with the exception of Bierhanzl and Downing (1998), which found that an increase in user charge reliance reduces the total expenditure for sewer service, no other studies have yet found to empirically examine whether the degree of reliance on user charges affects the expenditure level of charge-financed services.

The purpose of this chapter is to investigate the consequences of user charge financing on municipal expenditures with a focus on two specific public programs—the sewer service and parks and recreation service. Using the fixed effects regression technique on a panel of municipalities with populations over 25,000 from 1972 to 2004, empirical findings suggest that a greater degree of user charge reliance on the sewer and parks and recreation services leads to a reduced level of government expenditures for these functions, though the magnitude of the reduction effect for the sewer service is larger than for the parks and recreation service.

The remainder of the chapter is organized as follows. Section 3.2 provides a brief overview of the pricing system of user charges. Section 3.3 reviews existing literatures on the subject. Section 3.4 describes the data and outlines the methods employed in the study. Section 3.5 reports major findings. Finally, section 3.6 offers conclusions and suggestions for future research.

3.2 Pricing System of User Charges

Depending on the nature of the services, the pricing of user charges reflects different cost structures: some include operating costs only (e.g., salaries, supplies, and contractual service), while others include full costs (the costs of current outputs plus capital costs of financing the infrastructure). Opportunity costs are sometimes involved in the pricing system as well. For example, some recreation and emergency medical service charges are primarily designed to cover operating costs only because of the concern among public managers that governments may price themselves out of the markets if charging the services at a market price (McCarthy, 1986). Other charges such as charges for water supply, sewerage, and solid waste management services typically include a high percentage of both operating and capital costs due to the capital-intensive nature of the services. Another good example is parking services. In order to defray the costs of installation, maintenance and supervision of the meters, and to recover some of the opportunity costs of land devoted to parking lots or garages, the fees collected for parking services in most cities generally exceed the annual expenditure on parking.

In pricing charges, a variety of factors (e.g., location, distance, and volume) are taken into consideration for different types of services and/or for different groups of

consumers (sectors). In the case of sewer services, there is large variation in the sewerage charge formulas employed by municipalities and sanitary districts. Some municipalities simply charge a flat rate per month or per quarter for all service users or all users within a group (e.g., $10 per month for single family residence, and $7 per month for each unit in a multi-family dwelling), while other jurisdictions adopt more complicated formulas based on the amount of water used, plumbing fixtures (such as garbage grinders in residences, wash-racks in service stations, and washing machines in commercial laundries), water meters and sewer connections, assessed property values, or a combination of two or more of these factors. For industrial sewage, sewer strength (pollution potential) is frequently utilized as the basis for pricing (Bierhanzl & Downing, 2004; Johnson, 1969).

In the case of parks and recreation services, ICMA's 2001 survey (for 1,563 cities with varying population sizes and for 215 counties with populations of 50,000 and above) provides recent information on the use of charges (ICMA, 2002). According to the survey results, about 89% of responding local governments provide parks and recreation services. Those cities that do not provide these services indicated that another city, county, regional authority, special district, or organization provides the service. With respect to funding sources, responding cities cited general funds, revenue from another local government, private grants, state grants, federal grants, user charges and fees, and self fund-raisings were frequently used financing methods. Recreation facilities that generate user charge revenues include community centers, playgrounds, tennis courts, swimming pools, water parks, soccer fields, sport stadiums, campgrounds, gymnasiums, golf courses, hiking and biking trails, and so forth. Generally, local governments provide

many of above services for free. However, for some selective services, local governments impose fixed or variable charges. For example, many cities impose charges for parks and recreation facilities only during peak demand periods, while public golf courses charge for all users at all times and adopt higher rates on weekends.

3.3 Literature Review

3.3.1 Theoretical Arguments

Public finance and public choice literature indicates that government bureaucracies are inefficiently large because bureaucrats are able to exploit their monopoly position to force citizen-consumers into an all-or-nothing demand curve (i.e., a demand curve under an all-or-nothing pricing arrangement) especially under tax financing of public services (Niskanen, 1971). While managers of private firms are assumed to be profit maximizers, bureaucrats cannot benefit from any profits that might be generated by their organization. Instead, they are viewed as seeking to maximize the size of their organization's budget, especially the "discretionary budget," at the expense of citizens (Niskanen, 1975). This view is widely known as the "budget-maximizing" theory. Following this theory, Downing (1981) suggests that if consumers do not have good information about the activities of bureaucrats, governments will produce public goods and services at a larger-than-efficient quantity and at a higher-than-efficient cost.

An alternative view of bureaucratic behavior is "fiscal illusion" theory. This theory suggests that when government revenues are unobserved or not fully observed by taxpayers the cost of government is perceived to be less expensive than it actually is.

Thus, from the politician's perspective, the existence of a fiscal illusion enables a politician to select a revenue mechanism that maximizes the extent to which spending can be increased without attracting public attention, while at the same time, this same revenue mechanism will tend to promote greater-than-optimal consumption on the part of taxpayers by concealing from them the true costs of public services (Wagner, 1976)

Based on Puviani (1903) and Buchanan's (1967) work, Wagner (1976) introduced the concept of "revenue complexity" in his study of the impact of revenue structure on fiscal illusion and budgetary choices. The central theme of his study, as with his two predecessors, is that the institutional arrangement on taxation affects taxpayer perceptions about the price or cost of government and, thereby the level of public expenditure. From both conceptual and empirical perspectives, Wagner explained how the method used to finance public services influence taxpayer perceptions, especially how complex, multi-based revenue structures matter, and how alternative degree of revenue complexity affects budgetary outcomes. As a conclusion, Wagner recommends a relatively simple revenue structure that can make citizens "understand better and perceive more clearly" the budgetary consequences of fiscal institutions (Wagner, 1976, p. 59).

Besides revenue complexity, researchers find that other circumstances may cause fiscal illusion as well. One circumstance is the income elasticity of the revenue system. An income elastic tax structure is assumed to be able to attract larger increments of general income and this increase will be "automatically" reflected on the expenditure side (Oates, 1975). A further source of fiscal illusion is the "flypaper effect," which holds that there is a tendency for categorical lump-sum grants to increase public expenditure by more than an equivalent increase in income from other sources (Hines & Thaler, 1995;

Knight, 2000; Singhal, 2006). Fiscal illusion can also be derived from "renter illusion," which argues that only property owners can correctly perceive the tax price of the local public good while the renters misperceive the level of public good and services and the level of rents paid. This is especially the case for jurisdictions where property taxes serve as the primary revenue for local governments and are directly levied on property owners rather than renters (Bergstrom & Goodman, 1973). The final form of fiscal illusion is "debt illusion" which is caused by imperfect information available to individuals on the time path of the future benefits or costs of governmental activity. In this case, voters are less aware of the costs of public sector programs if they are paid for through government borrowing rather than current taxation thus leading to higher public expenditures (Floyd & Hynes, 1978).

An examination of the existing literature indicates that it is not altogether clear whether fiscal illusion is the result of shortsightedness on the part of voters that allows for temporary increase in government expenditures or the consequence of "permanent astigmatism" that obscures the true size of government (Mueller, 2003, p. 529). The tax revolts in the 1970s reveal that fiscal illusion may not necessarily have a detrimental effect on the public's understanding or involvement concerning issues of public finance. Rather, citizens will inevitably oppose irresponsible government spending and attempt to limit government expenditures by calling for greater political accountability and institutional restraint (Mueller, 2003).

Since a properly priced user charge financing scheme can restore a direct relationship between the service received and payment rendered, theoretical discussions claim that user charges can break fiscal illusion in that they provide taxpayers with

valuable information about the costs of their consumption and reduce the ability of a government agency to extract rent from taxpayers (Bailey, 1994a; Bierhanzl & Downing, 1998, 2004). This line of reasoning argues that the absence of a consumption-payment link under the general tax financing scheme may lead to an absence of incentives for taxpayers to consume goods and services efficiently, thus causing wasteful consumption of existing public goods and services. Properly priced user charges, in contrast, act in a manner similar to market price in the private sector and could restore such relationship between the consumption and payment. In this way it may be possible to persuade taxpayers to consume less goods and services than they would under a traditional tax financing system since taxpayers under the charge financing system must bear the full cost of their increased consumption (Bierhanzl & Downing, 1998). The underlying assumption of this argument is that public demand for charge-financed goods or services is fairly elastic or at least not perfectly inelastic, so that resource allocation and service utilization would be sensitive to the pricing system of user charges.

In addition to providing citizens with more accurate information regarding the costs of consumption of certain public goods and services, user charges may also provide public officials with invaluable information on consumer preferences for public goods and services, thereby assisting them in making long-run investment decisions on the types and levels of services provided. Such policy-making patterns could prevent local governments from "providing the wrong level of output at too high a cost to the wrong people" (ACIR, 1987, p. 31). In fact, ACIR (1987) suggests that government may expand local services "only if direct users are willing to pay the full costs of the expansion"(p. 3).

Based on these arguments, scholars have proposed that a greater degree of reliance on user charge financing could result in potential efficiency gains in terms of reduction in the level of service demands and possible cost savings from more efficient service delivery compared with a traditional tax financing scheme (e.g., property taxes), provided that the administrative costs of collecting charges are relatively low and alternative tax measures related to service usage can be devised (Bailey, 1994a; Bierhanzl & Downing, 1998, 2004; ACIR, 1987; Wagner, 1976). This efficiency-enhancing effect of user charges is closely in line with the economic concept of "allocative efficiency" which states that when the marginal benefit of consuming additional units of a good equals the marginal cost of producing the units, the quantity of the good in the market will reach the efficient level. It is important to distinguish this concept of efficiency from that of "productive efficiency," a situation which occurs when the production of a particular quantity of a good is achieved using the fewest possible resources or at the lowest possible cost. From what has been discussed, user charges seem to be more directly associated with allocative efficiency than to productive efficiency, although it is possible that user charges could improve efficiency in both fronts.

3.3.2 Empirical Analysis

Despite the theoretical discussions presented above, empirical studies have provided little demonstrable evidence that a greater degree of reliance on user charge financing would lead to enhanced efficiency for delivering public services. For example, in examining the municipal solid waste management services, Savas, Baumol, and Wells (1977) found that no relationship exists between the type of financing methods (e.g.,

taxes, flat fees, and variable fees) and the volume of waste generated, the frequency of collection or the place of collection. Their study, however, suffers serious methodology flaws due to the lack of statistical correlation measures and regression analysis controlling for factors that may affect the demand and supply of the service. Another study, Mercer and Morgan (1983), compared the actual user charges with a projected cost time series using data on 34 sample cities and 22 sample counties in California between 1977 and 1982, and found that overall, cities performed better than counties in efficiency terms over time and small counties performed better than do large counties. However, their study is limited in that their method of cost determination did not involve capital costs, an important part for capital-intensive services such as water and sewer services, and thus their efficiency measures based on the ratio of user charges to such estimated costs are biased. To date, Bierhanzl and Downing's (1998) study was the only empirical piece that has directly and systematically investigated whether a higher degree of reliance on user charge financing results in improved efficiency measured by the expenditure on charge-financed services. Using data from the 1990 *Census Survey of Governments*, Bierhanzl and Downing (1998) evaluated the sewer service of 751 U.S. cities in 1990 and found that the employment of user charge financing mechanism significantly reduced government spending levels on sewer services.

Bierhanzl and Downing's seminal work provided a helpful analytic approach in connecting the theoretical argument about the efficiency-enhancing effect of user charges to the actual economic effect of user charge financing. However, their study is limited and incomplete for a number of reasons. First and foremost, Bierhanzl and Downing's study did not control for quality and output of the public service, thus their conclusions

about efficiency gains through user charge financing should be interpreted with great caution. Second, their study only explored limited samples for a single cross-sectional year. Since a cross-sectional study cannot capture initial capital costs required in the delivery of most types of charge-financed services and the change in expenditure levels may possess a different pattern in the long-run from that in the short-run, an examination of a longitudinal dataset for specific types of charge-financed services is necessary to better capture the effects of user charge financing. Third, Bierhanzl and Downing's study only examined a single service function—the sewer service.[7] Since the degree of user charge reliance and the resulting level of government spending on charge-financed services vary extensively among different types of public services, an examination of a pooled dataset for more than one function of services is needed in order to reveal more detailed information on the research topic. Fourth, Bierhanzl and Downing's analysis only controlled for a limited number of factors that were expected to affect government expenditures on sewerage. The factors considered in their analysis include population, growth rates of population from 1980 to 1990, population density, income, and the percentage of owner-occupied housing. However, municipal expenditures often depend on various political, demographic, economic, and fiscal features that vary across cities and change over time. A more thorough analysis should take into account those factors as well. Last but not least, in Bierhanzl and Downing's empirical model, the dependent variable, total expenditure, enters as part of explanatory variables in the statistical equation, which may cause serious simultaneity problem that biases the estimated results.

[7] Bierhanzl and Downing stated that similar regressions were also run for parking services and for parks and recreation services, which showed similar results as for the sewer service, but the regression results and details for these services were not reported in their paper.

Alternative model specification should be developed to correct or alleviate such mathematical simultaneity problem. Hence, in order to examine and explain the effect of user charges on municipal expenditure levels, this study intends to conduct a more careful empirical analysis that builds upon Bierhanzl and Downing's conceptual framework but addresses the above limitations with an alternative model specification. It should be noted that due to the difficulty in measuring the quality and output of public services, this study does not attempt to draw broad conclusions concerning the efficiency of charge-financed government services.

3.4 Data and Methods

3.4.1 Data and Unit of Analysis

This study extends the time frame of Bierhanzl and Downing's work from a limited cross-sectional study to a cross-sectional time series analysis for sample cities with populations of 25,000 or above in 1970 during a 33-year period (1972 through 2004). The samples used in this study are based on the dataset developed in the previous chapter—Chapter 2. Thus, the data came from the same sources: the Census Bureau's *Annual Survey of Local Government Finances* and *Census of Government* (1970-2004); *County and City Data Book* (1972, 1977, 1983, 1988, 1994 and 2000); and ICMA's *Municipal Form of Government Survey* (1981, 1986, 1991, 1996 and 2001) and *Municipal Year Book* (1971, 1974 and 1977). Due to missing values (in particular total expenditures and tax revenues) for some cities for at least one year during the study period, the datasets are unbalanced panels—the dataset for the sewer service ("sewer

sample") consists of 20,402 observations for 686 cities from 1972 to 2004 or 90% of the possible city-years; and the dataset for the parks and recreation service ("park sample") consists of 21,955 observations for 715 cities from 1972 to 2004 or 93% of the possible city-years.

Instead of lumping together the total amount of user charge revenues into a single category, this study analyzes two specific charge-financed municipal services—sewer service and parks and recreation service. A selection of two specific services, rather than concentrating on the aggregate user charges across different service areas or on a single type of service charges (as in Bierhanzl and Downing's study), allows us to make comparisons among services, and thus better understand the effect of user charges. The primary reason for choosing sewer service and parks and recreation service is that the budgetary norm for public sector sewer service has been full-cost (operating cost plus capital cost) recovery, while it has been the common practice that covers only operating cost for parks and recreation service (Bierhanzl & Downing, 1998; Netzer, 1992). In addition, sanitary sewer systems (i.e., systems for collection and treatment of sewerage from houses or industry) are more likely to be supported by user charges than many other local government services. Benefits from sewer provision are clearly identifiable, easy to administer (they are commonly added to user's water bills) and there is little public opposition to charges for such service (Bierhanzl & Downing, 1998). In contrast, public parks have a very limited scope for user charges. Because of the general public benefits from the service provided and equity concerns, user charges collected in parks are most commonly limited to the form of parking fees and any franchise fees paid by concessionaires. Among services provided by local governmental bodies, recreation

departments are probably under considerable pressure to adopt some form of benefit-based charges. Thus, user charges for parks and recreations service typically recover between one-quarter and two-thirds of operating costs (Bailey, 1994b). This contrasting situation provides a good avenue to conduct a comparative study for the sewer service and parks and recreation service.

Another reason for choosing these two service is that, of the thirteen most widely utilized charge functions cited above, sewerage and parks and recreation services are two of the most important municipal functions and the majority of cities with population exceeding 25,000 tend to provide these services either fully or partially (U.S. Census Bureau, 1962-2004). Moreover, unlike some other types of charge-based services that are lumped together under the category of "others", which makes it very difficult to disaggregate the financial data, charge collections for sewer service and parks and recreation service and their total expenditure for each service are clearly disaggregated in the Census dataset. All the above factors make sewer and park and recreation services good candidates for the analysis.

3.4.2 Variables and Model

Following Bierhanzl and Downing (1998), this study proposes the following hypothesis: a higher degree of reliance on user charge revenue reduces the level of government expenditure for the charge-financed service.

Two dependent variables in the study include total sewerage expenditures and total parks and recreation expenditures. The Census data on both expenditures include current operating cost plus capital cost of the service delivery during the 33-year study

period from 1972 to 2004. The independent variable of primary interest is user charge reliance (UCR), defined as user charge revenue for the service divided by expenditures for that service. UCRSEW denotes user charge reliance of sewerage service (i.e., UCRSEW = sewerage charges/total sewerage expenditure), and UCRPARK represents user charge reliance of parks and recreation service (i.e., UCRPARK = park and recreation charges/total park and recreation expenditure). As such, user charges are measured in a relative term, as opposed to an absolute dollar amount. This approach of measurement helps determine how closely the charge revenue represents a full budget cost of the charge-financed service, and the measure can also be easily applied to various sizes of jurisdictions. To alleviate the mathematical simultaneity problem caused by the presence of expenditure in both dependent variables and independent variables—a major flaw of Bierhanzl and Downing's study—a three-year moving average of UCR is calculated and enters the statistical model instead of the annual UCR. Although this measurement cannot completely eliminate the simultaneity problem that Bierhanzl and Downing's study also has, it helps smooth out the trends in government expenditures and revenues and thus reduces the bias in estimation. Nonetheless, caution should be exhibited in that the results might still be biased upward to a certain extent due to the potential simultaneity issue.

Alternative measures of UCR might be total or per capita dollar amount of a specific charge. The advantage of using these measures is that they can solve the mathematical simultaneity problem caused by having expenditures on both sides of the regression equation, but the disadvantage is that they may raise another type of simultaneity that is more problematic in theory. That is, the changes in expenditure levels

could result in changes in user charges, and vice versa. Thus the direction of the causality would be difficult to determine.

Since expenditure reflects demand for the level of output, a method for estimating demand functions of individuals for municipal public services is required (Deacon, 1979; Deno & Mehay, 1987). According to the median voter hypothesis, a local government elected by majority rules provides the level of service that is most preferred by the median voter (Bergstrom & Goodman, 1973; Bierhanzl & Downing, 1998; Deacon, 1979; Deno & Mehay, 1987). Basic median voter's demand function for governmental services can be expressed as:

$$\ln G = \ln A + b_1 \ln T_j + b_2 \ln N + b_3 \ln Y_j \qquad (3.1)$$

where:

G is the total amount of public goods supplied;

A is any underlying differences in functional responsibility for services across cities and other differences in cities themselves; variables included in this shift parameter vary depending on the context of the study and the availability of the data;

T_j is the median voter (j)'s tax share of the local public good, which measures the increment in the household's tax burden caused by an extra dollar of public expenditure;

N is the number of people sharing the local public good, i.e., city population; and

Y_j is median voter (j)'s income.

Since the model is based on the assumption that median voters largely decide the fiscal outcome of the jurisdiction, the median voter's tax share is an important variable in the demand function. Given the key role of the property tax in local finance, the variable is usually defined as the ratio of median home value to the gross assessed property value

in a jurisdiction, which is citizens' share of local property tax bill. Unfortunately, for this study, although the dataset for median home value is available for 1970, 1980, 1990 and 2000, the gross assessed property values for all sample cities during the study period are not available. Therefore, the median voter's tax share is not included in the regression model.

The general equation for the expenditure model of charge-financed services, thus, can be written as:

$$EXP_{it} = \alpha_1 UCR_{it} + F_{it}\alpha_2 + X_{it}\alpha_3 + \delta_i + \varepsilon_{it} \quad (3.2)$$

where:

EXP_{it} is total expenditure for sewer service or for parks and recreation service for municipality *i* in year *t*;

UCR_{it} is a three-year moving average of user charge reliance defined as the average of user charge revenue for the charge-financed service for municipality *i* during the previous three years (i.e., years *t, t-1* and *t-2*) divided by the three-year average of expenditure for that service; this variable is replaced with other measures in different model specifications;

F_{it} is a vector of fiscal variables for municipality *i* in year *t*, including total intergovernmental revenue (IGR) and the number of special districts (i.e., "sewer districts" for sewer service, and "park districts" for parks and recreation service);

X_{it} is a vector of social-economic variables for municipality *i* in year *t* that are expected to affect the demand of the services, including population, land area, median family income, percentage of owner-occupied housing, percentage of population at age 65 and above, and percentage of non-white population;

δ_i is a city-specific intercept; and

ε_{it} is the error term.

All variables (including the dependent variables) except dummy variables are in log form. In addition, all monetary terms are adjusted for inflation using the Consumer Price Index (CPI) with 2004 as the base year.

Population, land area, and median family income are included to account for the demand and cost for public services. Intergovernmental revenue from federal, state and other local governments, in particular the unrestricted block grants, can be counted as additional income for city residents if the municipal government substitutes the grants for locally raised revenue. In the case of matching grants, there may be a price effect as well as an income effect on the demand for local public services in that the matching grant may reduce the tax price to city residents by the fraction of the unit cost of the local public good financed by the grantor (Oates, 1979). Under fiscal illusion, voters may fail to observe the lump-sum grant or misperceive its impact as an average price effect and thus are willing to support a higher level of government spending. Nevertheless, if the municipal government—the grantee—acts as a budget-maximizer and chooses to spend more than the amount of the intergovernmental grants, there is no substitution effect (Courant, Gramlich, & Rubinfeld, 1979; Holsey, 1993; Romer & Rosenthal, 1982; Turnbull & Mitias, 1999). In either case, however, the effect of intergovernmental revenue is expected to be positive on government expenditures.

Since sewer service and parks and recreation service in some regions are provided through special districts rather than municipal governments, the number of special districts within the county where the municipality is located is included as a control

variable.[8] According to their designated functions, the Census Bureau classifies 33 types of special districts including single-function special districts and multi-function districts. I count the number of sewer districts including single-function sewerage districts and multi-function sewerage-and-water supply districts and the number of park districts including single-function parks and recreation districts only. A larger number of special districts are expected to result in a lower level of municipal spending on the services that are provided fully or partially from the special districts.

Finally, to capture voter preferences of public services, percentage of population over 65 years of age, percentage of population that is non-white, and percentage of owner-occupied housing units are employed in the study. According to the renter's illusion hypothesis, since renters do not directly pay property taxes and thus are less aware of tax increases than homeowners, renters are more likely to favor expansions in the local budget than homeowners. If this is true, the percentage of owner-occupied housing would be negatively associated with the government spending level (Bergstrom & Goodman, 1973; Martinez-Vazquez, 1983).

3.5 Research Findings

This study employs a fixed effects regression model with cluster-robust standard errors. The fixed effects model helps to control for any omitted unobserved factors that differ across cities but are constant over time. In addition, the standard errors are

[8] It would be ideal to identify the exact number of special districts serving the municipality. However, such data are unavailable and difficult to calculate due to the fact that many special districts serve areas across city or even county boundaries. Therefore, the number of special districts within a county area is used as a proxy for the number of special districts serving a municipality.

clustered on the variable identifying each municipality to account for intra-group variations, which helps correct potential heteroscedasticity and autocorrelation problems.

Tables 3.2 and 3.3 present descriptive statistics of the variables for the sewer sample and for the park sample, respectively. As the tables show, there are large variations in government spending levels, revenue structures, and socio-economic characteristics among the sample cities, which justifies the use of regression models to capture the effects of user charge financing on municipal expenditures.

Tables 3.4 and 3.5 summarize the distribution of the three-year moving averages of UCRSEW and UCRPARK, respectively. For analytical and regression purposes, UCRSEW and UCRPARK are grouped along with five brackets at an interval of 0.5 for UCRSEW and 0.1 for UCRPARK. For example, UCRSEW 0-0.5 indicates the UCRSEW score between 0 and 0.5 and UCRPARK 0-0.1 indicates the UCRPARK score between 0 and 0.1; and other brackets follow this pattern.

At first glance, 38.2% of sample cities (with UCRSEW≥1.0) rely on user charges to cover the full budget cost of sewer service (see Table 3.4). However, Bierhanzl and Downing (1998) suggests that a typical municipal budget does not include depreciation or rent of previous capital investments and land expenditure, thus it is not clearly known how much the budget cost understates the true full cost (current operating plus capital costs) of service delivery. Since sewer service is capital-intensive, Bierhanzl and Downing propose that a UCRSEW of 1.5 or 2.0 could be more representative of a charge structure which covers the full cost. If this is the case, only about 10% of total observations cover the full cost of the service provision and the rest of them (90%) set

charges below the full cost. This suggests that sewer service is heavily subsidized by general taxes or other revenue sources.

In the case of the parks and recreation service, it is less known that how much the UCRPARK measure would cover the full cost of the service delivery. However, in general, parks and recreation services tend to be more heavily subsidized with general taxes or other sources of revenue than sewerage due to the nature of the service's generation of positive externalities and equity consideration for those who can not afford the charges for the entry of parks and recreation facilities (Downing, 1992). Nonetheless, it should be noted that only 11.3% of sample cities have UCRPARK score 0.4 or higher as the Table 3.5 shows. Given that the ICMA's 2001 survey reports that, on average, user charges account for 99.3% (UCRSEW 0.993) of local government annual sewerage expenditures and 21.6% (UCRPARK 0.216) of annual parks and recreation expenditures, respectively (ICMA, 2002), the sample means (UCRSEW 0.90 and UCRPARK 0.20) in this study are very close to the national averages. It should be acknowledged that the sample means in this study cover a 33-year period (1972-2004) for municipal governments only while the figures of ICMA apply to a single year (2001) and include both municipalities and counties.

Tables 3.6 and 3.7 report the regression results for the impact of user charges on total service spending under various model specifications: Models I are run with UCR as the primary independent variable; Models II employ four brackets of UCR dummy variables in order to understand the different magnitudes of the UCR on expenditure

reduction; and Models III use total sewerage charges or parks and recreation charges as an effort to avoid the mathematical simultaneity problem that may exist in Models I.[9]

As Table 3.6 shows, the statistically significant and negative coefficient on UCRSEW (-0.217) in Model I implies that a 10% increase in UCR sewerage leads to a 2.2% reduction in total sewerage spending. This finding suggests that as the percentage (or share) of sewerage charge increases, the total sewerage expenditure decreases. For example, suppose a city currently finances 60% of its sewerage expenditure from user charges, that is, the UCRSEW for this city is 0.6. If the city increases the degree of its user charge reliance and finances 66% of its sewerage expenditure from user charges, its sewerage expenditure will decrease by 2.2%. Considering that the average spending on sewerage for the sample cities is about $15.39 million annually, the 2.2% reduction would imply a saving of $338,580 for the municipal government. As Bierhanzl and Downing (1998) points out, the reduction in spending could be attributed to the presence of a consumption-payment link and the breaking of a fiscal illusion in the service provision and consumption of sewer services.

Furthermore, the negative and descending coefficients on four different brackets of UCRSEW dummy variables in Model II indicate that the higher the UCR sewerage level (bracket), the more sewerage expenditure is reduced.[10] In general, the finding suggests that the magnitude of spending reduction becomes larger when the proportion of charge financing increases.

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[9] Similar analysis has been done on a per capita basis as well, but the models either produced the same results with the ones using the total amount of sewerage or parks and recreation charges (when per capita charges are logged) or generated very low and meaningless R-square (when per capita charges are unlogged). Therefore, these model specifications are not reported.

[10] The coefficients on dummy variables reported in Tables 3.5 and 3.6 are adjusted using a method suggested by Kennedy (1981) for binary variables in a semi-logarithmic equation. To calculate the percentage changes in expenditures associated with binary variables, I calculate: $e^{(\beta - 1/2\ var(\beta))} - 1$.

In comparison, Model III shows that a 10% increase in the total amount of sewerage charges is associated with a 2.5% increase in sewerage spending. This positive relationship could occur under the situation that bureaucrats may have incentives to provide the charge-financed services at a more-than-needed level when a significant surplus of the user charge revenue is available to them. Thus, this finding may serve as evidence of budget maximizing behavior on the part of bureaucrats. Alternatively, this finding could also be indicative of a flypaper effect. For example, suppose that a city uses both general revenue and user charges to fund its sewer service. If the city raises more funds for sewer service from user charges in a given year, it might spend even more on the service instead of diverting general revenues to other purposes, thus resulting in a positive relationship between user charge reliance and government expenditures. However, since the direction of the causality could run two-ways, another possible and simple explanation could be that an increase in spending requires an increase in user charge revenue.

Table 3.7 shows the regression results of the effects of UCR parks and recreation on the level of parks and recreation spending. A similar pattern is repeated here as in the spending on sewerage. The result of Model I indicates that a 10% increase in UCRPARK leads to a 0.7% reduction in parks and recreation expenditures. The magnitude of the reduction effect is smaller than that in the case of sewerage spending. This blunt effect may be due to a heavy subsidization of general revenue funding for the parks and recreation services. In addition, as with the sewer spending, Model III in Table 3.7 shows a positive impact of user charges on expenditures. That is, a 10% increase in the total amount of parks and recreation charges leads to a 2.1% increase in total parks and

recreation spending. Unlike the results for sewer spending, the negative and descending coefficients on four different brackets of UCRPARK dummy variables in Model II fail to reach statistical significance at any conventional level, suggesting that the magnitude of spending reduction does not vary with the proportion of charge financing in the case of parks and recreation service.

With respect to the control variables, intergovernmental revenue, population, land area and percentage of non-white population are positively associated with both sewer expenditure and parks and recreation expenditure. The percentage of population at age above 65 is positively associated with parks and recreation spending but has no statistically significant impact on sewerage spending. Interestingly, the percentage of median family income has a positive impact on parks and recreation spending but a negative effect on sewerage spending. Another unexpected result is the effect of the number of special districts on government spending. Both the number of sewer districts and the number of parks and recreation districts show some evidence of positive (rather than negative) impacts on expenditures although the impacts are not consistent across different model specifications. Moreover, the coefficients on the percentage of owner occupied housing fails to reach statistical significance in either sewerage or parks and recreation spending.

3.6 Discussion and Suggestions for Future Research

In summary, the empirical findings in this study are consistent with Bierhanzl and Downing's finding that a greater degree of user charge reliance of the charge-financed services results in a lower level of the expenditure for the services. This study also finds

that the magnitude of spending reduction becomes larger when the proportion of charge financing increases as reflected in descending coefficients of four different brackets of UCRSEW dummy variables employed in the analysis, but this descending effect is not evident for parks and recreation services. Although this study does not measure efficiency directly, since the level of government spending has been widely used as a proxy for measuring the relative efficiency of municipal service provisions, this study has implications for improving the performance and efficiency of government through user charge financing.

This study employs a more elaborate methodology than previous studies, but the conclusions made here are still tentative and several issues remain open to further research. First of all, having expenditures on both sides of the regression equation may bias the results upward. Without sufficient information on the policy making process of municipal services, it would be difficult to determine how different financing methods affect fiscal outcomes.

Second, caution must also be exercised in claiming that charge financing and higher reliance of charge financing can be more efficient (in terms of allocative efficiency) than public provisions financed primarily with tax revenues. Although this study included a number of independent variables that may affect government expenditures and employed fixed effects regression models to help control for omitted variables that remain constant over time but vary across cities, spending in a community is related to numerous other factors such as wealth, tax base, government responsiveness, implementation of alternative service delivery systems, and quality of service (George A. Boyne, 1998a; George A. Boyne, 1998b; Kodrzycki, 1998). These factors should be

appropriately controlled in order to test the allocative efficiency of service delivery. For example, a reduction in spending might be accompanied by a reduction in service quality. Without sufficient information on the output of the service, it is not possible to derive any definite conclusion on the efficiency gains or losses. Moreover, some states' statutes prohibit local governments from charging more for a service than it costs to provide that service (e.g., in California). This is intended to prevent charges from being used as a revenue-raising device. However, it is unknown that how many other states have such provisions. Also, how to accurately determine the costs is not explained clear in the California laws. The practice may vary greatly across states.

Furthermore, this study has tested only demand function reflecting the expenditure level. It would be useful if a cost function were also used to understand productive efficiency (technical efficiency) of sewer and parks and recreation services in the study (Hirsch, 1965; Uri, 2001). This would require data on output levels and input prices. However, public sector output levels are very difficult to measure, and information on input costs are hard to collect. Municipalities may not have access to the same production technologies. For example, to measure the quality of the service, higher staff level or more productive workers may lead to quicker response time to plumbing problems; and jurisdictions with better fiscal (taxing) capacity can afford more efficient and environmentally-friendly technology and equipments (usually more expensive). While the degree of productive efficiency cannot be measured for a given quantity, increases in productive efficiency will be reflected in reduced costs of providing the service. This can be measured for a municipality as reduced expenditures for a given level of output.

Another concern is that studies examining differences in the level of government expenditures are commonly over-aggregated and, consequently, may provide insufficient information about the factors that affect the expenditure decisions of a particular governmental unit. As indicated above, the lack of an adequate method for extracting and measuring quality of service variations creates additional problems. Conducting intensive case studies of specific municipalities would enable researchers to collect more accurate and more detailed data as well as provide a basis for improved measurements of the value of urban services.

In addition, neighboring cities may act like competitors, affecting each other's spending and financing patterns. The inclusion of the variables accounted for neighbor effects are suggested for further analysis.

Finally, given that this study has tested only two commonly used charge-financed services, in order to understand a more accurate relationship between the degree of user charge reliance and the expenditure level, similar tests should be conducted for other charge-financed services in future studies.

Table 3.1 User Charges as a Percentage of Expenditure for Selected Functions

Functional Category	**1972**	**1982**	**1992**	**2002**
Parking	119.84	92.89	113.29	121.15
Electricity Supply	96.22	96.75	100.61	103.36
Gas Supply	111.59	105.41	106.72	100.25
Sewerage	46.31	53.10	83.00	92.21
Water Supply	97.18	81.59	86.52	85.90
Airports	61.83	74.00	70.98	80.51
Water Transport	56.80	81.28	115.87	70.01
Hospitals	40.42	66.58	60.76	62.20
Solid Waste Management	23.44	32.82	49.79	58.28
Public Transit	64.65	48.14	33.62	34.44
Parks and Recreation	15.22	17.77	22.21	21.76
Housing and Community Development	16.90	11.05	14.52	11.96
Highways	3.96	4.85	6.23	5.54
Education	3.70	3.14	2.10	1.57

Source: Author's calculations from U.S. Census Bureau, *Historical Finances of Federal, State and Local Governments: State Aggregates* (Fiscal Years 1972-2004).

Table 3.2 Descriptive Statistics of the Sewer Sample

Variables	**Mean**	**Std. Dev.**	**Min.**	**Max.**
Dependent Variable				
Sewerage expenditure (mil $)	15.39	53.78	0.002	1,823.47
Independent Variables				
UCR sewerage (3-year moving average)	0.90	0.86	0	23.51
Sewerage charges (mil $)	11.30	36.16	0	1,068.05
Sewer districts	4	16	0	280
Intergovernmental revenue (mil $)	85.56	786.81	0	23,900
Population	134,444	379,730	25,019	8,084,316
Land area (square miles)	42.44	71.62	1.00	765.70
Median family income	44,432	13,901	14,409	141,964
Owner-occupied house (%)	57.34	11.96	13.40	93.90
Age above 65 (%)	12.04	4.05	1.50	51.80
None-white population (%)	19.47	17.75	0	98.80

Note: 20,402 observations.

Table 3.3 Descriptive Statistics of the Park Sample

Variables	Mean	Std. Dev.	Min.	Max.
Dependent Variable				
Parks and recreation expenditure (mil $)	11.05	30.53	0.002	719.43
Independent Variables				
UCR park (3-year moving average)	0.20	0.18	0	2.17
Parks and recreation charges (mil $)	2.23	5.56	0	157.64
Park districts	2	9	0	94
Intergovernmental revenue (mil $)	81.71	758.89	0	23,900
Population	130,948	366,785	25,019	8,084,316
Land area (square miles)	43.36	91.66	1.00	1,732.00
Median family income	44,551	14,021	14,409	141,964
Owner-occupied house (%)	57.23	12.04	13.40	93.90
Age above 65 (%)	12.02	4.14	1.50	51.80
None-white population (%)	20.21	17.99	0	98.40

Note: 21,955 observations

Table 3.4 Distribution of UCR Sewerage (UCRSEW)

Variables	Mean	Std. Dev.	Min.	Max.	# of observations	
UCRSEW	0.90	0.86	0	23.51	20,402	(100%)
UCRSEW 0-0.5					5,256	(25.8%)
UCRSEW 0.5-1.0					7,353	(36.0%)
UCRSEW 1.0-1.5					5,680	(27.8%)
UCRSEW 1.5-2.0					1,369	(6.7%)
UCRSEW 2.0 or higher					744	(3.7%)

Note: UCRSEW is a three-year moving average derived from 686 samples cities for 33 years (1972-2004), which generate 20,402 total observations (excluding missing values).

Table 3.5 Distribution of UCR Parks and Recreation (UCRPARK)

Variables	Mean	Std. Dev.	Min.	Max.	# of observations	
UCRPARK	0.20	0.18	0	2.17	21,955	(100%)
UCRPARK 0-0.1					7,367	(33.5%)
UCRPARK 0.1-0.2					5,655	(25.8%)
UCRPARK 0.2-0.3					4,060	(18.5%)
UCRPARK 0.3-0.4					2,383	(10.9%)
UCRPARK 0.4 or higher					2,490	(11.3%)

Note: UCRPARK is a three-year moving average derived from 715 samples cities for 33 years (1972-2004), which generate 21,955 total observations (excluding missing values).

Table 3.6 Effects of Reliance on Sewerage Charges on Total Sewerage Spending (ln)

	Model I	**Model II**	**Model III**
UCRSEW (ln)	-0.217 (0.031)***		
UCRSEW 0.5-1.0		-0.121 (0.050)**	
UCRSEW 1.0-1.5		-0.313 (0.059)***	
UCRSEW 1.5-2.0		-0.513 (0.078)***	
UCRSEW 2.0 and higher		-0.855 (0.103)***	
Sewerage charges (ln)			0.252 (0.024)***
Sewer districts (ln)	0.038 (0.028)	0.053 (0.029)*	0.031 (0.025)
IGR (ln)	0.123 (0.028)***	0.152 (0.030)***	0.160 (0.026)***
Population (ln)	0.786 (0.115)***	0.797 (0.130)***	0.597 (0.109)***
Land area (ln)	0.303 (0.126)**	0.304 (0.132)**	0.070 (0.111)
Median family income (ln)	-0.289 (0.055)***	-0.184 (0.055)***	-0.164 (0.051)***
% Owner-occupied housing (ln)	-0.244 (0.358)	-0.158 (0.348)	-0.417 (0.295)
% Age 65 (ln)	0.125 (0.094)	0.057 (0.101)	0.051 (0.090)
% Non-white (ln)	0.293 (0.035)***	0.253 (0.036)***	0.087 (0.025)***
Intercept	0.475 (2.095)	-1.000 (2.152)	1.000 (1.761)

R-square	0.439	0.415	0.618

Note: Total 20,402 observations. Standard errors in parentheses are adjusted for clustering within municipalities; * significant at the 10% level; ** significant at the 5% level; and *** significant at the 1% level. All specifications include city-fixed effects.

Table 3.7 Effects of Reliance on Parks and Recreation Charges on Total Parks and Recreation Spending (ln)

	Model I	**Model II**	**Model III**
UCRPARK (ln)	-0.074 (0.026)***		
UCRPARK 0.1-0.2		-0.027 (0.039)	
UCRPARK 0.2-0.3		-0.073 (0.049)	
UCRPARK 0.3-0.4		-0.076 (0.063)	
UCRPARK 0.4 and higher		-0.085 (0.083)	
Parks and recreation charges (ln)			0.212 (0.020)***
Park districts (ln)	0.066 (0.032)**	0.059 (0.033)*	0.011 (0.026)
IGR (ln)	0.143 (0.038)***	0.178 (0.041)***	0.129 (0.032)***
Population (ln)	0.785 (0.132)***	0.816 (0.129)***	0.458 (0.111)***
Land area (ln)	0.426 (0.129)***	0.439 (0.126)***	0.292 (0.097)***
Median family income (ln)	0.087 (0.043)**	0.044 (0.050)	0.094 (0.038)**
% Owner-occupied housing (ln)	0.500 (0.344)	0.335 (0.354)	0.210 (0.296)
% Age 65 (ln)	0.198 (0.079)**	0.226 (0.084)***	-0.035 (0.072)
% Non-white (ln)	0.065 (0.025)**	0.063 (0.027)**	0.026 (0.022)
Intercept	-6.854	-6.489	-2.089

	(2.311)***	(2.297)***	(1.907)
R-square	0.557	0.473	0.721

Note: Total 21,955 observations. Standard errors in parentheses are adjusted for clustering within municipalities; * significant at the 10% level; ** significant at the 5% level; and *** significant at the 1% level. All specifications include city-fixed effects.

Chapter 4: Conclusion and Policy Implications

The main objective of this dissertation is to shed light on the causes and consequences of the increased utilization of user charges by American municipal governments since the late 1970s. To achieve this objective, the preceding chapters examined the effects of TELs on municipal user charge reliance and the impacts of user charge financing on the level of government expenditures. In this final chapter, I summarize key results, discuss relevant policy implications, and suggest directions for future research.

Following a brief introduction in Chapter 1, Chapter 2 began with the observation that since the late 1970s and early 1980s when the massive enactment of state-imposed TELs took place, the share of user charges in municipal own-source revenues increased dramatically. Therefore, the goal of the second chapter was to investigate whether the implementation of this fiscal policy facilitated or motivated the growing trend in municipal reliance on user charges. As one of the first empirical analyses that relate the state-imposed TELs directly to municipal user charges, this study finds strong support for the notion that TELs are in fact one of the determinants of the increasing reliance on municipal user charges. Using a nationwide sample of 724 cities over the period of 1970 through 2004, I find that cities with TELs, on average, collect about $130 more in per capita user charges than do cities without TELs, holding all others constant. When the potential endogeneity of TELs is taken into consideration the effect becomes even more striking. The 2SLS fixed effects model predicts that the implementation of TELs leads to an increase of approximately $1,080 in per capita user charges. The 2SLS estimates also show that TELs result in an increase of 7.5 percentage points in the share of user charges

in total municipal own-source revenue although such effect is not statistically significant under the OLS with fixed effects model which assumes that TELs are an exogenous event. These findings suggest that previous studies on TELs that have neglected the endogeneity of this policy may have seriously underestimated its impact on municipal fiscal outcomes. Some unobserved factors further decrease the amount of user charges and thus counteract the positive effect of the TEL policy.

To account for heterogeneity across cities, the basic model has been applied to two subsamples—a sample of 65 large cities with populations of at least 250,000 persons and a sample of 100 small cities with populations of between 25,000 and 50,000 persons. The positive effect of TELs on per capita user charges is supported in both large-city and small-city samples using either OLS or 2SLS approach, but the effect of TELs on the share of user charges is uncertain in both subsamples.

When the stringency or restrictiveness of the TEL policy is taken into consideration, the results show that potentially binding TELs increase per capita user charges by $76 in the full sample, by $114 in the large-city sample, and by $43 in the small-city sample. There is also evidence that potentially binding TELs increase user charge percentage in the large and small cities. Non-binding TELs, on the other hand, are associated with increases in per capita user charges in large and small cities but not in the full sample. There is no indication that non-binding TELs affect user charges as a percentage of own-source revenue. Therefore, one can conclude that the restrictiveness of TELs matters when the share of user charges is the primary interest. Nonetheless, it is not necessarily true that potentially binding TELs always have a greater effect on user charge reliance than do non-binding TELs. In fact, both categories of TELs could facilitate the

increases in the dollar amount of user charges and their impacts are not statistically distinguishable in large and small cities. In this sense, the classification of potentially binding or non-binding limitations seems more a reflection of public attitude toward municipal taxing and spending levels than a fiscal ceiling as the theory might have suggested. Furthermore, the finding that potentially binding TELs increase the share of user charges in large and small cities is somewhat different from previous studies which suggested that potentially binding TELs initially decrease local user charges and miscellaneous revenue as a share of local general revenue (including all units of local governments) but eventually increase the share over time (Mullins & Joyce, 1996).

In addition, this study also extends the literature by testing the effect of specific types of TELs on user charge reliance. To date, no existing studies have yet been found to evaluate the individual effect of the seven types of TELs. Since both previous research and this study suggest that the restrictiveness of TELs matters, detailed examination of each specific type of TELs could further our understanding on the fiscal impact of the policy. Estimates from the OLS with fixed effects model using the full sample, large-city sample and small-city sample reveal that specific types of TELs generate varying effects on user charge reliance with some limitations showing a negative effect while others a positive effect. In general, specific property tax rate limits and full disclosure appear to have greater overall effects than do others. That is, specific property tax rate limits lead to an increase in per capita user charges by $88 in the full sample, by $61 in the large-city sample, and by $109 in the small-city sample; and to an increase in user charges as a percentage of own-source revenue by 1.4 percentage points in large cities. Full disclosure increases per capita user charges by $112 in the full sample, by $238 in the large-city

sample, and by $119 in the small-city sample. Although, as mentioned above, previous studies have not examined the individual effect of TELs, in their analyses of the restrictiveness of TELs, these studies have excluded full disclosure from any of the categories based on the assumption that this type of limitation is "procedural rather than revenue or expenditure focus" and, accordingly, relatively non-constraining in nature (Joyce & Mullins, 1991; Mullins, 2004, p. 123; Mullins & Joyce, 1996). Since the present analysis has demonstrated the importance of full disclosure on municipal user charge reliance, previous studies that excluded full disclosure from the analysis of non-binding TELs may have produced biased results due to measurement errors.

Finally, an expanded analysis among the 724 cities between 1970 and 2004 reveals that the larger the number of the limitations, the greater the amount of per capita user charges a city collects. The magnitude of the effect is larger under the 2SLS model than under the OLS model. The OLS result also shows that the share of user charges in municipal own-source revenue decreases as the number of limitations increases and the relationship reverses when the number of limitations reaches three. However, this finding is not supported using the 2SLS approach.

The analysis of the causes of the increased utilization of user charges invited an investigation of the consequences of such changes in revenue mechanisms. This formed the purpose of Chapter 3. With a focus on two specific public programs—the sewer service and parks and recreation service, Chapter 3 examined a panel of 686 municipalities for the sewer service and 715 cities for the parks and recreation service with populations over 25,000 for the period of 1972 through 2004. Following Bierhanzl and Downing's (1998) conceptual framework, I find that a 10% increase in the share of

user charges in total sewerage spending leads to a 2.2% reduction in total sewerage spending, and that this reduction effect is also found in parks and recreation services although the magnitude of the effect is smaller (a 1% reduction). These findings are basically consistent with previous studies. In addition, this study also finds that municipal expenditure levels and total dollar amount of a specific charge revenue is positively correlated with each other. This result may still serve as evidence of possible budget maximizing behavior on the part of bureaucrats or an indication of a flypaper effect.

The results of this dissertation research raise several broad policy implications. One of the primary implications of this study is that state-imposed TELs have profound influences on municipal revenue structures. In particular, TELs have substantially augmented the utilization of user charges in municipalities and may lead to a bigger government. These influences could be unintended consequences for many states. In a democratic society, TELs may serve as a means to protect the general public from excessive levels of government spending and taxing that are higher than the public actually prefers or needs. On that part of public officials, TELs also perform the function of promoting political accountability in governments. However, when this fiscal institution is imposed by a higher level of government (originated either through voters or legislators) on a lower level of government, for example, imposed by a state government on municipal governments within the state, local political autonomy in terms of taxing and spending authorities may be hindered.

In the United States, municipalities, along with other units of local governments, are legal creatures of the states, directly or indirectly, established in accordance with state constitutions and statutes. This legal arrangement has been reinforced by Dillon's Rule

which asserts that municipalities only have the powers that are expressly granted to them by the state legislature—that is, those powers that are necessarily implied from that grant of power and those that are essential and indispensable to the municipality's existence and functioning. Any ambiguities in the legislative grant of power should be resolved against the municipality according to the Dillon's Rule (Frug, Ford, & Barron, 2006). This implies that local communities must derive their powers from the state rather than the local electorate and the state can expend or contract these same powers at any given time. In particular, Dillon's Rule is considered a critical limitation on local government fiscal activity. Although several states have altered Dillon's Rule by granting "home rule" charter powers to certain localities, including municipalities, where local governments can act in all areas unless state law specifically prohibits those actions, fiscal activities of local governments often fall into the most restricted areas (Mikesell, 2007).

Due to different social, political, and economic characteristics, the fifty states vary widely in the way they exercise control or oversight over local governments. Some states have granted local governments extensive discretionary authority, whereas others treat local governments simply as appendages of the state governments (Krane, Hill, & Rigos, 2001). Municipal governments, on one hand, must operate within the legal boundaries set by the states, which constrain their ability to raise revenue; on the other hand, there is a request to practice local autonomy, especially fiscal autonomy, in order to effectively or efficiently respond to the needs of their residents. Supporters of localism claim that local governments are the most efficient providers of certain public services. As service providers, municipal governments must have the necessary discretion to raise revenues from their citizens without significant interference from federal or state governments

(Bird, 1993). Moreover, since local governments are closer to their citizens, they can better reflect citizen desires and encourage them to participate in public affairs, thus, promoting democratic values and practices (Brunori, 2003; Frug, 1980). Some scholars propose that local governments should not only be permitted to access various revenue sources, but also be encouraged to exploit the sources that are best equipped for them. Nevertheless, caution must be exercised that municipal revenue generation should not seriously undercut the revenue base of state governments, especially those tax bases that generate state revenues for dealing with cross-jurisdictional issues such as income inequalities, environmental protection, and so forth.

During an era of tax and expenditure limitations when the traditional local revenue source—property taxes—have been severely constrained, the revenue potential of user charges makes this financing mechanism especially attractive to these fiscally challenged local government officials. User charges are one of the few areas in which most municipal governments can still autonomously exercise their taxing authorities without significant state government interventions. An adequate level of utilization of user charges can provide a robust source of revenue that is generally accepted by voters and politicians. The increased reliance on user charges can also further diversify municipal revenue sources and help improve fiscal performance by stabilizing revenue streams and reducing the risks associated with dependence on one or a few revenue sources. Although user charges themselves may be more volatile in the revenue stream over the business cycle, they may be able to vary in ways that counter other forms of local revenues. Having volatile sources of revenue and few options for alternative funding sources limits the flexibility of public managers in dealing with fiscal stress

brought about by economic downturns, intense competition, and changing public demands. Public programs and activities that are largely self-supported by user charges are less likely to suffer the inevitable budget cuts and reductions in services that occur during periods of fiscal austerity. In this sense, a diversified revenue structure with an adequate level of utilization of user charges can avoid or alleviate such risk and strengthen local control over taxing and spending decisions instead of seeking support through increased state aid.

The preceding analysis also suggests that user charge financing could lead to lower level of public expenditure than the tax financing method. With a proper pricing structure, user charges can provide a clear demand signal to decision makers in the public sector and assist them in deciding what to produce, how to produce it, and for whom to produce it. User charges can also enable the consumers to see a direct connection between the payment rendered and service received, thus reducing the possibility of overconsumption of publicly provided goods and services. However, care must be taken to ensure that low-income persons are not adversely affected by user charge systems. One suggestion offered by ACIR is to use a combination of general taxation and user charges to finance specific services so that a subsidy from general revenues can be provided to disadvantaged individuals or groups of consumers while other consumers paying the full price of services. However, some argue that government subsidy is not a good solution since all users of the service benefit regardless of economic status or needs. A better solution, as they proposed, is to charge a price for public service and then adjust that price in consideration of special circumstances such as a low or zero price for minimal levels of public service with additional service available at a specific rate. Others suggest

discounts offered to target groups or varying charges based on median family income in a neighborhood (Pascal, 1984; Zorn, 1991). Overall, a responsive government must ensure that user charges are implemented efficiently, equitably, and effectively.

Since a number of questions are beyond the scope of this study, further research is necessary to fully understand the causes and consequences of user charge reliance. For instance, how do municipal governments make decisions in selecting charge financed services? What are the political obstacles in implementing user charges? How does intergovernmental competition affect user charge reliance? Has the quality of service been improved under the charge financing system? Does municipal revenue system become more regressive with increased use of user charges? These questions point the way for future work.

Appendices

Appendix A: Supplemental Information for Chapter 2

Table A.1 Number of Municipalities in the Samples by Year

Year	Full Sample	Large-City Sample	Small-City Sample
1970	722	65	100
1971	724	65	100
1972	724	65	100
1973	721	64	98
1974	723	65	99
1975	724	65	100
1976	724	65	100
1977	723	65	99
1978	721	65	100
1979	724	65	100
1980	724	65	100
1981	723	65	100
1982	724	65	100
1983	722	65	100
1984	719	65	100
1985	722	65	100
1986	720	64	100
1987	721	65	100
1988	722	65	100
1989	708	65	97
1990	708	65	97
1991	710	65	97
1992	724	65	100
1993	662	65	85
1994	661	65	85
1995	660	65	86
1996	660	65	86
1997	719	65	100
1998	496	65	86
1999	496	65	86
2000	467	65	82
2001	328	65	26
2002	506	65	88
2003	322	65	23
2004	458	65	100
Total Observations	*23,012*	*2,273*	*3,220*

Table A.2 Number of Municipalities in the Sample by State

State	Census Region	Full Sample	Large-City Sample	Small-City Sample
Alabama	South	13	0	3
Alaska	West	1	1	0
Arizona	West	8	3	0
Arkansas	South	8	0	0
California	West	110	13	2
Colorado	West	11	3	0
Connecticut	Northeast	16	0	4
Delaware	South	1	0	0
Florida	South	27	3	3
Georgia	South	12	1	3
Hawaii	West	1	1	0
Idaho	West	4	0	0
Illinois	Midwest	46	1	3
Indiana	Midwest	19	0	3
Iowa	Midwest	15	0	3
Kansas	Midwest	9	1	2
Kentucky	South	6	2	0
Louisiana	South	10	2	1
Maine	Northeast	3	0	0
Maryland	South	4	1	1
Massachusetts	Northeast	35	1	11
Michigan	Midwest	38	1	8
Minnesota	Midwest	19	2	5
Mississippi	South	7	0	1
Missouri	Midwest	14	2	3
Montana	West	3	0	0
Nebraska	Midwest	3	1	0
Nevada	West	3	1	0
New Hampshire	Northeast	3	0	1
New Jersey	Northeast	26	1	8
New Mexico	West	6	0	0
New York	Northeast	26	2	1
North Carolina	South	15	2	3
North Dakota	Midwest	4	0	0
Ohio	Midwest	38	4	11
Oklahoma	South	11	2	3
Oregon	West	6	1	1
Pennsylvania	Northeast	19	2	3
Rhode Island	Northeast	7	0	0
South Carolina	South	7	0	1
South Dakota	Midwest	2	0	0
Tennessee	South	9	1	1
Texas	South	41	7	0
Utah	West	5	0	1
Vermont	Northeast	1	0	0

Virginia	South	12	1	0
Washington	West	11	1	1
West Virginia	South	5	0	1
Wisconsin	Midwest	22	1	8
Wyoming	West	2	0	0
Total Number of Cities		*724*	*65*	*100*

Table A.3 TELs and User Charges by Region, 2004

	Northeast	Midwest	South	West	Total
Cities, total	75 (16%)	137 (30%)	123 (27%)	123 (27%)	458 (100%)
Cities with TELs	59 (79%)	112 (82%)	123 (100%)	122 (99%)	416 (91%)
Cities with potentially binding TELs	49 (65%)	98 (72%)	71 (58%)	114 (93%)	332 (72%)
User charges, total ($mil)	$175.8	$65.4	$167.6	$185.3	$143.2
User charges, per capita ($)	$506.4	$520.4	$945.0	$674.8	$673.6
User charges, % of own-source revenue	28.3%	39.1%	48.1%	39.4%	39.8%

Note: Numbers in parentheses indicate percentage of total (458) sample cities or percentage of cities in each region in 2004.

Source: Author's calculations from Census data and Mullin & Wallin (2004).

Table A.4 Number of Cities with Populations Over 25,000 in 2004

Regions	**Total**	**Cities with TELs**	**Percentage**
Northeast	161	134	83%
Midwest	344	302	88%
South	354	351	99%
West	388	387	100%
Total	*1,247*	*1,174*	*94%*

Source: Author's calculations from the *2002 Census of Governments, Volume 1, Number 1, Government Organization,* Table 7.

Table A.5 Descriptive Statistics of the Large-City Subsample

Variables	Mean	Std. Dev.	Min.	Max.
Dependent Variables				
User charges per capita ($)	581.87	496.04	28.37	2957.41
User charges as % of own-source revenue	37.34	16.38	2.96	82.06
Independent Variables				
TELs	0.89	0.32	0.00	1.00
Number of TELs	2.01	1.25	0.00	5.00
Potentially binding TELs	0.61	0.49	0.00	1.00
Non-binding TELs	0.28	0.45	0.00	1.00
Overall property tax rate limits	0.32	0.47	0.00	1.00
Specific property tax rate limits	0.53	0.50	0.00	1.00
Property tax levy limits	0.38	0.49	0.00	1.00
Assessment increase limits	0.25	0.43	0.00	1.00
General revenue limits	0.04	0.19	0.00	1.00
General expenditure limits	0.23	0.42	0.00	1.00
Full disclosure	0.26	0.44	0.00	1.00
Taxes per capita ($)	662.81	403.10	129.15	3547.66
Taxes percentage (%)	49.50	16.31	10.79	90.20
IGR per capita ($)	513.59	557.22	0.93	3142.87
IGR percentage (%)	23.95	13.81	0.14	76.07
Debt per capita ($)	2671.64	1915.01	37.43	12846.18
Debt percentage (%)	188.06	88.74	9.33	738.28
Expenditure mix (%)	40.98	14.49	5.79	85.28
Optional tax	0.98	0.15	0.00	1.00
Special districts	40.25	59.39	0.00	465.00
Population	670158.40	1015743.00	48081.00	8084316.00
Per capita income ($)	19265.86	4274.34	8855.00	49736.00
Council-manager city	0.47	0.50	0.00	1.00
Instrumental Variables				
Passage rate	0.22	0.28	0	1
Land area (square miles)	180.07	225.33	23.50	1732.00
Business receipts (mil$)	67075.02	132386.20	1421.93	1623416.00
Unemployment rate (%)	6.12	2.48	1.80	18.50
Non-white (%)	31.97	17.25	1.00	87.70
Age 18 and under (%)	26.12	3.49	14.60	35.00
Age 65 and over (%)	10.80	3.04	2.00	17.90
Owner-occupied housing (%)	51.36	9.78	20.50	70.00
Central city	0.98	0.12	0.00	1.00

Note: Total 2,273 observations.

Table A.6 Descriptive Statistics of the Small-City Subsample

Variables	Mean	Std. Dev.	Min.	Max.
Dependent Variables				
User charges per capita ($)	501.34	577.03	1.75	4167.22
User charges as % of own-source revenue	37.31	21.56	0.51	91.14
Independent Variables				
TELs	0.77	0.42	0.00	1.00
Number of TELs	1.35	1.00	0.00	4.00
Potentially binding TELs	0.48	0.50	0.00	1.00
Non-binding TELs	0.28	0.45	0.00	1.00
Overall property tax rate limits	0.20	0.40	0.00	1.00
Specific property tax rate limits	0.46	0.50	0.00	1.00
Property tax levy limits	0.33	0.47	0.00	1.00
Assessment increase limits	0.09	0.28	0.00	1.00
General revenue limits	0.03	0.18	0.00	1.00
General expenditure limits	0.08	0.27	0.00	1.00
Full disclosure	0.16	0.37	0.00	1.00
Taxes per capita ($)	548.28	394.60	16.24	3422.31
Taxes percentage (%)	50.18	21.96	3.40	98.79
IGR per capita ($)	365.79	323.88	0.00	2661.74
IGR percentage (%)	23.78	13.19	0.00	87.60
Debt per capita ($)	1460.27	1638.50	0.00	14946.14
Debt percentage (%)	135.89	127.47	0.00	2825.37
Expenditure mix (%)	38.49	18.72	3.08	98.45
Optional tax	0.63	0.48	0.00	1.00
Special districts	18.71	21.03	0.00	196.00
Population	36890.48	7535.85	25067.00	74315.00
Per capita income ($)	19629.28	6766.88	9918.00	80149.00
Council-manager city	0.47	0.50	0.00	1.00
Instrumental Variables				
Passage rate	0.16	0.28	0	1
Land area (square miles)	17.49	12.53	1.00	85.60
Business receipts (mil$)	5361.98	9963.46	56.36	147846.10
Unemployment rate (%)	6.00	2.99	0.70	20.50
Non-white (%)	12.52	14.15	0.10	83.90
Age 18 and under (%)	25.14	3.59	10.50	39.70
Age 65 and over (%)	13.09	3.57	3.00	21.50
Owner-occupied housing (%)	61.21	12.45	13.40	93.90
Central city	0.43	0.50	0.00	1.00

Note: Total 3,220 observations.

Table A.7 Effects of TELs on User Charge Reliance in 724 Sample Cities, 1970-1997 (TELs treated exogenously)

	(1) User Charges Per Capita	(2) User Charge Percentage
TELs	119.180	-0.135
	(36.073)***	(0.497)
Taxes [a]	0.269	-0.529
	(0.066)***	(0.037)***
IGR [a]	0.053	0.033
	(0.030)*	(0.012)***
Debt [a]	0.037	-0.016
	(0.013)***	(0.002)***
Expenditure mix (%)	8.588	0.191
	(1.415)***	(0.022)***
Optional tax	96.943	1.056
	(25.473)***	(0.608)*
Special districts	0.139	0.011
	(0.351)	(0.004)**
Population (ln)	131.393	-1.097
	(71.413)*	(1.094)
Per capita income (ln)	-108.830	1.372
	(44.853)**	(0.681)**
Council-manager city	7.573	-0.466
	(27.110)	(0.610)
Constant	-597.981	56.837
	(742.289)	(12.070)***
R-square	0.397	0.868

Note: Total 19,939 observations. Standard errors in parentheses are adjusted for clustering within states; * significant at the 10% level; ** significant at the 5% level; and *** significant at the 1% level. All specifications include city-fixed effects.

[a] Taxes per capita, IGR per capita, and debt per capita for column (1); taxes percentage, IGR percentage, and debt percentage for column (2).

Table A.8 Effects of TELs on User Charge Reliance in 724 Sample Cities, 1970-1997 (TELs treated endogenously)

	(1) User Charges Per Capita	(2) User Charge Percentage
TELs	547.763 (257.483)**	2.211 (1.471)
Taxes [a]	-0.110 (0.518)	-0.413 (0.130)***
IGR [a]	-0.239 (0.516)	-0.136 (0.104)
Debt [a]	0.059 (0.024)**	-0.013 (0.002)***
Expenditure mix (%)	-46.193 (32.840)	-0.191 (0.207)
Optional tax	71.673 (62.114)	0.651 (1.348)
Special districts	-1.054 (0.778)	0.003 (0.010)
Population (ln)	-157.157 (164.655)	-4.096 (1.554)***
Per capita income (ln)	15.712 (62.384)	0.316 (1.232)
Council-manager city	-49.751 (77.658)	-1.075 (1.072)
First-stage F-statistic	14.290	13.510
Overidentifying restrictions *J*-test and *p*-value	8.443 (0.133)	11.453 (0.043)**
Hausman endogeneity test	109.720***	79.990***
Endogenous variables	TELs, Taxes, IGR, and Expenditure mix	
Instrumental variables	Passage rate, Land area (ln), Business receipts (ln), Unemployment rate, Non-white, Age 18, Age 65, Owner-occupied housing, and Central city	

Note: Total 19,939 observations. Standard errors in parentheses are adjusted for clustering within states; * significant at the 10% level; ** significant at the 5% level; and *** significant at the 1% level. All specifications include city-fixed effects.

[a] Taxes per capita, IGR per capita, and debt per capita for column (1); taxes percentage, IGR percentage, and debt percentage for column (2).

Appendix B: Supplemental Information for Chapter 3

Table B.1 Number of Municipalities in the Samples by Year

Year	Number of Cities for Sewer Service	Number of Cities for Parks and Recreation Service
1972	677	698
1973	677	696
1974	686	704
1975	680	704
1976	675	703
1977	667	707
1978	664	715
1979	666	707
1980	663	707
1981	657	703
1982	648	702
1983	651	706
1984	640	697
1985	644	702
1986	621	700
1987	629	697
1988	618	700
1989	611	689
1990	626	690
1991	633	691
1992	647	703
1993	597	640
1994	603	641
1995	592	639
1996	598	642
1997	651	699
1998	599	644
1999	602	644
2000	569	612
2001	377	415
2002	615	667
2003	365	400
2004	556	598
Total Observations	*20,404*	*21,962*

Table B.2 Number of Municipalities in the Samples by State

State	Census Region	Number of Cities for Sewer Service	Number of Cities for Parks and Recreation Service
Alabama	South	12	13
Alaska	West	0	1
Arizona	West	8	8
Arkansas	South	7	8
California	West	88	110
Colorado	West	10	11
Connecticut	Northeast	17	16
Delaware	South	1	1
Florida	South	27	27
Georgia	South	12	12
Hawaii	West	1	1
Idaho	West	4	4
Illinois	Midwest	41	37
Indiana	Midwest	19	19
Iowa	Midwest	15	15
Kansas	Midwest	9	9
Kentucky	South	6	6
Louisiana	South	10	10
Maine	Northeast	3	3
Maryland	South	4	4
Massachusetts	Northeast	33	35
Michigan	Midwest	38	38
Minnesota	Midwest	19	19
Mississippi	South	7	7
Missouri	Midwest	11	14
Montana	West	3	3
Nebraska	Midwest	3	3
Nevada	West	3	3
New Hampshire	Northeast	3	3
New Jersey	Northeast	24	27
New Mexico	West	6	6
New York	Northeast	25	26
North Carolina	South	13	15
North Dakota	Midwest	4	4
Ohio	Midwest	38	38
Oklahoma	South	11	11
Oregon	West	6	5
Pennsylvania	Northeast	21	19
Rhode Island	Northeast	7	7
South Carolina	South	7	7
South Dakota	Midwest	2	2
Tennessee	South	9	9
Texas	South	41	41
Utah	West	5	5

Vermont	Northeast	1	1
Virginia	South	12	12
Washington	West	11	11
West Virginia	South	5	5
Wisconsin	Midwest	22	22
Wyoming	West	2	2
Total Number of Cities		*686*	*715*

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