PROPERTY TAX RELIEF, ADDITIONAL REVENUE, OR TAX MIMICKING?

THE ADOPTION AND BUDGETARY EFFECTS OF THE GENERAL-PURPOSE LOCAL OPTION SALES TAX IN GEORGIA COUNTIES

by

ZHIRONG ZHAO

(Under the Direction of Laurence J. O’Toole)

ABSTRACT

Since the 1970s, local governments in Georgia have been authorized, upon voter approval, to levy a one-percent general-purpose Local Option Sales Tax (LOST), which is earmarked for property tax relief. Using socioeconomic and fiscal data during the period 1975-2002, this dissertation examines the adoption and budgetary effects of the LOST in Georgia counties.

The adoption of the LOST is studies with a discrete-time event history analysis. The results suggest that the probability that an eligible county will adopt the LOST is determined by a set of motivations, obstacles, and resources. The motivations are related to the perceived property tax level, the existence of fiscal pressure, and the potential of sales tax exportation. The obstacles are related to existing sales tax rates and the level of tax competition. The resources for overcoming these obstacles are related to the tax mimicking behavior in the process of policy diffusion. Budgetary effects of the LOST are examined with pooled time-series regressions. The results suggest that (1) the rollback of property tax millage rates by the LOST is gradually offset by a faster growth of the rates in the post-LOST period; (2) the LOST proceeds are fungible, as they lead to higher levels of revenue and expenditure in the counties; and (3) the levels of fungibility vary across counties in accordance with their fiscal and socioeconomic conditions.

INDEX WORDS: Local option sales tax, Property tax relief, Policy innovation, Policy diffusion, Earmarking, Tax mimicking
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REFERENCES
CHAPTER 1: INTRODUCTION

Since the 1970s, local governments in Georgia are authorized to adopt a one percent general-purpose Local Option Sales Tax (LOST), upon voter approval. The LOST Act requires that the proceeds of the LOST be used to roll back local property taxes to be collected in the next year. Two more decades have passed and all but five counties in Georgia have adopted the tax. However, local fiscal behavior in response to the LOST, for the most part, remains unexamined. This dissertation examines the adoption and budgetary effects of the general-purpose Local Option Sales Tax in Georgia counties. Two research questions are addressed – one is what determines whether and when a county will adopt the tax; the other is how the proceeds of the tax have been used.

The chapter begins with the background of property tax relief programs. The second section discusses local option taxes as alternative sources of revenue to the property tax. In the third section the research questions are addressed. The final section presents the organization of the dissertation.

1.1 Property Tax Revolt and Property Tax Relief Programs

The property tax, long the mainstay of local government finance in the United States, is still the single most important own-source revenue for local governments. However, local reliance on the property tax has declined dramatically in recent decades. In 1970, property taxes comprised 84 percent of local government tax collections. This share fell to 75 percent in 1994 (National Conference of State Legislatures, 1997). The decline in reliance

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1 Five counties, Cobb, Cherokee, DeKalb, Gwinnett, and Rockdale, do not levy the LOST. In other five counties, Bulloch, Habersham, Houston, Mitchell, and Rabun, the LOST is earmarked for the county school system, instead of property tax relief (Consortium for Educational Research in Georgia, 2001).

2 The property tax accounted for about half of total state and local tax collections by the mid 1940s. In 2001, it accounted
on property tax has been brought about by several changes over the past 25 years, the most important of which has been the “property tax revolt” (Shuford & Young, 2000).

According to public opinion polls, the property tax has always been “the least popular” tax (Advisory Commission on Intergovernmental Relations, 1994). The property tax is disliked for several major reasons: its high visibility, administrative difficulties in assessments, the imperfect association between homeowner income and tax liabilities over time, and fiscal disparities across jurisdictions (McGuire, 2001; Oates, 2001).

Since the late 1970s, there has been sustained resistance and opposition by taxpayers at the local level to new taxes or increases to existing rates. For the most part, the “tax revolt” was targeted at the property tax. For example, in 1978, California voters enacted Proposition 13 by a vote of 65 percent to 35 percent. Proposition 13 reduced local property tax revenues in California by half virtually overnight by capping property tax rates at one percent and rolling back property values for tax purposes to the 1975-76 level. In addition, it capped annual increases in property tax bills at two percent, and specified that property tax values are to be reassessed only when property changes ownership. Proposition 13 also made raising taxes more difficult by requiring state tax increases to receive the approval of two-thirds of the legislature and by imposing restrictions on the taxing authority of local governments.3

In 1980, voters in Massachusetts approved Proposition 2-1/2. This proposition contains two limitations on local property taxes. First, the amount of property tax can never exceed

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2-1/2 percent of the full cash value of all taxable property in a city or town. Second, the annual increase in the property tax levy cannot exceed 2-1/2 percent, with certain exceptions for new growth, or through overrides and exclusions as adopted by the voters (Fountain & Susskind, 1983).

Soon after the adoption of Proposition 13 and Proposition 2-1/2, many other states also enacted policies designed to reduce their property tax burden (Gold, 1979). The property tax relief programs (PTR) take many forms. Some, such as Proposition 13 in California and Proposition 2-1/2 in Massachusetts, provide general limitations on property tax level or growth of expenditure. Others, however, are granted to specific individuals, institutions, or types of properties. Examples include different kinds of credits or exemptions for residential property, based often on income and/or age of residents; exemption for property held by religious, educational, charitable, or nonprofit organizations; and property tax abatements on commercial or industrial properties to promote local economic development (Mikesell, 1999; Oates, 2001). Extensive studies have been conducted on these PTR programs, particularly on tax and expenditure limits (TELs) and state-funded credits/exemptions to homeowners, and knowledge has accumulated about corresponding local fiscal behavior (Duncombe & Yinger, 2001; O'Sullivan, 2001).

Another category of PTR programs, however, has been for the most part neglected in this literature. In recent decades, some states authorized their local governments to levy local option sales or income taxes, with the proceeds earmarked to reduce the property tax
burden. These programs tend to be overlooked when scholars categorize PTR programs,¹ and very few related studies have been published.

1.2 Local Option Taxes as Alternative Sources of Revenue

Since the property tax revolt in 1970s, local governments have struggled to find alternative revenues to fund their services. The three primary local alternatives to the property tax are sales taxes, income taxes, and user charges and fees. Local sales taxes and income taxes, commonly called local option taxes, are the major general-purpose alternatives to the property tax (Ulbrich, 1991), while user charges and fees are limited by the fact that they are tied to services to which access can be denied (McGuire, 2001).

Local sales tax is the second-largest tax source for local governments in the United States (Due & Mikesell, 1994). In 1995, thirty-three of the 45 states with sales taxes allow one or more types of local governments to levy sales taxes.⁵ Local income taxes are used on a smaller scale. In 1995, fifteen states allowed at least one local government to impose a local tax based upon income. In two among these states, Arkansas and Georgia, no localities have adopted the tax (National Conference of State Legislatures, 1997).

With local option taxes, tax structures of local governments become more flexible and responsive to changing local economic circumstances, legal challenges, or political action (Shannon, 1987).⁶ In particular, local sales and income taxes are often adopted to provide

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¹ For instance, this type of PTR was not included by Mikesell (1999) or Oates (2001) when they tried to categorize PTR programs. Local sales and income taxes were covered in Gold (1979), but were only analyzed as alternative revenues, not as earmarked measures of property tax relief.

² Twenty-three of the 33 states with local sales taxes provide authority to both cities and counties. Five states allow counties but not cities to levy sales taxes, while one state allows cities but not counties to impose a sales tax (National Conference of State Legislatures, 1997).

⁶ Not all scholars agree with this point. For instance, the fiscal illusion theory holds that diversification of revenue sources leads to inefficient and over-large governments (Oates, 1988).
additional revenues; in fact, most of these taxes were authorized when local governments encountered fiscal stress (Shuford & Young, 2000).

In addition, local option taxes are also authorized to reduce the property tax burden. To the extent that these taxes pay for local service delivery that would otherwise have been paid by property tax, the diversification preempts the increase of property tax burden (Krmencic, 1991). Furthermore, some states mandate that part or all of the proceeds of local option taxes be used for property tax relief. Indiana’s local income tax, for instance, is part of a property tax relief package, which involves limitation on local taxes and increased aid to local governments (Gold, 1979). Even more common is property tax relief provided by local sales taxes. As is the case in Georgia, state laws in Wisconsin mandate that the full amount of LOST proceeds be used to roll back the property tax in the next year (Wisconsin Taxpayers Alliance, 2002). In South Carolina, 63 percent of the first-year LOST revenues should be used for property tax rollback, and the portion increases annually up to 71 percent for the fifth and subsequent years (Ulbrich, 1996).\(^7\)

Despite the increasing popularity of earmarking local option taxes for property tax relief, few studies have been conducted to examine their adoption and budgetary effects.

### 1.3 Research Questions

The LOST Act in Georgia authorizes local governments to adopt a one percent sales and use tax, upon voter approval. The legislation also requires that all LOST proceeds be used to roll back local property tax in the next year. This dissertation examines the

adoption and budgetary effects of the LOST in Georgia counties. There are two research questions: one is about the factors that determine the adoption of the LOST in a county, and the second is how the proceeds of the tax have been used.

Whether a county will adopt the LOST can be attributed to both internal and external forces. On the one hand, the propensity of the adoption in a county may be determined by socioeconomic or political factors. The tax is more likely to be adopted in a county if (a) the property tax burden is perceived to be high, (b) the county encounters fiscal pressure, or (c) there is a potential of sales tax exportation. On the other, some counties may choose to adopt the tax just because others have already done so. County governments may emulate tax policies in their neighboring jurisdictions, or in other counties that are treated by them as references (Case, Rosen, & Hines, 1993). In this study, the factors influencing the LOST adoption are explored through a discrete-time event history analysis.8

City and county governments in Georgia are required to use LOST proceeds to roll back local property tax. However, arguments remain about the real purpose (or purposes) of the LOST. This study examines how LOST revenues were actually used in Georgia counties—in particular, to what extent they have been used to reduce the property tax burden or, alternatively, as additional revenues. Furthermore, the study analyzes the effects of the LOST over time and across counties. First, the effects of the LOST as property tax relief may not be long lasting, as suggested by previous studies of earmarked revenues. Second, counties vary in their use of LOST proceeds. The variations are probably tied to the counties’ fiscal conditions, the extent of tax exportation, and the relative property tax levels in neighboring counties.

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8 Event history analysis will be discussed in chapter 4.
The adoption and budgetary effects of the LOST are closely tied together. Because both are affected by a similar set of factors, they may interact with each other in the dynamic policy process. Testing the adoption and budgetary effects of the LOST in one conceptual framework enhances the ability of this dissertation to answer both questions.

This study contributes to the literature about local government fiscal behavior in several ways. First, previous studies of innovation and diffusion in the U.S. have focused almost exclusively at the state level. The adoption of the LOST in Georgia provides an opportunity to study policy innovation at the local level. Second, the study not only examines the general effects of the LOST, but also tracks its variations over time and across space. The longitudinal analysis reveals the dynamic effects of earmarking; the cross-sectional analysis explores the comparative features of fiscal decision-making in local governments.

The study has policy implications as well. Knowing the factors influencing the adoption of a LOST, policy entrepreneurs can better assess the “policy windows” (Kingdon, 1984), and adjust their strategies in order to make policy changes (Singer, 1987). On the other hand, knowing the actual effects of the LOST, the public can make an informed decision when it cast its votes in the LOST referenda.

1.4 Organization of the Study

The dissertation is organized as follows. The next chapter provides a brief description of the general-purpose Local Option Sales Tax (LOST) in Georgia. The third chapter reviews past research on related topics. It includes discussions about the determinants of state and local revenue structure, innovation and diffusion of revenue policies, and the effectiveness of property tax relief programs. The fourth chapter develops research
hypotheses, and discusses data and statistical methods used in the analysis. The fifth chapter presents research findings. The final chapter summarizes the findings, addresses policy implications, and discusses limitations and directions for future study.
CHAPTER 2: THE GENERAL-PURPOSE LOCAL OPTION SALES TAX (LOST) IN GEORGIA

This chapter begins with an overview of own-source revenues that are available for Georgia counties, with emphasis on the property tax and local option sales taxes. The second section briefly describes the history of the general-purpose Local Option Sales Tax (LOST) in Georgia. The third section presents the longstanding arguments about the purpose (or purposes) of the LOST. In the final section, policy issues about local option sales taxes are briefly addressed.

2.1 The Structure of Own-source Revenues (OSRs) in Georgia Counties

Local governments’ own-source revenues (OSRs) come from taxes and nontax revenues. The property tax is the dominant source of tax revenue, while local sales taxes compose the bulk of nonproperty taxes. Various miscellaneous taxes are also collected.

All county governments in Georgia impose the property tax. The tax is levied on real property, tangible personal property, and some intangible personal property. General law stipulates that real and tangible personal property be assessed at 40 percent of its fair market value, unless otherwise specified. The rate is stated in “mills,” with 10 mills equal to 1 percent of a property’s assessed value. County property tax (millage) rates are set each year by the county governing authorities by dividing the amount of money the county needs from property taxation by the total value of the property digest (Clements & Weeks, 1997). The share of property tax in OSRs ranges from 30 percent to 80 percent in Georgia counties. The average share, however, has been relatively stable in recent decades. It ranges from 43 percent to 53 percent from FY 1985 to FY 2002.10

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9 Localities in which the property tax assessed rates are higher than 40 percent in 1971 may continue to do so. In addition, there are preferential assessments for certain types of property (Clements & Weeks, 1997).
10 The descriptive statistics are based on the Local Government Finance Survey conducted by Georgia Department of Community Affairs since 1985.
Besides a four percent state sales tax, Georgia counties have enacted several types of local option sales taxes, including the general-purpose Local Option Sales Tax (LOST), Special Purpose Local Option Sales Tax (SPLOST), Metropolitan Area Rapid Transit (MARTA) sales tax, and Homestead Option Sales Tax (HOST).\textsuperscript{11} LOST and SPLOST are the two most popular local option sales taxes in Georgia counties. By the end of 2002, 149 counties in Georgia had adopted the LOST, and 136 counties had ever collected the SPLOST (Sjoquist, 2003).\textsuperscript{12} The volume of total sales taxes (mostly LOST and SPLOST) has increased steadily over recent decades. The share of total sales taxes in counties’ OSRs rose from 12 percent in FY 1985 to 34 percent in FY 2002.

Other taxes imposed by county governments include alcoholic beverage taxes, insurance payment taxes, hotel-motel taxes, franchise payment taxes, business and occupation taxes, and other excise and special use taxes (Clements & Weeks, 1997). Although most counties have utilized one or more of these taxes, they are not as significant as the property tax and sales taxes as a percentage of OSRs. The share of these revenues in the OSRs ranges from 13 percent to 16 percent from FY 1985 to FY 2002.

Georgia counties also collect nontax revenues. In addition to all sorts of charges and fees, nontax revenues also include interest earnings on investments, fines, forfeitures, sales of contraband property, and court fees (Clements & Weeks, 1997). The share of local revenue on these sources has been quite stable. From FY 1985 to FY 2002, nontax revenues account for between 15 percent and 19 percent of OSRs.

\textsuperscript{11} For a brief description of these local option sales taxes, see Clements & Weeks (1997). Educational purpose Local Option Sales Tax (ELOST) is not included in this list, because it is only available for school districts.

\textsuperscript{12} As of 2004, MARTA is levied in Fulton County and DeKalb County, and HOST is levied in DeKalb County and Rockdale County.
2.2 A Brief History of Georgia’s LOST

The general-purpose Local Option Sales Tax (LOST) Act was first passed in 1975 and amended in 1976. It permitted counties, with the approval of voters, to enact a one-percent sales and use tax,13 with revenues to be shared with cities within the county.14 The LOST Act mandated that local sales tax be used for property tax relief. The amended legislation specified that the first-year LOST revenues were to be used to roll back an equal amount of property taxes in the second year. It stated that the county government should use its share of LOST revenue to reduce property taxes in unincorporated parts of the county, while city LOST revenues were to replace at least part of the taxes on property in the city. The property tax rollback financed by LOST revenues was to be shown on property tax bills. In the second year of the LOST adoption and all the subsequent years, counties should continuously use their LOST revenues to relieve the property tax in unincorporated areas that were due the next year. City governments, however, were not required to roll back property taxes after the second year.

In late 1978, however, the differential rollbacks were ruled unconstitutional by a superior court judge. Then on February 8, 1979, the entire LOST legislation was found to be unconstitutional (Association County Commissioners of Georgia, 2002), as the Supreme Court ruled that nothing in the Georgia Constitution authorized counties to share their revenue with cities.

Subsequent to the Supreme Court’s decision, the General Assembly passed new legislation, the Local Option Sales Tax Act of 1979. The law set up 159 special tax districts that correspond to county boundaries, and it established the LOST as a joint county-city tax. The law required

13 In counties in which the county government did not enact the LOST, cities could, with voter approval, impose their own sales tax. However, no city has ever adopted the LOST independently.
14 Each city governments received a share in proportion to its share of county population, and the county government’s share was based on the percentage of population living in the incorporated areas of the county (Durning, 1992).
the proceeds to be divided among the county and all “qualified” cities\textsuperscript{15} within the county pursuant to an agreement negotiated by the county and these cities.\textsuperscript{16}

Like the 1975 LOST Act, the 1979 legislation required that all LOST revenues collected in the first year of the tax be used for dollar-for-dollar reduction of the property tax in the second year, and it required the property tax relief to be shown on property tax bills. Somewhat differently, counties would use their LOST revenues to reduce the property tax rate across the board on all taxable property in the county, including property within the incorporated areas. Taxpayers who own property in a “qualified” city also have their city property tax reduced, with revenue replaced by the city share of LOST revenue (Clements & Weeks, 1997). The legislation, however, “was less explicit about the use of LOST revenues for property tax rollbacks after the second year” (Durning, 1992).

Since the inception of the tax in 1975, the number of counties adopting it has gradually increased. As Figure 2-1 and Figure 2-2 show, a number of counties rapidly adopted the tax soon after 1975, and then the increase rate of adoption gradually leveled off. As of January 2004, all but five counties in Georgia have adopted the tax, and over half of them adopted within the first five years (Georgia Department of Revenue, 2004)

\textsuperscript{15} A city was defined as “qualified” if it imposed a tax other than the local option sales tax and offered at least three of the following local government services: (1) water; (2) sewage; (3) garbage collection; (4) police protection; (5) fire protection; and (6) library (Association County Commissioners of Georgia, 2002).

\textsuperscript{16} The 1979 LOST legislation did not specify any criteria for deciding how LOST revenues should be divided nor did it require that counties and qualified cities periodically renegotiate the distribution of LOST revenues. In 1994, the General Assembly passed legislation which amended the 1979 law to require cities and counties to periodically renegotiate their revenue distribution arrangements. This bill also established guidelines for the renegotiation process and eight criteria to be considered by the parties involved in the renegotiation process. See ACCG & GMA (1994).
Figure 2-1  The adoption of the LOST in Georgia Counties in Different Period

Figure 2-2  The adoption of the LOST in Georgia Counties by Year\textsuperscript{17}

\textsuperscript{17} Data source: Georgia Department of Revenue (2004).
2.3 The Purposes of the LOST in Georgia

Debate continues on what the LOST is intended to finance. Many proponents of the LOST argued that the legislation was enacted to reduce property taxes. They maintained that LOST revenues should be used to provide relief from high property taxes.\(^{18}\) If so, the sum of LOST and property tax revenues should not exceed the property tax revenue that would have been collected had there been no LOST. Other proponents said that the tax was needed as a source of revenue to help local governments pay for existing, more, or better services than would be possible without the tax (Durning, 1992). These two purposes are inextricably tied together. As Durning (1992: 15) argues, “to the extent that LOST revenue provides property tax relief, it does not increase local government revenues, and to the extent that it represents additional revenues for local governments, it is not used to roll back property taxes.”

The debate on the purposes of the LOST centers on the Official Code of Georgia (O.C.G.A.) § 48-8-91 and § 48-8-89. On the one hand, the legislation (O.C.G.A. § 48-8-91) requires that local governments use LOST proceeds to roll back property taxes during the second year and in “all subsequent years,” and illustrate on their tax bill the amount of property tax that have been reduced by the LOST (Association County Commissioners of Georgia & Georgia Municipal Association, 1994). On the other, the legislation (O.C.G.A. § 48-8-89 [a]) states that the LOST is to be used “for the purpose of assisting such political subdivisions in funding all or any portion of those services which are to be provided by such governing authorities pursuant to and in accordance with Article IX, Section II, Paragraph III of the Constitution of this state.”\(^{19}\)

\(^{18}\) The leading supporters of the LOST, the city and county government associations, maintained that a key purpose of the tax was to provide relief from high property taxes. According to the Georgia Municipal Association, the LOST would “allow Georgia citizens to decide whether or not they want to reduce property taxes by paying for some of their public services with a one percent sales tax” (Calvin, 1975).

\(^{19}\) The referenced provision of the Georgia Constitution lists a number of services which may be provided by local governments including police and fire protection, solid waste disposal, garbage collection, public health facilities and services, streets and
The conflicting requirements are also seen in the provisions regarding the distribution agreement. O.C.G.A. § 48-8-89 (b) contends, “It is the intent of the General Assembly that no initial agreement as to the distribution of the proceeds of the tax shall enrich any political subdivision beyond a sum which in the absence of the distribution would be raised through other sources of revenue.” This holds that LOST revenues are only used to replace property tax revenues. By contrast, O.C.G.A. § 48-8-89 (d) requires consideration of service delivery responsibilities and other factors in renegotiating distribution of the LOST proceeds. This lends weight to the argument that the LOST may be used for providing services (Association County Commissioners of Georgia & Georgia Municipal Association, 1994).

In fact, many observers agree that the LOST legislation does not require local governments to use sales tax revenues to achieve just one purpose. In an annotation to the O.C.G.A. § 48-8-91, the Attorney General stated that the intent of the legislature was that “imposition of local sales and use tax results initially in property tax relief, rather than in an automatic expansion of funds for local governmental services” (Durning, 1992:29). This statement implies that using the LOST as additional revenue was not against the intent of the legislature (Durning, 1992).

Legislative intentions aside, ACCG & GMA (1994) assert that, in almost all counties, LOST revenues are being used to finance services rather than simply to roll back property taxes. In a more cautious manner, Durning (1992: 16) argues that “almost certainly a portion of LOST revenues represents new tax revenues for at least some of the cities and counties receiving them.” The empirical test of this statement is a major part of this dissertation.

roads, parks and recreational programs, libraries, water and sewage treatment and collection (Association County Commissioners of Georgia & Georgia Municipal Association, 1994).
2.4 Policy Issues of Local Option Sales Taxes

Local option sales taxes are more popular for taxpayers and governments than the property tax for several reasons (Bahl & Hawkins, 1998; Due & Mikesell, 1994). For taxpayers, sales taxes are less visible as they are paid in small increments over a large number of transactions, while the property tax is collected in a large lump sum. In addition, sales taxes are perceived to be fairer by property tax owners as sales taxes shift part of the tax burden from property owners to consumers who make a purchase. Moreover, local option sales taxes improve local governments’ accountability to taxpayers by placing taxing and spending decisions closer to the people. This is especially important in geographically large states that encompass regions with divergent political views (National Conference of State Legislatures, 1997). For local governments, sales taxes are easier to administer than the property tax, for which the assessment procedure is especially cumbersome. Besides, sales taxes can also reach nonresidential shoppers who would not pay property taxes in a jurisdiction.

Compared with the property tax, local option sales taxes have their disadvantages as well (Bahl & Hawkins, 1998). First, many people believe that sales taxes are regressive. In the case of Georgia, the sales taxes exempt most services, which are heavily consumed by the middle and upper classes. This provides an unfair advantage to them. Besides, not all local sales taxes in Georgia have exempted food and other necessities; this fact further increases the regressivity (Sjoquist, 2003). Second, unlike income and property tax, sales taxes are not deductible from the federal income tax; this feature disproportionately burdens local taxpayers.

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20 Scholars disagree with each other about the regressivity of sales taxes in general. Musgrave and Musgrave (1989) considered sales taxes vertically inequitable. Poterba (1989) argues, however, that the lifetime incidence of sales taxes can be close to proportional.
where sales taxes are heavily used.\textsuperscript{21} Third, sales taxes are less stable than the property tax, as the proceeds tend to fluctuate over the economic cycles.

In addition, local option sales taxes raise concerns of horizontal and vertical tax competition. First, local sales taxes can create intense competition for retail development. On the one hand, it may encourage overbuilding of retail space, as local governments approve new projects in hopes of collecting revenues from residents, especially those from surrounding jurisdictions (National Conference of State Legislatures, 1997). On the other, the development of retail centers, along with the related workforce, redistribute the tax base across jurisdictions. It may increase disparities among localities. Second, there is vertical tax competition between counties and the state in that local option sales taxes may reduce state flexibility. The state law of Georgia limits the total rate of state and local sales taxes to a maximum of seven percent (Georgia Department of Revenue, 1996). For many localities in Georgia, the combined sales tax rate has reached or is approaching the limit. The existence of multiple local option sales taxes may restrict the state’s flexibility for approving new levies or making new exemptions.

In sum, local option sales taxes, as alternative sources of revenue to the property tax, have their advantages and disadvantages. First, local option sales taxes are favored for low visibility, easy administration, the perceived “fairness,” and the potential of tax exportation. Second, local option sales taxes are more regressive, not deductible from the federal income tax, and relatively unstable. Third, local option sales taxes raise several intergovernmental concerns. These features are assumed in this study to affect both the adoption and budgetary effects of the LOST in Georgia counties.

CHAPTER 3: LITERATURE REVIEW

The LOST in Georgia has two major features. First, it is optional. Local governments in Georgia can make their own decisions whether and when to adopt the tax, given voter approval. Second, it is earmarked for property tax relief. Despite the arguments about whether the LOST can be used as additional revenue, there is no doubt that property tax relief is one designated purpose of the LOST.

This chapter covers related literature that sheds some light on the adoption and budgetary effects of LOST in Georgia counties. The first section reviews the determinants of revenue structure in subnational governments. The second section, more specifically, deals with models that are used to explain the adoption of new revenue sources. The third section discusses the effectiveness of general property tax relief programs, especially those funded by alternative revenue sources.

3.1 Determinants of State and Local Revenue Structure

State and local revenue structure, including the composition and level of taxation, is influenced by many factors. The following is a discussion of three major approaches to understanding possible determinants of state and local revenue structure: the Dye-Sharkansky-Hofferbert (DSH) comparative study, the median voter approach, and the multi-jurisdictional approach.

The DSH comparative study

With a shift of focus from the description of political institutions to analyses of their product, some scholars have developed a subfield of comparative policy studies (Blomquist, 1999). These studies, which especially flourished in the United States during the 1960s and 1970s, seek
to explain variations in policy outcomes across a large number of states and localities (Dye, 1966; Hofferbert, 1974; Sharkansky, 1970a).

At the outset, the subfield was framed mostly around the famous “Dawson & Robinson question” – whether policy differences among the states might be more strongly influenced by socioeconomic conditions than by various aspects of politics (Dawson & Robinson, 1963). Dye (1966) reported that, in taxation and other policy areas, socioeconomic variables seem to account for more of the variations among states than political characteristics such as apportionment, party competition, and turnout. Sharkansky (1970a) edited his influential volume, *Policy Analysis in Political Science*, which consists of similar studies, mostly at the state level, dealing with the determinants of public policies. Later, the framework became more sophisticated: more factors had been added, and research had shown interactive as well partial effects of independent variables (Blomquist, 1999). In an attempt to produce a more comprehensive and sophisticated model, Hofferbert (1974) presented a decision-making process which is influenced by a sequence of related variables, from the broadest background variables capturing historical and geographic circumstances, on through socioeconomic attributes of population, mass political attitudes, government institutions, and elite behavior.

The Dye-Sharkansky-Hofferbert (DSH) study has been applied to revenue policies. To begin with, research by many scholars supports the thesis that community wealth is a primary variable influencing public policy decisions (Dye, 1967), in particular taxation and expenditures (Maxwell, 1965). According to Sharkansky (1970b: 141), lack of wealth may encourage state officials to emphasize sales taxes which raise revenue in small and relatively painless bites, rather than income taxes which are more visible to the taxpayer.
Demographic factors also matter. As a state’s population is increasingly concentrated in metropolitan areas, social and economic interdependence rises. This results in a greater need for government intervention, as problems are less amenable to individual solutions (Adrian, 1976: 42-43). Moreover, people with more education are better prepared to participate in the policy-making system and are more active. They can better understand the revenue system, new options, and the budgeting procedure (Chelf, 1984), and they tend to be more assertive in pressing demands on state and local governments (Nice, 1987). Finally, the presence of a relatively large black population, ironically, may reduce support for antipoverty programs as racial prejudice undercuts economic concerns (Nice, 1987). In a similar fashion, Sharkansky argues that a large black population may lead prejudiced decision makers to emphasize relatively regressive taxes that will bear heavily on poorer minority members (Sharkansky, 1970a: 140-141).

Some studies find that political variables also affect revenue policies (Boyne, 1998; Elling, 1979; Fry & Winters, 1970). In a cross-sectional analysis of policy measures from the period 1979-1981, Nice (1987) demonstrates a relationship between state party ideology and public policy, when the socioeconomic variables are held constant. In both parties, liberalism, with its emphasis on equality, is significantly associated with higher income tax reliance, lower sales tax reliance, and higher education spending per pupil.

The median voter approach

The median voter approach claims that fiscal decisions by local governments reflect median voters’ preferences. In a basic model, individual taxpayers try to maximize the tradeoff between various public services and their disposable private income. They balance the benefits obtained from a higher level of public services against the costs of higher taxes, in order to choose an
“optimal” benefit level. After each taxpayer has made a choice based on his or her own preferences, public policies in a democratic system would be determined by the choice of the median voter (Black, Newing, McLean, McMillan, & Monroe, 1998). In a simplified version, the preferences of the public are usually specified in terms of median or average characteristics of the population (Dye, 1990). A majority of people prefer, among other things, to shift their tax burden to others, especially to nonresidents or those outside their jurisdictions (Blackley & DeBoer, 1987; Chicoine & Walzer, 1986; Filer, Moak, & Uze, 1988; Norstrand, 1980; Sjoquist, 1981).

Several empirical analyses about revenue policies support the median voter perspective. Sjoquist (1981) conducted one of the first empirical studies that utilized this approach to explain variations in local tax composition in the United States. Sjoquist found that cities with higher median income and lower ability to export taxes rely less upon the property tax, usually in favor of higher sales taxes. In a similar vein, Norstrand (1980) found that, in Denmark, municipalities that can export a greater share of property tax burden rely more on the property tax, while municipalities with more farmers and retirees rely more on the income tax.

Examining the tax composition of 92 Indiana counties in 1982, Blackley and Deboer (1987) found that counties with tax bases weighted more heavily towards taxable property tend to adopt a local income tax that is designed to reduce property taxes, while those with significant amounts of non-locally owned property available for tax exportation tend not to adopt a local income tax. Rather, these counties relied heavily on the property tax. Chicoine and Walzer (1986) found similar results analyzing variations in property tax reliance among 101 Illinois counties.

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22 The median voter approach is widely applied to policy decisions in a democratic society, but it is especially useful when a policy enactment requires voter approval, as is the case for the LOST in Georgia.

23 This requires an inferential leap that characteristics of the population determined median voter preferences and, hence, community preferences. See Dye (1990).

24 The ability to export property taxes is measured as one minus the percentage of the property tax base that is non-farmer residential.
average, for every 10 percent increase in the non-residential property tax base, property tax reliance increases by about one percent. In contrast, areas with higher relative sales tax receipts rely more on sales tax and less on property taxes. Besides, the property tax reliance is lower when a higher percentage of families is below the poverty level (Chicoine & Walzer, 1986: 22).

**The multi-jurisdictional approach**

Some scholars hold that competition among local governments can affect government budgetary decisions (Dye, 1990; Schneider, 1989; Tiebout, 1956). In the Tiebout (1956) model, local governments provide different levels of services and levy different levels of taxes; variance in service provision and tax levies provides suburban residents with a choice of residency, such that they can receive the services they want at the cost they are willing to pay. If they are not satisfied with the “package” of services and taxes, they can move to another community (“vote with their feet”). Or, alternatively, they can voice their dissatisfaction, impose pressure for governments to improve the performance, or punish elected officials at the polls (Santerre, 1986). Consequently, local elected officials in suburban governments try to meet residents’ demand for services at competitive tax prices in order not to lose population and business activity (Schneider, 1989) or to reduce risks involved with their reelectability (Besley & Case, 1995).

Focusing on the taxation side, a group of scholars argues that local governments take into account the tax burdens in other jurisdictions when making their own tax decisions. A literature on tax competition has explored how competition among jurisdictions for a mobile tax base, such as industrial property, affects the nature of equilibrium and the efficiency of public sector choices (Oates & Schwab, 1988; Wilson, 1986; Zodrow & Mieszkowski, 1986). This review, however, focuses on tax mimicking associated with individual tax burdens. As Ladd argues,

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25 They measured the reliance on the property tax as its share in total tax revenues, its share in total own-source revenues, or its share in total revenues.
local officials are concerned with tax burdens in neighboring jurisdictions because “resident voters may use tax burdens in other jurisdictions as a yardstick with which to evaluate the fiscal performance of their government” (Ladd, 1992: 451).

Several empirical studies support this view (Besley & Case, 1995; Case et al., 1993; Heyndels & Vuchelen, 1998; Ladd, 1992). Case et al. (1993) used panel data from states to examine the extent to which states copy their “neighbors” when making spending decisions, where “neighbors” are defined as states to which the state compares itself. They found that, even after allowing for fixed state effects, year effects, and common random shocks among neighbors, a state government’s level of expenditure is positively and significantly affected by that of its neighbors. Ceteris paribus, a one-dollar increase in a neighboring state’s expenditures increases its own expenditure by over 70 cents.

In a similar vein, Besley and Case (1995) tested yardstick competition in states’ tax-setting decisions from 1960 to 1988. They found that tax changes in neighboring states have a positive and significant effect on a given state’s tax changes; a one-dollar increase in neighbors’ taxes results in roughly a 20-cent increase in a given state’s taxes. On the other hand, the probability that an incumbent will be defeated is increased by higher state taxes; however, this effect is offset if neighbors increase their taxes simultaneously. The results demonstrated that vote-seeking and tax-setting are tied together through the nexus of yardstick competition.

At the local level, based on data for large U.S. counties, Ladd (1992) found that the variation of local tax burdens (specially, total taxes, residential property taxes, and current charges) among neighboring counties within a metropolitan area is smaller than that in other parts of the state. The results suggested that these metropolitan counties mimic the tax burdens of their competitive
neighbors. Furthermore, multivariate regression confirms the presence of tax mimicking for total local tax burdens and for property tax burdens.

Analyzing tax rates in 589 Belgian municipalities which operate within an institutionally homogeneous setting, Heyndels and Vuchelen (1998) found that local income and property tax rates of immediate neighbors tend to be similar over time, and the mimicking effect can extend beyond municipalities’ immediate neighbors, although the intensity of this influence diminishes with geographic distance. This study suggests that mimicking behavior is not an artifact of the U.S. system. Rather, it is a characteristic of decision-making within the context of decentralized government.

To summarize, these three approaches provide a general framework for the determinants of revenue policies in state and local governments. Each approach has its merits and weaknesses. The DSH comparative study revealed the complexity of policy decision-making in its socioeconomic contexts, and it has helped to identify certain patterns in policy outcomes. The approach, however, has been critiqued by many for its inductive and data-driven nature (Blomquist, 1999: 220) and the “extremely weak theoretical structure” (Tullock, 1967: 539). The median voter approach provides a more structured and falsifiable model about democratic political systems (Dye, 1990). Nevertheless, median voter preference is sometimes measured simply by the characteristics of the population. If this “inferential leap” (Dye, 1990) cannot be justified, the simplified median voter is reduced to a form of DSH-style study. The multi-jurisdictional approach reveals the importance of external factors that should not be neglected in the subnational policy-making process. Difficulties remain, however, about the specification of “neighboring effects,” which would not be convincing unless we know more about the underlying reasons for this behavior (Ladd, 1992).
3.2 Innovation and Diffusion of Revenue Policies

The prior section examines the determinants of state and local government revenue structure. A common weakness of this literature is the use of cross-sectional analyses without accounting for the change of public policy over time (Blomquist, 1999). Nevertheless, public policy scholars not only seek to explain the comparative differences of policy across jurisdictions, but also are interested in the dynamics of policy change (Sabatier, 1999). This section reviews literature about policy innovation and diffusion, which have been extensively studied for several decades (See Berry and Berry, 1990).

In his seminal study, Walker defined a state innovation as a “program or policy which is new to the states adopting it” (Walker, 1969: 881). Analyzing the adoption of 88 programs across the states, Walker (1969) documented tendencies for particular American states to be innovation leaders (early movers in the adoption of new programs), and he further analyzed the determinants of the states’ innovativeness. Later, Gray (1973) studied a variety of policies in the areas of civil rights, welfare, and education, and demonstrates the diffusions of innovations based upon user interaction. After Walker and Gray’s influential work, numerous other studies were published in the 1970s and 1980s, yielding insights into the determinants of state innovation in a variety of policy areas (Berry & Berry, 1999).26

In summarizing studies of state government innovation, Berry and Berry (1999) claimed that two principal forms of explanation have been offered: internal determinants and policy diffusion models. The Berrys argued the traditional segregation between these two approaches has serious methodological problems, and they propose an integrated model to be tested by event history analysis.

26 Some studies of government innovation have been cross-national, and others have focused on innovation by local governments. But the vast majority of empirical research on policy innovation has examined policy adoption across the American states (Berry & Berry, 1999).
Internal determinants models

Internal determinants models assume that, once a state is aware of a new policy, internal characteristics of the state determine whether and when an adoption will occur. In these models, traditionally, the propensity of a state to adopt a policy is defined as the relative earliness-of-adoption. The analysis is cross-sectional, with the unit of analysis being the American states. The dependent variable is measured by the year of adoption, by the rank of a state in the sequence of adoption (Canon & Baum, 1981; Gray, 1973; Walker, 1969), or by a dummy variable which indicates whether a state has adopted a policy by a specified date (Filer et al., 1988; Glick, 1981). Later, an alternative way to conceptualize the propensity of policy adoption has been employed since the 1980s. The unit of analysis is now the American state in a particular year, and the dependent variable is the probability that a state that is eligible to adopt a particular policy will adopt it during that year (Berry & Berry, 1990; Hays & Glick, 1997; Mintrom, 1997). Empirical analyses are pooled (cross-sectional time-series) and states are observed over multiple years. Comparing the two types of studies, the latter has theoretical advantages because using “probability-of-adoption” rather than “earliness of adoption” as the dependent variable can capture the changes of state environments over time, and it better measures the propensity to adopt (Berry & Berry, 1999: 179).

Another question is about policy areas for which the innovation will be analyzed. At one extreme are studies designated to explain the adoptions of a single program (Berry, 1990); at the other are models measuring the general innovativeness across multiple issue areas (Savage, 1978; Walker, 1969). Walker (1969: 881) created an index reflecting the earliness of adoption of a set of 88 policies spanning a wide range of economic and social issue areas. Likewise, Savage’s (1978) innovativeness measure was based on 69 policies. Implicit in the Walker and Savage
measures is the claim that it is reasonable to conceive of a general proclivity toward state innovativeness. However, Gray (1973) challenges the assumptions of any general innovativeness score, and claims that the diffusion patterns are issue-specific and time-specific. In recent innovation studies, it is commonly assumed that the propensity of states to adopt a certain policy cannot be explained fully by a general proclivity to innovate (Berry & Berry, 1999).²⁷

Research has found that persons with greater socioeconomic status – higher levels of education, income, and wealth – are more likely to innovate than persons with less status (Rogers, 1983: 251-263). Similar hypotheses have been developed about organizational-level innovation (Savage, 1985). To begin with, organizations with greater levels of slack resources are assumed to be more innovative than others. Many policy diffusion studies provide varying degrees of support for this generation (Gray, 1973; Rogers, 1983; Walker, 1969), but mixed results were also found (Savage, 1985). Other commonly utilized socioeconomic factors include population size (Dye & Davidson, 1981), industrialization (Foster, 1978; Walker, 1969), urbanization (Mueller & Comer, 1983), education level (Allen & Clark, 1981), religion (Wohlenberg, 1980), public opinion (Blaire & Savage, 1981), and socioeconomic change (Clarke, 1977), but the empirical results are also mixed. In addition, some studies have examined the political factors of policy adoption, such as party competition (Gray, 1973), political culture (Savage, 1973), and pressure group activity (Moore & Newman, 1975). Moreover, characteristics of policy-making institutions, such as legislative professionalism, have also been tested (Hamm & Robertson, 1981). Over all, many internal determinants have been found to somewhat influence the

²⁷ Most recent studies did not assume a general innovativeness, or attempted to incorporate a state’s general innovativeness in explaining its probability in adopting a particular policy (Hays & Glick, 1997; Mooney & Lee, 1995).
innovation of certain policy, but none has a consistent relationship with general policy innovativeness.

Policy diffusion models

Rogers (1983: 5) defines diffusion as “the process by which an innovation is communicated through certain channels over time among the members of a social system.” Scholars of state policy innovation in the U.S. assume a social system consisting of the fifty state governments that communicate through a variety of channels and emulate the policy behavior of each other.

States emulate each other for several reasons. First, states learn from one another as they borrow innovations perceived successful elsewhere. State policymakers faced with complex problems are not able to absorb all the information, compare all possible alternatives, and search for a best possible solution (Simon, 1947). Therefore, state officials “make most of their decisions by analogy” (Walker, 1969: 889). Second, states compete with each other. Walker (1969) argues that there is pressure on all states to conform to nationally or regionally accepted standards. Such pressure leads states to adopt programs that have been adopted widely by others. Third, states also emulate others in order to achieve a competitive advantage (Gray, 1973), or avoid being disadvantaged (Berry & Berry, 1990). Fourth, public officials can experience public pressure to adopt popular policies initiated in other states, especially when it is critical for incumbents to seek electoral support in order to run for another term (Berry & Berry, 1999).

Policy diffusion models can be categorized by their assumptions about different channels through which states communicate with others. Three types of models are most commonly proposed in the literature: the “national interaction” model, “neighboring diffusion” models, and

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28 Note that there is great similarity between the DSH comparative study and policy innovation with respect to internal determinants. Considering that policy adoption is only a step of public policy-making, the determinants of policy innovation should be a subset of DSH-style determinants.

29 Policy diffusion models are closely connected to theories of tax competition or tax mimicking, the difference being that the former focuses on a specific stage of policy-making (policy adoption) while the latter on a specific policy area (revenue policy).
leader-laggard models. The “national interaction” model assumes a national communication network among state officials regarding public programs, in which officials learn about programs from their peers in other states. Then, it is predicted that the probability that a state will adopt a program is proportional to the number of interactions its officials have had with officials of already-adopting states. In a simplified version, the interaction is formulated, based on communication theories, as the multiplication of the number of states that have adopted and the number of states that have not (Gray, 1973).

Alternatively, “neighboring diffusion” model posits that states are influenced primarily by their “neighbors,” where the “neighbors” are defined as states to which the state compares itself (Case et al., 1993). Some models assume that states are influenced primarily by those states that are geographically proximate, for instance, states with which they share a border (Berry & Berry, 1990). Other models assume that the nation is divided into multiple regions and that states tend to emulate the policies of other states within the same region (Mooney & Lee, 1995). Still others assume that state may regard as neighbors other states that are similar to them economically or demographically, regardless of geographical proximity (Case et al., 1993).

The national diffusion models and the neighboring diffusion models both assume that states emulate each other in the same level. However, leader-laggard models assume that certain states are pioneers in the adoption of a policy, and that other states emulate these leaders (Walker, 1969). These models are consistent with the presumption that some states are more innovative either in general (Walker, 1969) or in a specific policy area (Gray, 1973), and that policymakers are more likely to turn to these states for cues (Grupp & Richards, 1975). Therefore, leader-
laggard models assume that states emulate other states in a learning process rather than interstate competition or public pressure.\textsuperscript{30}

**An attempt at integration**

Traditionally, internal determinants models are used to analyze policy innovation, while policy diffusion models are framed to explain the spread of innovation. Berry and Berry (1999: 187) argue that the segregation between innovation and diffusion provides at best incomplete explanations of policy innovation because of its methodological flaw. To the extent that studies of policy innovation overlook the influence by neighboring states, the models are not property specified; to the extent that studies of policy diffusion fail to control for internal determinants, the validity is threatened by spuriousness, because geographically proximate states usually have many other characteristics in common.

To solve these problems, the Berrys (1990) posit that the two types of models can be integrated based on Mohr’s theory of organizational innovation, and can be tested simultaneously by means of event history analysis. Mohr (1969) proposes that the probability that an organization will innovate is inversely related to the strength of the obstacles to innovate and is directly related to (1) the motivation to innovate, and (2) the availability of resources for overcoming the obstacles. First, numerous internal determinants of policy innovation are consistent with Mohr’s ideas. For instance, closer party competition motivates politicians to adopt popular programs (Gray, 1973), and the availability of “slack” resources help to overcome the administrative obstacles associated with policy change (Walker, 1969). Second, a strong case can also be made to link policy diffusion models to Mohr’s theory. Elazar (1972) claims

\textsuperscript{30} In their review, Berry and Berry (1999) specified another type of model, vertical influence models, which sees states as emulating not the policies of other states, but the policies of the national government. Vertical influence models are not included in this review for two reasons. First, to the extent that states emulate the national government as a result of a learning process, the process is similar to that of the leader-laggard model. In this case, the national government serves in the same role as a state-level pioneer. To the extent that states are influenced by the national government to adopt policies by other reasons, such as mandates or incentives, it is not really a diffusion process.
that state policy makers tend to view nearby states as “experimental laboratories” for policies. Policy adoptions and successful experiences in nearby states strengthen the motivation for politicians to emulate (Berry & Berry, 1990), and provide a critical resource – information – for overcoming obstacles such as uncertainty, organizational inertia, or political costs (Berry & Berry, 1992; Walker, 1969). Hence, internal determinants models and policy diffusion models can be fully integrated based on Mohr’s theory.

Empirical findings about innovation and diffusion of revenue policies

The policy innovation and diffusion literature has been applied to analyze the adoption of revenue policies, but in a very limited scope. Almost all these studies are about the adoption of lotteries in the American states (Alm, McKee, & Skidmore, 1993; Berry & Berry, 1990; Filer et al., 1988; Furlong, 1998; Winn & Whicker, 1989). The major reason for this focus is data availability rather than theoretical or epistemological considerations. The comparative studies in the U.S. have been predominantly conducted at the state level, because the fifty states are readily comparable (Blomquist, 1999). At the state level, however, very few new revenue sources like the lottery have been authorized and widely considered in recent decades.31

The first well-known study about lottery adoption was conducted by Filer et al. (1988). The study was cross-sectional with two dependent variables: a dichotomous dummy variable about whether lotteries have been adopted in a state as of 1986, and a censored dependent variable indicating the age in months of the lottery for states that already have adopted lotteries. Using the independent variables measured in 1986, Filer, Moak, and Uze find that states that have higher overall tax burden, higher expected return from the lottery, fewer poor people, and more tax exportability have a higher probability of adopting the lottery (Filer et al., 1988). Soon after

31 Most states adopted their taxes early in the twentieth century. Of all state taxes, the general sales tax arrived latest on the scene, with Mississippi’s 1932 adoption. But more than half of the states had adopted it by 1938 (Advisory Commission on Intergovernmental Relations, 1995).
that, Winn and Whicker (1989) conduct a similar study on indicators of state lottery adoptions. From a contingency table analysis, they find that social and economic characteristics of state population are better indicators of lottery adoption than partisan control. In particular, per capita income, per capita tax, and high local control of state/local finances are positively associated with lottery adoption (Winn & Whicker, 1989).

Aware of the conceptual and methodological problems associated with previous studies, Berry and Berry (1990) construct an integrated model of policy innovation and diffusion and applied the model to analyze state lottery adoption through event history analysis. The dependent variable was lottery adoption by a state in a particular year, and the independent variables about each state were pooled across the years. The Berrys find that a state’s fiscal health, per capita income, and belief in fundamentalist religion are negatively associated with the probability of lottery adoption. Besides, the probability that a state will adopt a lottery increases as the number of its neighbors that have previously adopted it grows, even when the effects of internal characteristics have been controlled. Also using event history analysis, Alm et al. (1993) focus on the effects of fiscal pressure and tax mimicking in the lottery adoption. The results suggest that fiscal pressure played an important role in the early introduction of state lotteries, but this influence has declined in recent years, when political considerations and attempts to mimic the behavior of neighboring states become the dominant factors.

Although there has been a growing literature about lottery adoption, few studies have been conducted on the adoption of new taxes. Berry and Berry (1992) assess the factors that prompt

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32 Likewise, the study was cross-sectional. The dependent variable is the dichotomous dummy of adoption as of 1986, and the independent variables are mostly measured around 1985 and 1986. One exception is the “state-local debt at time of passage” for the states that have adopted the lottery. For states that have not adopted the lottery, however, current debt levels (in 1986) were used.

33 Some may argue that the lottery can be seen as a special “tax” in that it provides new source of revenue. However, lotteries are normally considered voluntary while most taxes are compulsory, and lotteries are popular while taxes are not. Even when
states to adopt taxes, in particular the gasoline tax and the individual income tax, during several periods of the twentieth century. Using event history analysis, they tested five explanations of state tax innovation – economic development, fiscal health, election cycle, party control, and regional diffusion. The results yield little support for the economic development and party control hypotheses, but are highly consistent with other explanations. It is found that states tend to adopt new taxes when (1) there is a relatively long time before the next election, (2) the government encounters fiscal crisis, and (3) many neighboring states have previously adopted a tax. And this empirical evidence is consistent throughout the twentieth century (Berry & Berry, 1992).

Tax innovation and diffusion at the local level had received little attention. In a cross-sectional study, Pajari (1984) examines the result of LOST referenda held in Georgia counties for three years (1978, 1980, and 1982). Using gamma as the ordinal measure of association, Pajari finds that the adoption of the LOST is positively correlated with education achievement, urbanization, property tax burden, taxable sales, and the presence of an interstate highway. Although a valuable early attempt, the study has serious weaknesses in its research methods. First, the study used cross-sectional analyses, which assumed that the independent variables remained unchanged over time. At its worst, the causal link had been reversed when the adoptions of LOST as early as 1975 were analyzed against environmental characteristics measured in 1978. Second, the measure of association captured only bivariate correlations, which may not reveal the true relationships between the independent variables and the LOST adoption.

the models have been adjusted to reflect these differences, whether state or local government respond similarly with the lottery and other kinds of revenue remains an empirical question.
3.3 The Effects of General Property Tax Relief Programs

As is discussed above, the property tax had become the major target of the tax revolts in the late 1970s and early 1980s. In response to the tax revolts, many states have enacted a variety of property tax relief programs since the 1970s. These programs can be categorized in different ways (Gold, 1979). One distinction is made between programs that provide tax relief to all kinds of properties and those that do not. Credits, exemptions, and preferential assessment ratios are normally granted to specific individuals, institutions, or types of properties (Mikesell, 1999). In contrast, general tax and expenditure limits (TELs) and the use of alternative revenue sources are normally to reduce property tax burdens for all types of properties (Gold, 1979). This review is focused on the programs that provide general property tax relief, in particular those funded by nonproperty taxes.

State-imposed TELs and Property Tax Relief

There is an extensive literature on state-imposed local tax and expenditure limits (for a survey, see Mullins & Cox, 1995). These programs are generally classified into two categories – potentially binding and nonbinding – based on the likelihood that they would restrict overall local taxing and spending power (Joyce & Mullins, 1991). Explicit limits on property tax levy, expenditure, and revenue increases are potentially binding because they impose a fixed ceiling. In contrast, a simple property tax rate limit is nonbinding, because local governments can still raise local property tax revenue by increasing the assessed property value. In most states the TELs have become potentially binding over time (Mullins & Cox, 1995), and the majority of them restrict property tax levies, typically by limiting the growth rate of property tax revenues (Shadbegian, 1998).
Many theories have been advanced to explain the wave of TELs. Some suggest that voters found local government becoming larger than desired, and thus the intended effect was a reduction in government size and growth (Shadbegian, 1998). Others, however, maintain that voters did not support TELs for smaller government; instead, they were just hoping to get “something for nothing” (Campbell, 1998; Ladd & Wilson, 1981, 1982; Sears & Citrin, 1982). Still others find that voters support TELs according to their self-interest – those whose tax burdens would most likely be reduced supported the limitations (Stein, Hamm, & Patricia, 1983).

Empirical results about the effectiveness of the TELs have been mixed. Mullins and Cox (1995) argue that the limits have had no effect on the size of government, but have had considerable impact on its composition. In particular, the limits reduced reliance on property tax revenue and other local own-source revenues, and increased local reliance on state aid and the general level of state revenue responsibility. Shadbegian (1998), however, contends that most of the previous studies were cross-sectional and thus failed to capture the dynamic feature of the TEL process. Using panel data at the state level, he (1998) demonstrates that TELs are successful in reducing both the size and growth of local government as well as the property tax burden. Later, Shadbegian conducted another test using panel data at the county level. The results suggest that TELs decrease the level of property and “other” taxes,34 but generally increase the level of miscellaneous revenues, which partially offset the decrease in tax revenues (Shadbegian, 1999).

**Property Tax Relief Funded by Alternative Sources of Revenue**

As the studies about the TELs suggest, it is hard to provide property tax relief simply by improving government efficiency or limiting governmental size. In order to reduce the property

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34 The “other” taxes include excise, sales, and income taxes in these counties (Shadbegian, 1999).
tax burden, local governments should find alternative sources of revenue, primarily nonproperty
taxes, to fund their services (Oates & Harriss, 2001).

Nonproperty taxes, such as local sales taxes or local income taxes, reduce the property tax burden in two ways. On the one hand, property tax burden can be relieved indirectly when the nonproperty taxes are enacted for other purposes. Local income taxes, for instance, usually have been introduced under conditions of severe financial crisis, with the primary objective being the capture of additional revenue. But they generally have an indirect impact on the property tax level by averting an increase in property tax revenue to finance services (Deran, 1968).35 In another case, Krmenec (1991) identifies a sales-for-property-tax substitution in recent decades when he examines the fiscal data for 46 largest cities in Illinois. The substitution was mostly attributed to economic change (such as increase in local capital stock or growth in local consumption), rather than policy changes (such as the changes in tax rates). For instance, cities that enjoy a higher relative share of the retail market tend to have higher levels of sales-for-property-tax substitution (Krmenec, 1991).

On the other hand, property tax relief can be an earmarked purpose for local option taxes, as is the case of the LOST in Georgia. Despite the increasing popularity of these programs, not many studies have been systematically conducted about their effects (Jung, 2001; Ulbrich, 1996; Wisconsin Taxpayers Alliance, 2002).

Since 1990, local governments in South Carolina have been authorized to adopt a local option sales tax (LOST), with the requirement that a certain portion of the proceeds each year be

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35 Comparing large U.S. cities of similar size with and without local income taxes in the mid-1960s, Deran (1968) finds that income-tax cities had lower reliance on property taxes (as a percentage of total taxes), lower per capita property taxes, and a lower growth rate of property tax. Thus the results suggest that the local income tax is a substitute for the property tax. But the study involves only simple comparative analyses, without taking into account other factors, such as functional responsibilities, service levels, and the availability of state or federal aid.
used to roll back the property tax. Ulbrich compares the revenue structures in cites with and without the LOST in Fiscal Year 1991 and Fiscal Year 1994, and he finds “striking consequences” of the LOST (Ulbrich, 1996). The property tax growth rate in LOST cities (1.5 percent) was less than one tenth of that in non-LOST cities (17.9 percent). Moreover, per capita property tax between FY 1991 to FY 1994 increased about $7 in LOST cities, comparing to about $32 in non-LOST cities. Thus, Ulbrich argues that the LOST has been “almost exclusively a substitute for rather than an addition to the property tax as a local revenue source” (Ulbrich, 1996).

Nevertheless, another report about the LOST in Wisconsin, of which all the proceeds should be used for property tax relief, suggests different results (Wisconsin Taxpayers Alliance, 2002). Analyzing fiscal data for the counties within a fifteen-year period, WTA compares the actual property tax changes to the property tax trend, which is calculated by the previous five-year patterns before the LOST was adopted. The analysis shows that the PTR effect of the LOST phases out over time: the relief was relatively high during the first few years, but it began to wane in the sixth and seventh years. On average, only 28 cents per dollar of the LOST have been used to reduce property taxes. In addition, the counties seem to have responded to the LOST differently. For 21 counties, it appears that some or all of the LOST proceeds have been used to relieve property taxes. For another 21 counties, there is little or no evidence of property tax relief (Wisconsin Taxpayers Alliance, 2002).

Caution should be taken about these two studies because of their methodological weaknesses. Ulbrich (1991) was a simple comparison without controlling for other factors that may affect the

36 The property tax should be roll backed by an amount equal to 63% of the LOST proceeds received in the first year. In the second year, the rollback rises to 65%; the third year, 67%; the fourth year, 69%; and the fifth and subsequent years, 71%. Several of the recent referenda have gone beyond the state requirement and committed to using 100% of the LOST proceeds for property tax relief (Ulbrich, 1996).
property tax levels. Wisconsin Taxpayers Alliance (2002) represents a set of time-series analyses (for all the counties as a whole as well as for each county), but the underlying assumption that the property tax trend without LOST can be captured by the previous five-year trend before the LOST may be problematic. To capture variations across space and over time, the effect of the LOST on property tax relief is preferably studied by pooled time-series analysis. Using this research method, Jung (2001) examines the effects of the LOST on the property tax level, millage rate, and total spending level in Georgia counties. Covering a 13-year period for 136 Georgia counties, the study demonstrated that the LOST decreases the property tax revenues as well as millage rates. The results suggest that counties with the LOST, on average, have lower per capita property taxes ($-12) and lower property tax rates (-1.8 mill) than those without the LOST. However, while an extra dollar of LOST revenue provides about 28 cents in property tax relief, it leads to about 48 cents increase of total spending. Thus Jung (2001) argues that the LOST is more an augmentation of property taxes than an effective substitute.

Nevertheless, Jung’s study leaves several questions unanswered about the effect of the LOST in Georgia counties. First, Jung assumes the effects of the LOST do not vary over time. However, as evident in the Wisconsin Taxpayers Alliance (2002) and many studies about the effect of earmarking (Borg & Mason, 1988; Miller & Pierce, 1997), it is very likely that the PTR effect would decrease over time (Durning, 1992). Second, Jung’s article did not examine the PTR effect across counties. Given diverse socioeconomic and political conditions, counties in Georgia may respond to the LOST in different ways. Discovering not only the commonalities but also differences, as is the effort of this study, will not only enhance our knowledge, but also make policy research more relevant.
CHAPTER 4: RESEARCH QUESTIONS AND METHODS

This chapter addresses research questions, develops research hypotheses, and discusses data and statistical methods used in the analysis. The first section presents the research questions of this study. The second section introduces data sources. The third section develops research hypotheses for testing. The fourth section discusses research methods employed in the study.

4.1 Research Questions

As of 2004, all but five counties in Georgia have made use of the LOST. This study analyzes the internal and external determinants of the LOST adoption through an event history analysis (Tuma & Hannan, 1984). On the one hand, the propensity of a county to adopt the tax may be determined by its socioeconomic or political factors. On the other, some counties may choose to adopt the tax simply because others have already done so.

The legislation requires that LOST proceeds be divided among the county and all qualified cities within the county. Then, the county and cities should use the proceeds to roll back their property tax burden (Association County Commissioners of Georgia & Georgia Municipal Association, 1994). However, debates continue on what the LOST is intended to finance and for what it has been actually used (Durning, 1992). This study examines how LOST proceeds were actually used in Georgia counties,\(^{37}\) in particular, to what extent they have been used to reduce the property tax burden or have been used as a source of additional revenue. In addition, the study goes further to analyze the effects of the LOST over time and across counties.\(^{38}\)

The questions about the adoption and budgetary effects of the LOST are closely tied together. First, they are subjected to the same conceptual framework. According to Ostrom (1999), a

\(^{37}\) Similar questions can be raised about the use of the LOST in Georgia cities. It is part of my plan for future research, given data availability.

\(^{38}\) In this study, the “effects” of the LOST refer to the fiscal impact of the tax on local budgetary decisions. Scholars may discuss other effects of the LOST, for instance, the distributional effects (incidence) or managerial effects (say, whether the LOST increases local autonomy and how it affects governmental efficiency). See Oates & Harriss (2001).
conceptual framework identifies a set of variables and the relationships among them that presumably account for a set of phenomena. As has been discussed in the literature review, the choices made by local governments whether to adopt the LOST and how to spend LOST revenues are both influenced by a similar set of factors. Second, the adoption and budgetary effects of the LOST interact with each other in the “flux” of policy implementation (Pressman & Wildavsky, 1973). On the one hand, the incentives for a county to adopt the LOST may affect the way the LOST proceeds are used. On the other, the effects of LOST proceeds among earlier adopters may be taken into account when other counties are pondering the adoption. Consequently, testing both the adoption and budgetary effects of the LOST in a single study enhances the ability to analyze local fiscal behavior in response to the tax.

4.2 Data Sources

The data required for this study come from several sources. The primary source of socioeconomic data is the Georgia County Guide, which is compiled annually by the Center for Agribusiness and Economic Development and the College of Family and Consumer Sciences at the University of Georgia (Bachtel & Boatright, 1982-2003). The guide contains annual demographic and economic data for individual Georgia counties.

Fiscal data are collected mostly from the Report of Local Government Finances (Counties). Since FY1985, the Georgia Department of Community Affairs (DCA) has conducted this annual survey, which collects detailed information on revenues, expenditures, and debts of general-purpose local governments in Georgia. Although the report is an unaudited database, most local governments submitting the data state that they had recorded their fiscal information using generally accepted accounting and auditing procedures (Georgia Department of Community Affairs, 2004).
affairs, 1994). In fact, the u.s. bureau of the census relies on this database in publishing the
annual government finances and state and local government finances. another source for
fiscal data is the statistical report, published by the georgia department of revenue. although
it contains fewer variables about local government finance, the statistical report provides
information about taxable sales base and property tax level in georgia counties from 1970 to
2002.

4.3 research hypotheses

the adoption of the lost in georgia counties

as of 2004, all but five counties in georgia have enacted the lost. a county’s decision to
adopt the tax can be attributed to both internal and external forces. on the one hand, the lost
adoption may be determined by the counties’ socioeconomic or political conditions. on the
other, some counties may become more prone to adopt the tax because of the fact that many
others have done so.

the unit of analysis in this study is each county-year. the dependent variable is
conceptualized as the conditional probability that a county without the lost will adopt the
program during a particular year, but it is measured by a dummy variable that is scored 1 when a
county levies the lost and zero otherwise. the determinants of the adoption are tested
simultaneously in a model based on mohr (1969), which proposes that the probability of
innovation is negatively related to the strength of the obstacles to innovate and is directly related
to (1) the motivations to innovate, and (2) the availability of resources for overcoming these
obstacles.

the motivations for a county to adopt the lost take several forms. first, as the law requires
the lost to be used for property tax relief, it is hypothesized that counties with higher property
tax levels are more eager to adopt the LOST. The level of property tax is measured by millage rate and the ratio of property tax to personal income. The ratio of property tax to personal income\(^{40}\) is the “effective” property tax level relative to the ability-to-pay; the millage rate, while not an accurate measure of property tax level unless the assessment is controlled for, represents the “perceived” property tax level. The ratio of property tax to personal income is a common way to measure property tax burden. However, how sensitive local governments and taxpayers are about this measure remains an empirical question. In contrast, property tax millage rate, being highly visible, is often used for time-series and cross-jurisdictional comparisons in local governments’ budgetary files.

Hypothesis 1a: The probability that a county will adopt the LOST is positively related to its property tax millage rate.

Hypothesis 1b: The probability that a county will adopt the LOST is higher if the ratio of property tax to personal income is higher.

Second, although the LOST is earmarked for property tax relief, there is an ongoing debate as to whether the LOST proceeds have been used at least in part as additional revenues (Durning, 1992; Jung, 2001). In this regard, counties facing fiscal pressure may have a higher motivation to adopt the LOST (Alm et al., 1993; Furlong, 1998). Fiscal pressure is measured in two ways. One is the percentage of public roads that are unpaved (Jung, 2000), a measure that reflects the lack of resources for a county to fulfill one of its primary functions. The other is the percentage change of real property and utility digest. This variable reflects the changes in the size of the tax base. A county with a decreased tax base has more difficulties to raise sufficient revenue to fund public services, and thus may have stronger incentive to raise new taxes.

\(^{40}\) This measure is calculated by dividing the total property tax revenue by total personal income in a county, or by dividing per capita property tax revenue by per capita personal income in a county.
Hypothesis 2a: *The probability that a county will adopt the LOST is higher if the county has a higher percentage of unpaved public roads.*

Hypothesis 2b: *The probability that a county will adopt the LOST is higher if the county encounters a decreased size of real property and utility digest.*

Third, counties in a better position to export their sales tax burden may have a stronger incentive to adopt the LOST. The potential of tax exportation is measured in two ways. One is the presence of an interstate highway in a county, because regional shopping centers tend to be located along interstate highways (Pajari, 1984). The other is the ratio of the taxable sales base to personal income (Jung, 2000). If a county’s taxable sales base is disproportionately higher than its personal income, it is more likely that the sales base is also contributed by residents from other jurisdictions.

Hypothesis 3a: *The probability that a county will adopt the LOST is higher if the county contains a portion of the interstate highway (See Figure 4-1).*

Hypothesis 3b: *The probability that a county will adopt the LOST is positively related to the ratio of the taxable sales base to personal income.*
Several obstacles might impede a county’s adoption of the LOST. First, voters are less likely to approve the LOST in counties that have a higher existing sales tax rate than other places. The rate of state sales tax in Georgia is four percent, and the local governments can elect to adopt several local option sales taxes. As a result, sales tax rates vary across counties that have not adopted the general-purpose LOST. Second, the “economic cost” (the risk of losing some of the counties’ tax base) to levy the LOST in a county may be higher in high-density metropolitan areas where there is a high degree of spatial competition between market centers (Krmenec, 1991). Finally, it may be more difficult to adopt the LOST in a county with a higher percentage

41 In addition to the LOST, local governments in Georgia can elect to adopt several other local option sales taxes, such as the special-purpose Local Option Sales Tax (SPLOST), the education-purpose Local Option Sales Tax (ELOST), or the Metropolitan Atlanta Rapid Transit Authority (MARTA) tax.
of voters who believe in Republican ideology, because these voters may be against any kind of new taxes (Nice, 1987; Poterba, 1995).

Hypothesis 4a: The probability that a county will adopt the LOST is negatively related to the existing rate of sales tax in the county.

Hypothesis 4b: The probability that a county will adopt the LOST is lower if the county is located within the Atlanta Metropolitan Statistical Area.42

Hypothesis 4c: The probability that a county will adopt the LOST is lower if there are a larger percentage of voters voting for Republican presidential candidates.

42 As Figure 4-2 shows, the Atlanta Metropolitan Statistical Area has by far higher population density than other areas in Georgia.
Figure 4-2  Population Density of Georgia Counties (1970-2000)
The resources for overcoming the obstacles are associated with tax mimicking behavior. First, the “political cost” to adopt the LOST (voter resistance of a new tax) would be lowered if many other counties in the state have adopted the tax. Second, the “economic cost” to adopt the LOST (losing tax base because of tax competition) would decrease if many neighboring counties have adopted the tax (Ladd, 1992). Finally, the “information cost” to adopt the LOST (lacking information and experience with a new source of revenue) would be reduced if many others have experienced the tax (Berry & Berry, 1990; Gray, 1973).

Hypothesis 5a: The probability that a county will adopt the LOST is higher if many neighboring counties have adopted the tax.

Hypothesis 5b: The probability that a county will adopt the LOST is higher if many other counties in Georgia have adopted the tax.

In addition, the study controls for two other variables. One is the percentage change of real per capita personal income that reflects the fluctuation of economic conditions. Its coefficient is expected to be positive, because voters in better economic conditions may be more tolerant of a tax increase. The other is the percentage change of population. Counties with rapid population growth generally have higher fiscal pressure for expanding public services, and thus the coefficient is expected to be positive (Bergstrom & Goodman, 1973).

The effects of the LOST in Georgia counties

The LOST Act in Georgia mandates that local governments use LOST revenues to roll back property taxes during the second year and in “all subsequent years.” In addition, these localities are required to illustrate on their tax bills (1) the amount of property tax that would have been levied without the LOST (PT*), (2) the amount of LOST proceeds of the preceding year (ST_{t-1}),
and (3) the resulting net property tax for the calendar year ($PT_t$). The rollback can be illustrated as the following equation:

$$PT_t = PT^*_t - ST_{t-1}$$  \[4.1\]

Despite these requirements, after the second year, the extent of actual rollback becomes less certain – as it is difficult to assess the amount of property tax that would have been levied without the LOST ($PT^*_t$), there is not a binding limit on the property tax to be levied ($PT_t$), given the amount of LOST proceeds of the preceding year ($ST_{t-1}$). In fact, local governments might calculate the rollback in a reverse way. At first, the net property tax millage rate to be levied is assessed, and then it is added with the millage rollback provided by the LOST receipts of the preceding year, which results in the “would-be” millage rate without the LOST.\(^{43}\) In this case, the PTR requirement has little influence on the actual budgetary decision, and the actual would be less than the “paper rollback” (Durning, 1992: 29). Without a “binding” limitation on tax levy, local government could receive more revenue from a combination of sales tax and property tax than they would have received without the LOST.

Theoretically, there are several scenarios concerning the effects of the LOST in Georgia counties.\(^{44}\) Figure 4-1, 4-2, and 4-3 depict three commonly assumed scenarios regarding the effects of the LOST. Two additional scenarios, as shown by Figure 4-4 and Figure 4-5, are hypothesized in this study.

To begin with, the counties may use all LOST proceeds as property tax relief (Scenario I, Figure 4-1). In this case, the total of property tax revenue and LOST revenue should not exceed the projected property tax level if the LOST were not levied. Alternatively, the counties may use

\(^{43}\) This is my interpretation from a personal interview with Chris Caldwell in the Office of Budget and Finance, Athens-Clarke County, on December 22, 2003.

\(^{44}\) There are two assumptions underlying these scenarios. First, there is a stable trend of property tax growth if the LOST were not levied. Second, LOST proceeds in these counties remain unchanged over time. The first assumption is critical for the model, while the second one is for the purpose of simple interpretation.
all LOST proceeds as additional revenues (Scenario II, Figure 4-2), and then the property tax level remains stable. Most probably, however, in the aggregate level, LOST proceeds may be used for both purposes (Scenario III, Figure 4-3). Accordingly, the property tax level is lowered, but the total of property tax revenue and LOST revenue exceeds the projected property tax revenue if the LOST were not levied. In comparable studies about state lotteries that are earmarked for education, this issue of fungibility has been widely acknowledged (Borg & Mason, 1989; Borg & Mason, 1988; Mikesell & Zorn, 1986; Spindler, 1995). In the case of Georgia LOST, scenario III has received some support from Jung (2001). Jung’s finding, however, presents only an incomplete picture, because it is highly possible that the effects of the LOST would vary over time.

This study proposes two alternative specifications to distinguish the short- and long-term effects of the LOST. One is the “fiscal illusion” scenario which is presented in Figure 4-4. In this scenario, property tax revenue drops in the second year of the LOST because of the property tax rollback; however, it will increase faster in the post-LOST period than before the LOST, which eventually offsets the short-term effect and lead to an even higher property tax level. A comparable case of earmarking is found by Miller and Pierce (1997). By employing pooled time-series data in 50 states from 1966 to 1990, they find that in lottery states the rate of growth in education spending declined in the years following the initial use of the lottery, and eventually nonlottery states maintain and increase their education spending more so than lottery states.45

45 Miller and Pierce (1997) find that states generally increase education spending prior to lottery adoption by about $12 annually per capita. In the first year of the lottery’s operation, a state could be expected to raise education spending by $50 per capita. After a lottery is put into effect, however, the rate of increase in education spending drops to only $6 annually.
Figure 4-1: The effects of the LOST, Scenario I

Figure 4-2: The effects of the LOST, Scenario II

Figure 4-3: The effects of the LOST, Scenario III

Figure 4-4: The effects of the LOST, Scenario IV

Figure 4-5: The effects of the LOST, Scenario V
A plausible explanation for this situation is the “fiscal illusion” theory, which holds that taxpayer’s perceptions of the cost of government can be obscured by the ways in which government taxes are raised (Dickson & Yu, 2000; Dollery & Worthington, 1996). There are several sources of perception error. First, local option sales tax, being more invisible, makes it harder for average taxpayers to assess accurately the cost of public service. Thus the public may fail to realize that they are paying for a higher level of government spending. Second, the sales tax is more income-elastic, so it will automatically raise more revenues as the income increases over time, without increasing tax rates (National Conference of State Legislatures, 1997). Finally, the “paper rollback” (Durning, 1992: 29) camouflages the non-binding nature of the property tax relief requirement, and the illusion that property tax has been rolled back may, paradoxically, indulges governments to levy even higher property tax in the long run. The “fiscal illusion” scenario is tested by:

Hypothesis 6: Property tax revenue drops one year after the LOST is levied, but it then increases faster in the post-LOST period than before the LOST, which eventually leads to an even higher level of property tax.

In contrast to the “fiscal illusion” scenario is the “rational choice” one (Scenario V, Figure 4-5). This scenario takes a different assumption about the long-term effect of the LOST—after the instant rollback the property tax gradually increases to a new “equilibrium,” which is the “rational choice” of local residents. According to the median voter theory, individual taxpayers try to maximize the tradeoff between various levels of public services and their disposable private income. When they cast votes based on their own preference, the choice of the median voter prevails (Black et al., 1998). Accordingly, the preference of the public is usually specified at the preference of the voters with median or average characteristics (Dye, 1990). These people
have a strong preference to shift their tax burden to others, especially to nonresidents or those living outside their jurisdictions (Blackley & DeBoer, 1987; Chicoine & Walzer, 1986; Filer et al., 1988; Norstrand, 1980; Sjoquist, 1981). In the Georgia case, the adoption of the LOST may have been attributed to the preference of homeowners, who tend to be more active in local political issues (Oates & Harriss, 2001). Because the sales tax is exportable and more regressive, median-voter homeowners will be able to shift some of their burden to others. In response to the lowered tax prices, they will be willing to “purchase” more governmental services (Wildasin, 1977). Consequently, the property tax level would be raised to a new “equilibrium.” Fiscal illusion aside, this equilibrium level would be somewhere between the projected property tax level without the LOST and the property tax level rolled back by the full amount of the LOST proceeds.\footnote{Intuitively, we can consider that the equilibrium is fine tuned between the two extremes. Starting from Scenario I, when all the LOST proceeds are used to relieve property tax, homeowners would be willing to pay more because of (1) the substitution effect because of the lower level of average tax price (King, 1984), and (2) the income effect because of the tax shifting. Starting from Scenario II, if all the LOST proceeds are used to fund additional services, the marginal utility of additional services is lower than the marginal tax price which stays the same for each additional dollar of property tax. As a result, taxpayers would prefer to reduce the property tax level.} The “rational choice” scenario is tested by:

Hypothesis 7: The LOSTs are used mostly for property tax relief in the beginning years, but then the property taxes will gradually increase to a new level, and thus part of LOST proceeds become additional revenues.

Wisconsin Taxpayers Alliance (2002) suggests that the LOST proceeds in Wisconsin have been used in different ways. In some counties it appears that some or all of the LOST proceeds have been used to relieve property taxes, while in others there is little or no evidence of property tax relief. Likewise, the Georgia counties may have responded differently to the LOST. It is hypothesized in this study that different counties would reach different “equilibria” in their use of LOST proceeds, depending on their internal and external conditions. First, counties with higher property tax levels are more eager to roll back their millage rates due to public pressure.
According to the tax mimicking theory, counties have "yardstick competition" with their neighboring jurisdictions with regards to their tax levels (Besley & Case, 1995; Heyndels & Vuchelen, 1998). Second, how counties use the LOST proceeds may be related to their fiscal conditions. It is expected that counties with fiscal pressure use the proceeds more as additional revenues. Third, based on the median voter theory, homeowners care more about the property tax level and are more active in public decision-making, and thus counties with higher homeownership (percentage of housing units occupied by the owner) are expected to use a higher percentage of the LOST proceeds as property tax relief. Finally, counties with higher potential of sales tax exportation are expected to use the proceeds more as additional revenues. The higher level of tax exportation, the bigger change occurs in homeowners’ tax price, and the homeowners will be more willing to support a higher level of public expenditure (Wildasin, 1977). These hypotheses are listed as follows:

Hypothesis 8a: Counties with higher property tax levels tend to use higher percentages of LOST proceeds for property tax relief.

Hypothesis 8b: Counties with more severe fiscal pressure tend to use higher percentages of LOST proceeds as additional revenues.\(^{47}\)

Hypothesis 8c: Counties with higher percentages of homeownership tend to use higher percentages of LOST proceeds for property tax relief.

Hypothesis 8d: Counties with a higher potential to export the LOST tend to use higher percentages of LOST proceeds as additional revenues.\(^{48}\)

\(^{47}\) The level of fiscal pressure is measured by the fiscal health and the percentage of local roads unpaved.

\(^{48}\) Tax exportation is measured in three ways: the presence of interstate highway, whether or not the county contains a retail center, and the ratio of per capita taxable sales to per capita income.
4.4 Research Methods

Event history analysis

The adoption of the LOST in Georgia counties is analyzed by a discrete-time event history analysis. Event history analysis is a method to explain a qualitative change (an “event”) that occurs in an individual (or unit) at a particular point of time. The data for analysis, called an “event history,” is a longitudinal record showing whether and when the event was experienced by a sample of individuals (or units) during a period of observation (Tuma & Hannan, 1984). In this study, the units are Georgia counties, and the event history is whether or when the counties adopted the LOST in a particular year during the period 1975 to 2002.

A critical concept in the event history analysis is the “risk set,” which is the set of individuals in the sample that are “at risk” of the event’s occurrence (i.e., have a chance of experiencing the event) at a particular time. When the event under analysis is one that an individual cannot repeat (e.g., death), the size of the risk set will decrease over time as individuals in the sample experience the event (Berry & Berry, 1990). In this study, the risk set in each year consists of the counties that are eligible but have not adopted the LOST. The state law of Georgia limits the total rate of state and local sales taxes at seven percent (Georgia Department of Revenue, 1996). For counties without the LOST, only those in which the total sales tax rate is lower than seven percent can elect to adopt the tax. The size of the risk set is generally decreased at the end of each year for two reasons. First, the number of eligible counties changes when the total state and local sales tax rates in some counties reaches or drops from the seven percent cap. Second, the risk set downsizes when some eligible counties elect to adopt the LOST in a particular year. Accordingly, the dataset for analysis consists of the risk sets of different sizes in each year during the study period.
There are discrete-time models and duration models of event history analysis. In a discrete-time model – the kind to be used in this study – the variable to be explained is called the “hazard rate” and defined as the probability $P_{i,t}$, that an individual $i$ will experience the event at a particular time $t$, given that the individual is “at risk” at that time. Alternatively, a duration model can be used to analyze the typical spell of time before an at-risk individual experiences the event (Temple, 1996; Tuma & Hannan, 1984). In Georgia counties, the adoption of the LOST is contingent upon the results of certain discrete-time events (the LOST referenda, if held) rather than a process of continuous consideration. The probability of adoption in a particular year may not influence the decision upon the adoption thereafter. As such, a discrete-time model would be appropriate in this context.

The hazard rate to be analyzed in this study is the conditional probability that an “at risk” Georgia county will adopt the LOST in a particular year. It is presumed determined by a set of internal and external independent variables. Nevertheless, the hazard rate, being a probability, cannot be observed. The observed dependent variable for estimation is a dummy variable that is scored one for each case when an eligible county adopts the LOST, zero otherwise. Since the dependent variable is binary, ordinary least squares (OLS) method is inappropriate because several conventional regression assumptions are violated (Long, 1997).\footnote{The approach is called a Linear Probability Model (LPM) when the OLS method is applied to a binary dependent variable. There are many problems with LPM (Long, 1997). First, as the errors are heteroscedastic, the OLS estimator is inefficient and the standard errors are biased, resulting in incorrect test statistics. Second, the errors cannot be normally distributed. Without assuming normality, while the OLS estimates can still be unbiased, it raises problem in hypothesis testing. Third, the LPM could easily predict nonsensible values of probability $y$ that are negative or greater than 1. Finally, the model assumes an unrealistic linear relation between the independent variables and the probability of an event.} Parameters will be instead estimated by a logistic model, which has been widely used with the context of binary outcomes (Hosmer & Lemeshow, 1989; Menard, 1995).

The logistic model assumes a nonlinear S-shape relationship between independent variables and the probability of an event. The model can be expressed as follows (Long, 1997):
\[ E(Y) = \Pr(y = 1 \mid x) = \frac{\exp(X\beta)}{1 + \exp(X\beta)} \quad [4.2] \]

where \( X \) and \( B \) are the matrix form of independent variables and parameters, respectively. In equation 4.2, \( E(Y) \rightarrow 0 \) when \( XB \rightarrow -\infty \), and \( E(Y) \rightarrow 1 \) when \( XB \rightarrow +\infty \). To transform the probability into the odds:

\[
\frac{\Pr(y = 1 \mid x)}{\Pr(y = 0 \mid x)} = \frac{\Pr(y = 1 \mid x)}{1 - \Pr(y = 1 \mid x)} \quad [4.3]
\]

This expression indicates how often something (e.g., \( y = 1 \)) happens relative to how often it does not happen (e.g., \( y = 0 \)). It ranges from 0, when \( \Pr (y = 1 | x) = 0 \), to \( \infty \), when \( \Pr (y = 1 | x) = 1 \).

Taking the logarithm of the odds and solving it by equation 4.2 results in:

\[
\ln \left[ \frac{\Pr(y = 1 \mid x)}{1 - \Pr(y = 1 \mid x)} \right] = X\beta \quad [4.4]
\]

This suggests that the log of the odds, known as the logit, is linear to the independent variables.

**Interrupted time-series analysis with panel data**

The budgetary effects of the LOST in Georgia counties are analyzed by two separate pooled time-series regression models. In the first model, the dependent variable is property tax millage rate. The cases in the dataset represent 154 counties\(^{50}\) over the period 1979-2002.\(^{51}\) The focus of the analysis is the PTR effect of the LOST over time. In the second model, the dependent variables are per capita property tax, per capita total revenue, and per capita total expenditure. In this case, the dataset consists only of observations from 1985 to 2002,\(^{52}\) during which most of the counties have adopted the LOST, but it provides more detailed information about local

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\(^{50}\) In five counties, Bulloch, Habersham, Houston, Mitchell, and Rabun, the LOST is earmarked for public education, instead of property tax relief. Thus these counties are not included in the dataset.

\(^{51}\) The primary source of socioeconomic data is the *Georgia County Guide*, which is compiled annually by the Center for Agribusiness and Economic Development and the College of Family and Consumer Sciences at the University of Georgia (Bachtel & Boatright, 1982-2003). The source for fiscal data is the *Statistical Report*, published by the Georgia Department of Revenue.

\(^{52}\) Data for some additional fiscal variables come from the *Report of Local Government Finances (Counties)*, an annual survey conducted by Georgia Department of Community Affairs since 1985.
government finance. With the second model, the focus of the analysis is the levels of fungibility across counties.

The first model deals with the short-term and long-term effects of the LOST with interrupted time-series analysis (McDowell, McCleary, Meidinger, & Hay, 1980). Fluctuations in the property tax level over time may be interpreted as a historical trend disturbed by short- and long-term changes associated with the interruption.53 There are three major variables affecting property tax level. The first variable is “TREND,” an annual counter for the years 1979-2002. The coefficient for this variable is expected to be positive and significant, indicating a long-term trend toward higher property tax level (as measured by millage rate) in all counties. The second one is “SHORTTERM,” which is measured by a dummy variable scored 0 for observations made before the LOST was in effect (pre-LOST), and 1 when the LOSTs were levied (post-LOST). The coefficients are expected to be negative because of the property tax rollback. The third one is “LONGTERM,” an annual counter scored 0 for pre-LOST years, and 1, 2, 3, and so on for observations made after the second year of the LOST. It captures the long-term effect of the LOST, and the coefficient is expected to be positive. In particular, Scenario IV (Figure 4-4) assumes a linear relationship between “LONGTERM” variable and the dependent variable, while Scenario V (Figure 4-5) assumes a nonlinear relationship between them. In addition, several control variables such as population, income, homeownership, education attainment, poverty level, and so on are also employed.

One problem with the pooled time-series data is that the OLS assumption of homoskedasticity is typically violated. Differences in the “size” of the units will usually produce systematic differences in the residuals and raise the problem of heteroskedasticity (Stimson,

53 This approach was offered by Lewis-Beck (1979), and later used by Miller and Pierce (1997) to examine the effects of lotteries on education expenditures.
Luckily, many pooled regression models are available to deal with the problem (Baltagi, 1995). To account for the differences among counties, intercepts for the cross-sectional units are employed.\(^5^4\) This remedy is commonly called Least Squares with Dummy Variables (LSDV) (Kmenta, 1986; Smith, 1995; Stimson, 1985). These dummy variables effectively account for additional factors of cross-sectional differences that are not included in the model.\(^5^5\)

Another problem in using time-series data concerns autocorrelation of the error terms. Most likely, error terms are strongly correlated over time. As a result, the variance of the error terms is seriously underestimated, and the significance of the coefficients is overestimated. Nevertheless, the pooling of the cross-sectional units reduces the likelihood that autocorrelation will be severe (Stimson, 1985). The problem can be mitigated in this study, as there is a high degree of cross-sectional dominance (154 counties >18 years). In addition, the level of autocorrelation will be assessed empirically. If necessary, the Prais-Winsten regression can be used to further solve this problem (STATA, 2001).

After examining how the LOST affects property tax millage rate, the second model is used to examine the fungibility of the LOST and how it varies across counties. The dependent variables are per capita property tax, per capita total revenue, or per capita total expenditure; the key independent variable is per capita LOST revenue. In the first step, we will see how each dollar of LOST proceeds affects the property tax in the next year, and how it affects total revenue and total expenditures of the same year. Moreover, the levels of fungibility across counties are explored with an approach called Substantively Weighted Analytical Technique (SWAT).

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\(^5^4\) The number of dummy variables (N-1=153) is not small, but still manageable given the sample size.

\(^5^5\) The LSDV model, also called the fixed-effects model, assumes a fixed cross-sectional difference that does not vary over time. Alternatively, a random effect model assumes that the cross-sectional differences are stochastic. The choice between the fixed-effects model and random effect model can be justified both theoretically and empirically (STATA, 2001).
**Substantively Weighted Analytical Techniques (SWAT)**

Created by Meier and Gill (2000), SWAT is a form of regression diagnostics with a twist. It generally involves weighting data to reveal how certain organizations, programs, or policies differ in their impact on their target populations. Rather than avoiding the unusual and seeking the safety of techniques that are highly resistant to outlying cases, SWAT encourages the analyst to probe the unusual cases and understand the valuable information that they contain.

The SWAT analysis usually takes several steps (Meier & Gill, 2000). First, each of several “feature” variables is used as a base to separate a “featured group” from an “average group.” Second, the featured group and average group are compared to check whether the two groups are relatively similar in terms of other independent variables, that is, whether the two groups are different only with respect to the variable chosen to be the base of separation. This procedure is intended to check for possible spuriousness that the two groups yield different regression outcomes because of other variables. The third step involves multiple consecutive regressions with the two groups being pooled together in different relative weights. At first both groups are weighted as 1, and then the weights on the average group are gradually decreased until the final regression weights the featured cases many times higher than the average group. Finally, a graph can be presented to show how the coefficients of featured variable change in accordance with the change of relative weights.

In this study, the SWAT analysis is used to investigate whether and how the PTR effects of the LOST differ in counties with certain characterizes, such as higher property tax level, the existence of fiscal pressure, higher homeownership, or the level of sales tax exportation.
CHAPTER 5: FINDINGS -- THE ADOPTION OF THE LOST

This chapter presents and discusses research findings on the adoption of the LOST in Georgia counties. The first section introduces variables and regression models. The second section presents the results of estimation. The third section discusses several ways to interpret the statistical results. The final section summarizes the findings.

5.1 Variables and Regression Models

The adoption of the LOST in Georgia counties is analyzed by a discrete-time event history analysis. The dependent variable, the hazard rate, is the conditional probability that a Georgia county still eligible for the LOST will adopt it in a particular year. Because the probability is not directly observable, it is reflected by a dummy variable that is scored one for each case when an eligible county adopts the LOST, zero otherwise. The dependent variable is presumed determined by a set of internal and external independent variables, of which the definition, mean, and standard deviation are shown in Table 5-1.

As is discussed in Chapter 4, the motivations for the LOST adoption come from three places: property tax level, fiscal pressure, and tax exportation. The property tax level is measured in two ways, property tax millage rate (MILLAGE) and the ratio of property tax to personal income (EFBURDEN). The level of fiscal pressure is measured by the percentage of public roads that are unpaved (UNPAVED) and the percentage change of real property and utility digest (DGCHANGE). The potential of tax exportation is measured by whether a county contains a portion of interstate highway (HIGHWAY) and the ratio of taxable sales base to personal income (EXPORT). These “motivation” variables, except for DGCHANGE, are expected to have positive relations with the LOST adoption. The coefficient of DGCHANGE is expected to be negative, as a decrease of DGCHANGE is an indicator of fiscal pressure.
The obstacles to the LOST adoption take three forms. The first is Republican ideology, measured as the percentage of Republican votes in gubernatorial elections (REPUBLICAN). The second is accumulated state and local sales tax rate that has been collected in a county (TAXRATE). The third is tax competition of shopping centers within high-density metropolitan area, measured by whether a county is located within the Atlanta Metropolitan Statistical Area (ATLMSA). These variables are expected to have negative effects on the adoption.

The resources for overcoming the obstacles are related to different channels of policy diffusion. One measure of policy diffusion is the percentage of neighboring counties (sharing a common boundary) that have adopted the LOST (NEIGHBOR). The other measure is the number of counties that have adopted the LOST (OTHERLOST). These two variables are used to test the “neighboring diffusion” model and the “national (statewide) interaction” model, respectively. Their coefficients are expected to be positive. In addition, the study also controls for the changes of demographic and fiscal conditions. IMCHANGE is the percentage change of real per capita personal income, and POPCHANGE is the percentage change of population.
Table 5-1. Variables Definitions, Means, and Standard Deviations (1975-2002)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition</th>
<th>Mean</th>
<th>Std. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MILLAGE</td>
<td>Total property tax millage rate levied in the unincorporated area of a county.</td>
<td>23.17</td>
<td>6.80</td>
</tr>
<tr>
<td>EFBURDEN</td>
<td>The ratio of property tax (dollar) to personal income (thousand dollar), a measure of property tax burden.</td>
<td>2.43</td>
<td>0.85</td>
</tr>
<tr>
<td>UNPAVED</td>
<td>The percentage of local roads that are unpaved, a measure of fiscal pressure. (^a)</td>
<td>37.30</td>
<td>17.77</td>
</tr>
<tr>
<td>DGCHANGE</td>
<td>The annual percentage change in real property and utility digest, a measure of fiscal pressure.</td>
<td>0.03</td>
<td>0.12</td>
</tr>
<tr>
<td>HIGHWAY</td>
<td>Dummy variable, coded 1 if interstate highway passes through a county, zero otherwise.</td>
<td>0.34</td>
<td>----</td>
</tr>
<tr>
<td>EXPORT</td>
<td>The ratio of taxable sales base to personal income, a measure of tax exportation.</td>
<td>0.49</td>
<td>0.21</td>
</tr>
<tr>
<td>NEIGHBOR</td>
<td>The percentage of neighboring counties (sharing a common boundary) that have adopted the LOST.</td>
<td>0.37</td>
<td>0.34</td>
</tr>
<tr>
<td>OTHERLOST</td>
<td>Number of counties that have adopted the LOST.</td>
<td>69.57</td>
<td>51.51</td>
</tr>
<tr>
<td>REPUBLICAN</td>
<td>The percentage of republican votes in gubernatorial elections.</td>
<td>0.38</td>
<td>0.16</td>
</tr>
<tr>
<td>TAXRATE</td>
<td>Accumulated state and local sales tax rate that has been collected in a county.</td>
<td>3.29</td>
<td>0.71</td>
</tr>
<tr>
<td>ATLMSA</td>
<td>Dummy variable, coded 1 if located within the Atlanta Metropolitan Statistical Area, zero otherwise.</td>
<td>0.13</td>
<td>----</td>
</tr>
<tr>
<td>IMCHANGE</td>
<td>The annual percentage change of real per capita personal income.</td>
<td>0.02</td>
<td>0.07</td>
</tr>
<tr>
<td>POPCHANGE</td>
<td>The annual percentage change of population.</td>
<td>1.62</td>
<td>2.82</td>
</tr>
</tbody>
</table>

\(^a\): Because of data availability, this variable takes the value measured in 1985.

The model is analyzed by two maximum likelihood estimations. The first estimation includes all the at-risk observations during the period 1975-2002, while the second one involves only those during the period of 1975-1980.\(^56\) As is discussed above, half of the adoption occurs within the first five years since the LOST Act was enacted. The two-step analysis attempts to see whether the early adoptions were triggered by the same factors as the late adoptions were. It is hypothesized that counties with higher motivations – higher property tax level, the existence of

\(^56\) A better way to examine the structural change is to estimate the model with two divided samples (1975-1980 and 1981-2002). However, there is not enough variability in the second sample (1981-2002) because very few counties adopted the LOST during that period. As a result, the study examines the models with two overlapping periods.
fiscal pressure, or the potential of tax exportation – might adopt the LOST earlier, while others that adopted the LOST later may have done so more as an effect of tax mimicking.

5.2 Results of Estimation

The results of the estimations are shown in Table 5-2. Beginning with the analysis of the sample during 1975-2002, the analysis shows that most of the hypotheses about the motivations for the LOST adoption are supported. First, the property tax level significantly affects the adoption of the LOST. As expected, MILLAGE is positively related to the adoption (significant at the 0.05 level). Surprisingly, however, PTINCM significantly (at the 0.05 level) lowers the probability of adoption. A little further reasoning provides a possible explanation. The “perceived” property tax level (MILLAGE) and “effective” property tax level (EFBURDEN) are barely correlated (R = 0.055). When MILLAGE is controlled for, EFBURDEN actually reflects the ratio of property tax digest to personal income, that is, the “effective” size of property tax base. Thus the result suggests that counties with higher millage rates have higher propensity to adopt the LOST, while counties with broader property tax base tend not to adopt the LOST.

Second, the potential of sales tax exportation significantly increases the probability of the LOST adoption. The coefficient of HIGHWAY and EXPORT are both positive and significant at the 0.05 level.\(^57\) It suggests that counties passed by an interstate highway or those have disproportionately high taxable sales base are more eager to adopt the tax. Nevertheless, the effect of fiscal pressure does not receive support. Neither UNPAVED nor DGCHANGE is significantly related to the LOST adoption.

\(^{57}\) HIGHWAY and EXPORT are only slightly correlated (R = 0.1615).
Table 5-2. Logit Maximum Likelihood Estimates for Event History Analysis Model of LOST Adoption

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coef.</td>
<td>z</td>
</tr>
<tr>
<td>MILLAGE</td>
<td>0.05</td>
<td>2.48*</td>
</tr>
<tr>
<td>EFBURDEN</td>
<td>-0.28</td>
<td>-2.07*</td>
</tr>
<tr>
<td>UNPAVED</td>
<td>0.01</td>
<td>1.33</td>
</tr>
<tr>
<td>DGCHANGE</td>
<td>1.42</td>
<td>1.84</td>
</tr>
<tr>
<td>HIGHWAY</td>
<td>0.45</td>
<td>1.97*</td>
</tr>
<tr>
<td>EXPORT</td>
<td>1.38</td>
<td>2.68**</td>
</tr>
<tr>
<td>NEIGHBOR</td>
<td>1.15</td>
<td>2.40*</td>
</tr>
<tr>
<td>OTHERLOST</td>
<td>0.00</td>
<td>0.90</td>
</tr>
<tr>
<td>REPUBLICAN</td>
<td>-0.94</td>
<td>-0.92</td>
</tr>
<tr>
<td>TAXRATE(^a)</td>
<td>-0.73</td>
<td>-2.68**</td>
</tr>
<tr>
<td>ATLMSA(^a)</td>
<td>-2.36</td>
<td>-3.50**</td>
</tr>
<tr>
<td>IMCHANGE</td>
<td>5.17</td>
<td>3.66**</td>
</tr>
<tr>
<td>POPCHANGE</td>
<td>0.04</td>
<td>0.90</td>
</tr>
<tr>
<td>Intercept</td>
<td>-1.45</td>
<td>-1.35</td>
</tr>
</tbody>
</table>

Number of cases        953  497
Percentage of adoption 15.38 16.27
LR chi-square          76.17 44.12
Prob > chi-square       0.00  0.00

\(^a\): The two variable are dropped from the 1975-1980 model because of lacking of variation.
*: p < 0.05
**: p < 0.01

Most hypotheses about the obstacles to the adoption receive strong support. TAXRATE and ATLMSA are both negatively associated with the adoption (significant at the 0.01 level). It suggests that counties with a higher existing sales tax rate have lower probability of adoption, so do counties located within Atlanta Metropolitan Area. However, the coefficient of REPUBLICAN has the right sign but is not significant.\(^58\)

The results yield some support to the effects of policy diffusion as well. NEIGHBOR is significantly (at the 0.05 level) related to the adoption, but OTHERLOST shows no discernable

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\(^58\) REPUBLICAN is measured as the percentage of republican voters in gubernatorial elections. It is possible that this variable does not well reflect the political ideology at the local level. First, local residents may have different political preferences with local issues than at the state level. Second, the variable is measured by vote turnout rates, it may be better measured by voter registration rates, given data availability.
effect.\textsuperscript{59} It suggests that counties do mimic others in their response to the LOST, but they receive more influence from neighboring counties than from the others.\textsuperscript{60}

The overall fit of the model is reasonable. As shown in Figure 5-1, the curves of predicted and actual adoption cases fit generally well. Note that there is higher variation in the actual adoption cases. This suggests the level of uncertainty in the LOST adoption beyond the explanation of the tested model.

\textbf{Figure 5-1 The Actual and Predicted Cases of The LOST adoption in Georgia Counties}

The analysis based on the sample in the early period (1975-1980) yields slightly different results. Most motivation variables have seen their coefficients doubled. The effects of millage rate and the presence of an interstate highway become significant at the 0.01 level, and the effect of UNPAVED receives support at the 0.05 level. In contrast, the coefficient of neighboring effect drops by half and become insignificant. Evidently, the property tax level, the potential of

\textsuperscript{59} NEIGHBOR and OTHERLOST are strongly correlated (R = 0.616).

\textsuperscript{60} In addition, the coefficient of IMCHANGE is significant (at the 0.01 level) while that of POPCHANGE is not.
tax exportation, and fiscal pressure play a more important role in the LOST adoption during the early years, while the neighboring effect looms larger later.

5.3 The Interpretation of Statistical Results

One drawback of the logistic model is the difficulty in interpreting statistical results. Unlike the case in linear regression models, the magnitude of effects in logistic models cannot be viewed directly from the coefficients. In this study, the effects of the independent variables on the LOST adoption are interpreted in three ways: the (overall) ranges of probabilities, the partial ranges of probabilities, and the factor change coefficients of odds (Long, 1997).

| Table 5-3. Ranges of Probabilities of the LOST Adoption |
|---------------------------------|---------------------------------|---------------------------------|
|                                | Max   | Min   | Range of Pr. | Max   | Min   | Range of Pr. |
| Estimated probabilities        | 0.56  | 0.00  | 0.56         | 0.68  | 0.01  | 0.67         |
| Hypothetical extremes          | 0.90  | 0.00  | 0.90         | 0.94  | 0.00  | 0.94         |

a. These are the maximum and minimum predicted probabilities of the observations.  
b. Hypothetical extremes are estimated based on the range of each individual independent variables that are significant in the estimation.

The ranges of probabilities, given in Table 5-3, show the biggest impacts the independent variables can have on the LOST adoption. Distinction should be made between the estimated range and the hypothetical range. The estimated range is calculated based on the predicted probabilities of actual observations. For instance, it ranges from 0.00 to 0.56 according to the estimation with all the observations during 1975-2002. The hypothetical range is calculated with the assumption that the observations can have any combination of independent variables within
their ranges in the sample (Long, 1997). With regards to the 1975-2002 estimation, the probability of the LOST adoption can range, hypothetically, from 0.00 to 0.90. That is, if a county located outside the Atlanta MSA contains a portion of an interstate highway and has the maximum values in MILLAGE, EXPORT, and NEIGHBOR, as well as the minimum value in EFBURDEN, it is almost certain (probability = 90%) that the county will adopt the LOST right away. This shows the explanatory power of the model.

The partial ranges of probabilities show the effect of each variable on the predicted probability, that is, the extent to which change in a variable affects the LOST adoption. The way to do this is to allow one variable to vary from its minimum to its maximum, with all other variables fixed at their means. The results are given in Table 5-4. In the first five years since the LOST Act was enacted, for instance, (1) the change of MILLAGE from its minimum to its maximum would lead to an increase of 35 percent in the probability of adoption, (2) the change

<table>
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<tbody>
<tr>
<td></td>
<td>At Max.</td>
<td>At Min.</td>
<td>Range of Pr.</td>
<td>At Max.</td>
</tr>
<tr>
<td>MILLAGE</td>
<td>0.26</td>
<td>0.05</td>
<td>0.21</td>
<td>0.40</td>
</tr>
<tr>
<td>EFBURDEN</td>
<td>0.04</td>
<td>0.21</td>
<td>0.17</td>
<td>0.03</td>
</tr>
<tr>
<td>UNPAVED</td>
<td>0.17</td>
<td>0.09</td>
<td>0.08</td>
<td>0.23</td>
</tr>
<tr>
<td>HIGHWAY</td>
<td>0.15</td>
<td>0.10</td>
<td>0.05</td>
<td>0.23</td>
</tr>
<tr>
<td>EXPORT</td>
<td>0.27</td>
<td>0.07</td>
<td>0.20</td>
<td>0.31</td>
</tr>
<tr>
<td>NEIGHBOR</td>
<td>0.23</td>
<td>0.08</td>
<td>0.15</td>
<td>0.24</td>
</tr>
<tr>
<td>TAXRATE</td>
<td>0.01</td>
<td>0.14</td>
<td>0.13</td>
<td>----</td>
</tr>
<tr>
<td>ATLMSA</td>
<td>0.02</td>
<td>0.16</td>
<td>0.14</td>
<td>----</td>
</tr>
</tbody>
</table>

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<tbody>
<tr>
<td></td>
<td>At Max.</td>
<td>At Min.</td>
<td>Range of Pr.</td>
<td>At Max.</td>
</tr>
<tr>
<td>MILLAGE</td>
<td>0.26</td>
<td>0.05</td>
<td>0.21</td>
<td>0.40</td>
</tr>
<tr>
<td>EFBURDEN</td>
<td>0.04</td>
<td>0.21</td>
<td>0.17</td>
<td>0.03</td>
</tr>
<tr>
<td>UNPAVED</td>
<td>0.17</td>
<td>0.09</td>
<td>0.08</td>
<td>0.23</td>
</tr>
<tr>
<td>HIGHWAY</td>
<td>0.15</td>
<td>0.10</td>
<td>0.05</td>
<td>0.23</td>
</tr>
<tr>
<td>EXPORT</td>
<td>0.27</td>
<td>0.07</td>
<td>0.20</td>
<td>0.31</td>
</tr>
<tr>
<td>NEIGHBOR</td>
<td>0.23</td>
<td>0.08</td>
<td>0.15</td>
<td>0.24</td>
</tr>
<tr>
<td>TAXRATE</td>
<td>0.01</td>
<td>0.14</td>
<td>0.13</td>
<td>----</td>
</tr>
<tr>
<td>ATLMSA</td>
<td>0.02</td>
<td>0.16</td>
<td>0.14</td>
<td>----</td>
</tr>
</tbody>
</table>

For instance, the lower extreme of the probabilities is calculated by setting each independent variable associated with a positive $\beta$ to its minimum and each independent variable associated with a negative $\beta$ to its maximum. Note that observations with this combination of independent variables do not necessarily approximate any member of the sample (Long, 1997). The hypothetical range of probabilities and the partial range of probabilities are predicted by the Clarify software program created by King et al. (2000).
of EXPORT in the same way would lead to an increase of 24 percent, and (3) the similar change of UNPAVED, 16 percent. The results suggest that the property tax level and the potential of tax exportation play more important roles in the adoption than fiscal pressure does during the period.63

Figure 5-2 compares the probability of adoption for counties that have different values of MILLAGE and EXPORT. As the figure shows, the chance of the adoption rises with counties that have higher property tax millage rate or/and higher potential of tax exportation, and the combined effects of the two variables are significant. It is almost certain that a county with the minimum values of both MILLAGE and EXPORT would not adopt the LOST (p = 2.4%); in contrast, a county with the highest values of MILLAGE and EXPORT is very likely to adopt the tax (p = 63.1%).

![Figure 5-2](image)

**Figure 5-2 Partial Ranges of Probability for MILLAGE and EXPORT**

63 Note that all variables account for bigger range of probabilities for the early adopters. It does not necessarily mean that these variables have higher impact in the early years, however, as the same results can be yielded simply because the 1975-1980 estimation has higher predicted probabilities in general than the 1975-2002 one.
The estimation results can also be interpreted as the factor change coefficients of odds. This method takes advantage of the tractable form of the logistic model, which is linear in the log of the odds, known as the logit. Consequently, for a unit change in variable $X_k$, we expect the logit to change by $\beta_k$, and the odds of the LOST adoption to change by a factor of $\exp(\beta_k)$, holding all other variables constant. Moreover, for a standard deviation change in $X_k$, we expect the odds of the LOST adoption to change by a factor of $\exp(\beta_k \times S_k)$, holding all other variables constant.

The results are given in Table 5-5 and Table 5-6. The motivation variables – millage rate, unpaved public roads, and presence of an interstate highway – account for higher factor change in the odds during the earlier years of the LOST. In contrast, the variable of neighboring effect accounts for lower factor change during 1975-1980, i.e., the diffusion effect is stronger after the earlier years of the LOST.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Logit Coefficient</th>
<th>Factor Change</th>
<th>Standard Factor Change</th>
<th>z-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>MILLAGE</td>
<td>0.05</td>
<td>1.05</td>
<td>1.40</td>
<td>2.48*</td>
</tr>
<tr>
<td>EBFURDEN</td>
<td>-0.28</td>
<td>0.76</td>
<td>0.79</td>
<td>-2.07*</td>
</tr>
<tr>
<td>UNPAVED</td>
<td>0.01</td>
<td>1.01</td>
<td>1.19</td>
<td>1.33</td>
</tr>
<tr>
<td>HIGWAY</td>
<td>0.45</td>
<td>1.57</td>
<td>----</td>
<td>1.97*</td>
</tr>
<tr>
<td>EXPORT</td>
<td>1.38</td>
<td>3.97</td>
<td>1.34</td>
<td>2.68*</td>
</tr>
<tr>
<td>NEIGHBOR</td>
<td>1.15</td>
<td>3.16</td>
<td>1.48</td>
<td>2.40*</td>
</tr>
<tr>
<td>TAXRATE</td>
<td>-0.73</td>
<td>0.48</td>
<td>0.60</td>
<td>-2.68**</td>
</tr>
<tr>
<td>ATLMSA</td>
<td>-2.36</td>
<td>0.09</td>
<td>----</td>
<td>-3.50**</td>
</tr>
</tbody>
</table>

*: $p < 0.05$

**: $p < 0.01$
Table 5-6. Factor Change Coefficients for the Logit Model of the LOST Adoption (1975-1980)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Logit Coefficient</th>
<th>Factor Change</th>
<th>Standard Factor Change</th>
<th>z-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>MILLAGE</td>
<td>0.09</td>
<td>1.09</td>
<td>1.84</td>
<td>3.12**</td>
</tr>
<tr>
<td>EFBURDEN</td>
<td>-0.44</td>
<td>0.64</td>
<td>0.69</td>
<td>-1.90*</td>
</tr>
<tr>
<td>UNPAVED</td>
<td>0.02</td>
<td>1.02</td>
<td>1.43</td>
<td>2.01*</td>
</tr>
<tr>
<td>HIGWAY</td>
<td>0.92</td>
<td>2.51</td>
<td>----</td>
<td>3.14**</td>
</tr>
<tr>
<td>EXPORT</td>
<td>1.58</td>
<td>4.85</td>
<td>1.39</td>
<td>2.32*</td>
</tr>
<tr>
<td>NEIGHBOR</td>
<td>0.65</td>
<td>1.92</td>
<td>1.25</td>
<td>0.85</td>
</tr>
</tbody>
</table>

*: \( p < 0.05 \)
**: \( p < 0.01 \)

5.4 Discussions

This section examines the adoption of the LOST in Georgia counties using socioeconomic and fiscal data during the period 1979-2002. The discrete-time event history analysis provides support for most of the hypotheses about the LOST adoption and yield additional clues for further exploration. To conclude, counties with higher property tax millage rates and higher potentials of sales tax exportation show higher propensities to adopt the LOST, and these effects are especially strong in the early years. The results about the effect of fiscal pressure is mixed. The percentage change of real property and utility digest does not have a significant effect, while the percentage of unpaved public roads has an effect only in the early years. In contrast, the effect of tax mimicking looms larger in the later period when many counties have already adopted the tax.

The results suggest that the property tax level plays a more important role in the LOST adoption than the existence of fiscal pressure. One caveat, however, is that fiscal pressure may be measured in some other ways, such as the ratio of revenue to expenditure or governmental deficits/debts. These measures should be incorporated in future studies given data availability.
CHAPTER 6: FINDINGS – THE BUDGETARY EFFECTS OF THE LOST

This chapter presents and discusses research findings on the budgetary effects of the LOST in Georgia counties. The first section examines the LOST’s effect on property tax millage rates, and how the effect changes over time. The second section examines how each extra dollar of the LOST, on average, affects property tax, total revenue and public expenditure. The third section takes a step further to explore different levels of fungibility across counties.

6.1 The LOST’s Effect on Property Tax Millage Rates

The budgetary effects of the LOST in Georgia counties are analyzed by two separate pooled time-series regression models. The first one is an interrupted time-series model, of which the research findings are reported in this section. In this model, the dependent variable is property tax millage rate (MILLAGE), and the focus of the analysis is whether the LOST has lowered the millage rates and how this effect has changed over time.

Based on the interrupted time-series model, the fluctuations in the millage rates over time are interpreted as a historical trend disturbed by short- and long-term changes associated with the LOST adoption. There are three major independent variables: TREND (an annual counter), SHORTTERM (LOST dummy with one year lag), and LONGTERM (an annual counter after the second year of the LOST). The model also controls for population, personal income as well as other socioeconomic variables.

The cases in the dataset represent 154 counties over the period 1979-2002. The primary source of the data is the Georgia County Guide and the Statistical Report. Table 6-1 shows the summary statistics and definitions of variables employed in the regression analysis. The model is estimated by pooled regression analysis, which incorporates both cross-sectional and time-series data in a single analysis. The major strength of this approach is its ability to capture
variations in terms of both time and space (Baltagi, 1995; Hsiao, 1986; Kmenta, 1997). It increases the number of available observations, and enables better identification and measurement of effects that are “simply not detectable in pure cross-sections or pure time-series data” (Baltagi, 1995:5). The most commonly used pool regression models are fix-effects regression and random-effects regression. The choice of appropriate model is contingent upon assumptions and diagnoses of the error terms. In this study, a fixed-effects model is employed to account for the difference among the counties and other omitted factors of cross-sectional differences.64

The study runs three regressions that are slightly different from each other. Regression 1-1 takes into account only the short-term effect of the LOST dummy. The underlying assumption is Scenario III, in which the millage rate is rolled back to a certain degree after the second year of the LOST. Regression 1-2 considers not only the short-term effect of the LOST, but also a long-term effect which is assumed to be linear. The underlying assumption is Scenario IV (“fiscal illusion”), in which the millage rate is rolled back since the second year of the LOST adoption but increases faster in the post-LOST period. In Regression 1-3, however, the long-term variable is log-transformed to reflect a curvilinear relationship between MILLAGE and LONGTERM – this is the case in Scenario V (“rational choice”), which assumes that the millage rate grows faster especially in the beginning years of the LOST until the millage rate reaches a new “equilibrium.”

64 In this study the use of fixed-effects model can be justified both theoretically and empirically. First, the dataset consists of almost all the counties in Georgia, and the results are not to be generalized to a larger population. In this case, the fixed-effects model is more suitable than the random-effects model. Second, a Hausman test is used to test the null hypothesis that the coefficients estimated by the efficient random-effects estimator are the same as the ones estimated by the consistent fixed-effects estimator. The null hypothesis is rejected.
The three regressions are estimated by Prais-Winsten Regressions with panel-corrected standard errors (PCSE), and the results are reported in Table 6-2. Several observations are similar across the board. First, three regressions have high R-squared values (about 0.88) even when the panel-specific autocorrelations have been adjusted. Second, the coefficients of TREND range from 0.26 to 0.37; all are significant at the 0.01 level. These reflect a general trend of increased millage rate over time. Third, the coefficients of SHORTTERM range from –1.23 to –1.34; all are significant at the 0.01 level. It suggests that on average the property tax rate is rolled back slightly above 1 mill after the LOST.

65 The PCSE uses Prais-Winsten transformation, which is an improvement to the original Cochrane-Orcutt algorithm for estimating time series regressions in the presence of autocorrelated errors. When computing the standard errors and the variance-covariance estimates, PCSE assumes that the disturbances are, by default, heteroskedastic and contemporaneously correlated across panels.

66 County-specific effects are controlled, and the results suggest that there are strong first-order autocorrelation (most p-values range from 0.3 to 0.7). In addition, regression diagnoses show that there is no serious problem of multicollinearity. The bivariate correlations are high between TREND and LONGTERM (r = 0.83) and between INCOME and EDULEVEL (r = 0.81), but the VIF values of these variables remain low (for INCOME, VIF = 5.8; for TREND, VIF = 4.9; for LONGTERM, VIF = 4.4; and for EDULEVEL, VIF = 4.4).
<table>
<thead>
<tr>
<th>Variables</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dependent Variable</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MILLAGE</td>
<td>5.9</td>
<td>56.6</td>
<td>23.2</td>
<td>6.11</td>
</tr>
<tr>
<td><strong>Independent Variables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TREND</td>
<td>9</td>
<td>32</td>
<td>20.1</td>
<td>6.7</td>
</tr>
<tr>
<td>SHORTTERM</td>
<td>0</td>
<td>1</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>LONGTERM</td>
<td>0</td>
<td>25</td>
<td>8.7</td>
<td>7.0</td>
</tr>
<tr>
<td>POP</td>
<td>1,841</td>
<td>825,431</td>
<td>39,448</td>
<td>88,816</td>
</tr>
<tr>
<td>DENSITY</td>
<td>5.2</td>
<td>2502.8</td>
<td>120.2</td>
<td>261.6</td>
</tr>
<tr>
<td>AGE65</td>
<td>0.7%</td>
<td>27.2%</td>
<td>12.1%</td>
<td>3.2%</td>
</tr>
<tr>
<td>INCOME</td>
<td>4,193</td>
<td>26,485</td>
<td>10,517</td>
<td>2,324</td>
</tr>
<tr>
<td>UNPAVED</td>
<td>0.2%</td>
<td>89.6%</td>
<td>37.3%</td>
<td>16.7%</td>
</tr>
<tr>
<td>HMOWNER</td>
<td>14.3%</td>
<td>89.3%</td>
<td>71.3%</td>
<td>8.4%</td>
</tr>
<tr>
<td>EDULEVEL</td>
<td>3.5%</td>
<td>43.6%</td>
<td>10.9%</td>
<td>5.6%</td>
</tr>
<tr>
<td>REPUBLICAN</td>
<td>17.0%</td>
<td>81.3%</td>
<td>51.7%</td>
<td>12.3%</td>
</tr>
<tr>
<td>HOMESTEAD</td>
<td>0</td>
<td>1</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>SPLOST</td>
<td>0</td>
<td>1</td>
<td>----</td>
<td>----</td>
</tr>
</tbody>
</table>

**Variable Definitions**

- **MILLAGE**: Total property tax millage rate levied in the unincorporated area of a county.
- **TREND**: An annual counter starts from 1970 (1970 is coded 0)
- **SHORTTERM**: LOST dummy with one year lag
- **LONGTERM**: An annual counter starts from the third year of the LOST
- **POP**: Population size
- **DENSITY**: Population density; number of people per acre
- **AGE65**: Percentage of population of age 65 or above
- **INCOME**: Per capita personal income, constant (1982) dollars
- **UNPAVED**: Percentage of local roads that are unpaved, a measure of fiscal pressure.
- **HMOWNER**: Percentage of housing units occupied by the owner
- **EDULEVEL**: Percentage of population with four-year college degree or higher.
- **REPUBLICAN**: Percentage of votes who voted for Republican presidential candidates
- **HOMESTEAD**: Homestead Local Option Sales Tax dummy
- **SPLOST**: Special Purpose Local Option Sales Tax dummy

**Data Sources:**
The University of Georgia, *The Georgia County Guide* various issues.

*a: Summary statistics are presented based on 3459 observations that are used to estimate parameters in Table 6-1.*
Table 6-2 The Effect of the LOST on Property Tax Millage Rates

<table>
<thead>
<tr>
<th>Variables</th>
<th>Regression 1-1&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Regression 1-2&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Regression 1-3&lt;sup&gt;c&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>TREND</td>
<td>0.32</td>
<td>7.44**</td>
<td>0.37</td>
</tr>
<tr>
<td>SHORTTERM</td>
<td>−1.23</td>
<td>−5.10**</td>
<td>−1.34</td>
</tr>
<tr>
<td>LONGTERM</td>
<td></td>
<td></td>
<td>−0.05</td>
</tr>
<tr>
<td>LONGLOG&lt;sup&gt;d&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>POP</td>
<td>0.00002</td>
<td>2.02**</td>
<td>0.00002</td>
</tr>
<tr>
<td>DENSITY</td>
<td>−0.01</td>
<td>−4.09**</td>
<td>−0.01</td>
</tr>
<tr>
<td>AGE65</td>
<td>−7.17</td>
<td>−0.79</td>
<td>−8.04</td>
</tr>
<tr>
<td>INCOME</td>
<td>−0.003</td>
<td>−2.12**</td>
<td>−0.003</td>
</tr>
<tr>
<td>UNPAVED</td>
<td>−0.30</td>
<td>−0.14</td>
<td>−0.37</td>
</tr>
<tr>
<td>HMOWNER</td>
<td>26.90</td>
<td>7.22**</td>
<td>26.90</td>
</tr>
<tr>
<td>EDULEVEL</td>
<td>−16.82</td>
<td>−3.35**</td>
<td>−17.15</td>
</tr>
<tr>
<td>REPUBLICAN</td>
<td>−3.66</td>
<td>−2.57**</td>
<td>−3.73</td>
</tr>
<tr>
<td>HOMESTEAD</td>
<td>−5.44</td>
<td>−3.80**</td>
<td>−5.64</td>
</tr>
<tr>
<td>SPLOST</td>
<td>0.28</td>
<td>1.75*</td>
<td>0.28</td>
</tr>
</tbody>
</table>

Observations: 3459 3459 3459
Estimated coef.e 163 164 164
Adjusted R² 0.86787 0.86846 0.86804

Note: The parameters are estimated by Prais-Winsten regressions with panel-corrected standard errors (PCSE). County-specific effects are controlled. There is strong first-order autocorrelation, the coefficient of which is assumed specific to each panel.

a. Model 1-1 assumes that the LOST provides a rollback of millage rates, which is captured by the LOST dummy with one-year lag (SHORTTERM).
b. Model 1-2 assumes that the LOST provides not only a short-term rollback of millage rates (SHORTTERM), but also a long-term effect which is linear (LONGTERM).
c. Model 1-3 assumes that the LOST provides not only a short-term rollback of millage rates (SHORTTERM), but also a long-term effect which is curvilinear (LONGLOG).
d. Log-transformed value of LONGTERM (LONGLOG = lg[LONGTERM+1]).
e. Coefficients of the county-specified effects are not presented.

*: P < 0.1; **: P < 0.05; ***: P < 0.01

In addition, the results suggest that many controlling variables are significantly associated with the millage rates. Population density and personal income have negative effects; a possible explanation is that counties that are more industrialized tend to have a more diverse and larger tax base, and thus they can levy sufficient property tax without high property tax millage rates. The percentage of Republican votes has a negative effect; it suggests that political ideology matters in local revenue decisions (Nice, 1987). The education attainment has a negative effect, probably because people with higher education tend to be more aware and care more about their
tax burden (Chelf, 1984). Special Purpose Local Option Sales Tax (SPLOST) has a positive effect; it supports the argument that SPLOST may lead to higher operational expenditures (Jung, 2002).67

The key to the analysis, however, is in the comparison among the three regressions. First, compared to Regression 1-1, Regressions 1-2 and 1-3 both have higher adjusted-\(R^2\)s, although the differences are small, and both have better estimations about the LOST’s short-term effect, as are indicated by higher absolute value of the Z-scores. The results suggest Scenario III reflects an incomplete picture, and the model can be slightly improved by adding a long-term variable. Second, the coefficient of LONGLOG is positive as expected and significant at the 0.05 level (Regression 1-3), while that of LONGTERM is insignificant (Regression 1-2). The results suggest that the long-term effect of the LOST is curvilinear. The millage rate grows much faster in the beginning years during the post-LOST period, but this effect diminishes over time.

If one were to assume a county with the median millage rate adopted the LOST in 1980, the change of millage rate over time could be depicted as in Figure 6-1, based on the regression results of Regression 1-3. Before the LOST, the millage rate increased 0.26 mill each year. In 1981, the second year of the LOST, it was rolled back by 1.31 mill. After 1981, however, it increased much faster than before, gradually caught up and eventually exceeded the projected level of millage rate if the LOST were not adopted. Surprisingly, the results as shown in Figure 6-1 reflect a combination of “rational choice” and “fiscal illusion.” On the one hand, the speed of growth during the post-LOST period levels off over time, which lends weight to the “rational choice” scenario (Hypothesis 7). On the other, the millage rate quickly recovered from the rollback within 10 years and eventually became even higher than the pre-LOST trend. This sketch provides support to the “fiscal illusion” theory (Hypothesis 6).

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67 The correlation between LOST and SPLOST (as dummies) is moderate (\(r = 0.46\)).
To summarize, this section discusses the finding about the LOST’s effect on property tax millage rates. Property tax millage rate, being highly visible, is normally the “perceived” property tax level. In Chapter 5 it is found that the adoption of the LOST was strongly affected by the counties’ property tax millage rates. Thus it is reasonable to examine the budgetary effects of the LOST on the millage rates. Nevertheless, caution should be taken that property tax millage rate is not an accurate measure of the property tax level unless the property assessment is controlled for.

The research findings in this section are interpreted under the assumption that the changes in the property assessment are not correlated with the LOST adoption. There are two caveats about this assumption. First, the adoption of the LOST increases the tax burden of living or doing business in a county. As a result the county may suffer from losing both population or tax base due to tax competition, and thus might experience a decreased size of property digest. Second, counties in Georgia may lose part of their property tax bases for homestead exemptions, which
are applied to homestead property owned by the taxpayer and occupied as his or her legal residence. The State of Georgia requires certain level of homestead exemption, and some counties provide more beneficial homestead exemptions above the amounts offered by the state. Homestead exemptions in Georgia have increased over time, and thus counties may have to increase their millage rates to maintain the same amount of property tax revenue. For these two reasons, caution should be advised. The rise of millage rates in the post-LOST period may have been driven in part by an effort to compensate for the lowered property digest, because of either tax competition or increased homestead exemptions.

6.2 The LOST’s Effect on Property Tax, Total Revenue, and Total Expenditure

After examining the LOST’s impact on the millage rates over time, another pooled time-series model is used to explore the fungibility of LOST revenues – how each extra dollar of the LOST affects property tax revenue, total revenue, or governmental expenditure. This model uses another dataset which come from the Report of Local Government Finances (Counties), an annual survey conducted by Georgia Department of Community Affairs since 1985. Table 6-3 shows the summary statistics and definition of variables in this model.

In this model there are three regressions, each with different dependent variables. Regression 2-1 tests how much an extra dollar of LOST reduces per capita property tax that is collected in

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68 For more details, see Property Tax Guide for the Georgia Taxpayer: Homestead Exemption, Georgia Department of Revenue. Retrieved 03/18, 2005, from http://www2.state.ga.us/departments/dor/ptd/adm/taxguide/exempt/Exemptions
69 The State of Georgia increases state homestead exemption over time, but the state-required exemption is funded by the state budget and thus does not affect local governments’ property tax millage rates. Nevertheless, counties also increase additional homestead exemptions that are provided above the state-required level. The increase of these exemptions does decrease property tax digests of Georgia counties.
70 According to Georgia Department of Revenue’s official website, about 70% of Georgia counties have local homestead exemptions. However, to what extent local homestead exemptions in Georgia would affect property tax base remains an unanswered empirical question. Most homestead exemptions at the local level require means test, with strict limitations on age, income or status of veteran. In addition, it is the responsibility of the eligible taxpayers to claim the exemptions. In a telephone survey, Baer (1998) finds that many homeowners who are eligible for homestead exemptions are not aware of this fact. Among those who are aware of the exemptions, still many choose not to participate.
71 Compared with the dataset used in the millage rate model, this dataset has several weaknesses. It covers a shorter time period; it has more data points missing; and it may be less reliable as it comes from un-audited survey results. But this dataset consists of more variables about local government finance in Georgia counties.
the second year; Regression 2-2 analyzes how much an extra dollar of LOST increases the total revenue; Regression 2-3 examines how much an extra dollar of LOST increases the level of total spending. In all three regressions, the key independent variables include TREND (the annual counter) and per capita LOST revenue (the current year value and the value with a one year lag). The model also controls for population, personal income as well as other socioeconomic variables.72

Table 6-3 Variable Definitions and Summary Statistics

<table>
<thead>
<tr>
<th>Variables</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dependent Variable</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PROPTAX</td>
<td>0.94</td>
<td>548.3</td>
<td>107.0</td>
<td>51.5</td>
</tr>
<tr>
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<td>1030.3</td>
<td>253.7</td>
<td>94.2</td>
</tr>
<tr>
<td>EXPENDITURE</td>
<td>21.3</td>
<td>1110.9</td>
<td>280.1</td>
<td>118.0</td>
</tr>
<tr>
<td><strong>Independent Variables</strong></td>
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<td></td>
</tr>
<tr>
<td>TREND</td>
<td>14</td>
<td>31</td>
<td>22.5</td>
<td>5.2</td>
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<tr>
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<td>33.6</td>
<td>19.3</td>
</tr>
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<td>41,842</td>
<td>92,797</td>
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<td>2491.8</td>
<td>125.9</td>
<td>273.2</td>
</tr>
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<td>27.2%</td>
<td>12.3%</td>
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</tr>
<tr>
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<td>70.9%</td>
<td>35.8%</td>
<td>16.7%</td>
</tr>
<tr>
<td>HMOWNER</td>
<td>16.8%</td>
<td>88.7%</td>
<td>72.6%</td>
<td>8.2%</td>
</tr>
<tr>
<td>EDULEVEL</td>
<td>4.2%</td>
<td>42.5%</td>
<td>11.4%</td>
<td>5.9%</td>
</tr>
<tr>
<td>REPUBLICAN</td>
<td>17.0%</td>
<td>81.3%</td>
<td>54.3%</td>
<td>11.2%</td>
</tr>
<tr>
<td>HOMESTEAD</td>
<td>0</td>
<td>1</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>SPLOST</td>
<td>0</td>
<td>1</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td><strong>Additional Variable Definitions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PROPTAX:</td>
<td>Per capita property tax collected, constant (1982) dollars</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>REVENUE:</td>
<td>Per capita total own source revenue collected, constant (1982) dollars</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EXPENDITURE:</td>
<td>Per capita total expenditure, constant (1982) dollars</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LOSTS:</td>
<td>Per capita LOST revenue, constant (1982) dollars</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LOSTSLAG:</td>
<td>Per capita LOST revenue with one year lag, constant (1982) dollars</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Data Sources:
The University of Georgia, *The Georgia County Guide* various issues.
a: Summary statistics are presented based on 2718 observations that are used to estimate parameters in Table 6-3.

72 Note that, unlike the interrupted time-series regressions in the millage rate model, these regressions do not have SHORTTERM and LONGTERM variables.
Table 6-4  The Effect of the LOST on Property Taxes, Revenues, and Expenditures

<table>
<thead>
<tr>
<th>Variables</th>
<th>Regression 2-1: PROPTAX</th>
<th>Regression 2-2: REVENUE</th>
<th>Regression 2-3: EXPENDITURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>TREND</td>
<td>1.04</td>
<td>2.99***</td>
<td>5.20</td>
</tr>
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<td>-0.46</td>
<td>-4.38***</td>
<td>-----</td>
</tr>
<tr>
<td>LOSTS</td>
<td>-----</td>
<td>-----</td>
<td>0.74</td>
</tr>
<tr>
<td>POP</td>
<td>-0.0002</td>
<td>-1.81*</td>
<td>-0.0006</td>
</tr>
<tr>
<td>DENSITY</td>
<td>0.01</td>
<td>0.38</td>
<td>0.16</td>
</tr>
<tr>
<td>AGE65</td>
<td>-20.69</td>
<td>-0.29</td>
<td>-6.64</td>
</tr>
<tr>
<td>INCOME</td>
<td>0.003</td>
<td>1.78*</td>
<td>0.008</td>
</tr>
<tr>
<td>UNPAVED</td>
<td>-11.68</td>
<td>-0.76</td>
<td>12.46</td>
</tr>
<tr>
<td>HMOWNER</td>
<td>295.98</td>
<td>4.71***</td>
<td>213.51</td>
</tr>
<tr>
<td>EDULEVEL</td>
<td>233.02</td>
<td>3.09***</td>
<td>161.50</td>
</tr>
<tr>
<td>REPUBLICAN</td>
<td>-1.56</td>
<td>-0.12</td>
<td>12.72</td>
</tr>
<tr>
<td>HOMESTEAD</td>
<td>-48.36</td>
<td>-2.66***</td>
<td>14.44</td>
</tr>
<tr>
<td>SPLOST</td>
<td>1.50</td>
<td>1.46</td>
<td>34.89</td>
</tr>
</tbody>
</table>

Observations   | 2311             | 2473             | 2473             |
Estimated coef.: | 160              | 160              | 160              |
Adjusted $R^2$  | 0.8783           | 0.8923           | 0.6811           |

Note: The parameters are estimated by Prais-Winsten regressions with panel-corrected standard errors (PCSEs). County-specific effects are controlled. There is strong first-order autocorrelation, the coefficient of which is assumed to be specific to each panel.

a: Coefficients of the county-specified effects are not presented.
*: P < 0.1; **: P < 0.05; ***: P < 0.01

As is the case in the millage rate model, the three regressions control for county specific effects, and they are estimated by Prais-Winsten Regressions with panel-corrected standard errors (PCSE). The results are reported in Table 6-4. All these models fit very well even when the panel-specific autocorrelations have been adjusted. In all three regressions, the coefficients of TREND are positive and significant at the 0.01 level. On average, per capita property tax revenue in Georgia counties grows $1.04 each year, while per capita total revenue grows $5.20. At the same time, per capita total expenditure grows $5.41 each year. The results reflect the fact that local governments increase their reliance on alternative sources of revenue. The focus of

73. Because of the research method, the model has effectively controlled for heterogeneity, heteroscedasticity, and autocorrelation. In addition, regression diagnoses show that there is no serious problem of multicollinearity. The only bivariate correlation that is high is between INCOME and EDULEVEL (r = 0.85), but their VIF values are still low (for INCOME, VIF = 5.4; for EDULEVEL, VIF = 4.6).
this study, nevertheless, is on the effects of LOST revenues. As the regressions show, an extra dollar of the LOST reduces 46 cents of the property tax that is collected in the second year. Meanwhile, an extra dollar of the LOST increases total revenue for the same year by 74 cents, while it increases total expenditure by 65 cents. Therefore, the findings suggest that the LOST has more impact on current year revenue and expenditure than on the property tax that are collected the next year.

Jung (2001) finds that an extra dollar of LOST revenue provides about 28 cents in property tax relief. This study, however, finds a much larger effect of the LOST (46 cents) in the same setting. One possible explanation for the difference is data coverage. Jung (2001) covers a 13-year period for 136 Georgia counties, while this study covers an 18-year period for 151 counties. Nevertheless, this study extends Jung (2001) to more recent years, which tend to minimize rather than magnify the PTR effect. Therefore, the difference is most probably driven by model specifications. In particular, this study controls for TREND, the annual counter, and it finds that per capita property tax is increasing over time. Without controlling for this trend, Jung (2001) may have underestimated the PTR effect of the LOST.

74 As is explored in the subsequent section, different coverage of counties can account for some of the discrepancy, but the difference is not that big.
6.3 SWAT analysis: The Levels of Fungibility Across Counties

A previous study suggests that local governments may respond to the LOST in different ways (Wisconsin Taxpayers Alliance, 2002). If the fiscal behavior is a result of “rational choice,” we would expect that the PTR effect of the LOST varies across counties, depending on their fiscal or socioeconomic conditions. This variation is preliminarily analyzed here with the Substantively Weighted Analytical Technique (Meier & Gill, 2000).

The SWAT analysis usually takes several steps. First, each of several “feature” variables is used as a base to separate a “featured group” from an “average group.” These variables include property tax level, fiscal pressure, homeownership, and the extent of tax exportation. Second, the featured group and average group are compared to check whether the two groups are relatively similar in terms of other independent variables, that is, whether the two groups are different only with respect to the variable chosen to be the base of separation. This procedure is intended to check for possible spuriousness that the two groups yield different regression outcomes because of other variables. The third step involves 10 consecutive regressions, with the two groups pooled together in different relative weights. At the beginning, both groups are weighted as 1, and then the weights on the average group are gradually decreased until the final regression weights the featured cases 10 times higher than the average group. This procedure is designed to investigate how the featured group differ from the average group with regards to the LOST’s effects. An alternative way to detect these differences is to separate the counties as several subgroups and do separate regressions. But the iterative process of SWAT analysis has its advantages in that the featured group is investigated in the context of the entire data set.76

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75 Each of these regressions applies the same model as that of the pooled time series analysis discussed in the previous section. 76 The SWAT estimation is more efficient with more degree of freedom. Second, the iterative process assumes that all other independent variables have the same effects across counties, which enhances the comparability among the regressions. For more about the justification for the iterative process rather than the separate regression process, see Bartles (1997) and Meier (Meier & Gill, 2000).
Note that, however, the results of SWAT analysis are estimated from a “hypothetical population.” They are not to be generalized in the actual, existing population. After the iterative process, a table or graph can be presented to compare the coefficients in the 10 regressions. It indicates how the counties with certain features, such as higher property tax level or more fiscal pressure, respond differently to the LOST proceeds than do the average counties.

**SWAT analysis with respect to property tax millage rates**

According to the tax mimicking theory, counties have “yardstick competition” with their neighboring jurisdictions with regards to their tax levels (Besley & Case, 1995; Heyndels & Vuchelen, 1998). Because property tax millage rate is very visible, it is expected that counties with higher millage rates are more eager to roll back their millage rates due to public pressures (Hypothesis 8a).

To test this hypothesis, the counties are sorted by MILLAGE, and the 30 counties in the highest quintile are selected as a “featured group.” Summary statistics of the featured group and the average group are compared in Table 6-4. The 30 counties in this group tend to have higher per capita property tax and a lower percentage of public roads that are unpaved, and these counties normally have higher population density. Note that these variables are confounding variables that may also contribute to the different levels of fungibility which may exist between the two groups. Given this caution, however, the SWAT analysis can still yield valid information for the hypothesis test.

---

77 How many cases will be included in the featured group may be an arbitrary decision. The top quintile is selected in this study for two considerations: first, the featured group should be substantively different from the average group regarding the specific feature, and second, the featured group still contains enough numbers of cases (30 here).

78 The rationale here is analogous to bivariate correlation. It does not control for other variables as multiple regressions may do, but it still yields valid information in an exploratory study.
The SWAT analysis runs 10 consecutive regressions, in which the two groups are pooled together in different relative weights. The featured group is always weighted as 1, while the average group’s weights decrease consecutively from 1 to 0.1.

Table 6-5 reports the change in coefficients for two explanatory variables – the annual trend and the property tax rollback. In the last two columns, all slopes are divided by the ordinary least square (OLS) slope so that changes can be compared in percentage terms to the linear model and to each other. The final row of Table 6-5 shows how much the coefficients changed when the high-millage-rate counties were weighted ten times that of the average counties. Note that the difference in the weights is not as extreme as it sounds. There are four times as many average counties as there are counties in the top quintile of millage rates, the high-millage-rate counties as a group, therefore, are weighted to contribute about 2.5 times what the average counties do to the regression as a group.

The results can also be presented as Figure 6-2, the slope-change graph. The graph essentially plots the values in the last two columns of Table 6-5 against the weights used in the regression. This allows the analyst to observe how the individual slopes change as the weighting process occurs. In Figure 6-2, we can see that, as the weights incrementally favor high-millage-rate counties, the annual rate of increase decreases, while the property tax rollback provided by each dollar of LOST revenue significantly increases from 46 cents to 66 cents, which is a 45 percent change. Thus Hypothesis 8a is supported.
Table 6-4  Comparing High-Millage-Rate Counties to Average Counties

<table>
<thead>
<tr>
<th>Variables</th>
<th>Counties with high Millage Rate</th>
<th>Average Counties</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Std. Dev.</td>
</tr>
<tr>
<td>Dependent Variable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PROPTAX</td>
<td>143.1</td>
<td>56.8</td>
</tr>
<tr>
<td>Independent Variables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TREND</td>
<td>22.5</td>
<td>5.2</td>
</tr>
<tr>
<td>LOSTSLAG</td>
<td>26.8</td>
<td>18.5</td>
</tr>
<tr>
<td>POP</td>
<td>120,504</td>
<td>184,314</td>
</tr>
<tr>
<td>DENSITY</td>
<td>307.8</td>
<td>415.7</td>
</tr>
<tr>
<td>AGE65</td>
<td>10.3%</td>
<td>2.8%</td>
</tr>
<tr>
<td>INCOME</td>
<td>12,247</td>
<td>3,447</td>
</tr>
<tr>
<td>UNPAVED</td>
<td>26.3%</td>
<td>19.9%</td>
</tr>
<tr>
<td>HMOWNER</td>
<td>70.7%</td>
<td>9.8%</td>
</tr>
<tr>
<td>EDULEVEL</td>
<td>14.7%</td>
<td>9.1%</td>
</tr>
<tr>
<td>REPUBLICAN</td>
<td>53.0%</td>
<td>13.4%</td>
</tr>
</tbody>
</table>

Table 6-5  Change in Coefficients with Iterative Weighting

<table>
<thead>
<tr>
<th>Weight of the Average Group</th>
<th>Coefficient Trend</th>
<th>Rollback</th>
<th>Slope-change* Trend</th>
<th>Rollback</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>1.04</td>
<td>-0.46</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>0.9</td>
<td>1.03</td>
<td>-0.46</td>
<td>0.99</td>
<td>1.01</td>
</tr>
<tr>
<td>0.8</td>
<td>1.02</td>
<td>-0.46</td>
<td>0.98</td>
<td>1.02</td>
</tr>
<tr>
<td>0.7</td>
<td>1.01</td>
<td>-0.47</td>
<td>0.97</td>
<td>1.03</td>
</tr>
<tr>
<td>0.6</td>
<td>0.99</td>
<td>-0.47</td>
<td>0.96</td>
<td>1.04</td>
</tr>
<tr>
<td>0.5</td>
<td>0.98</td>
<td>-0.48</td>
<td>0.94</td>
<td>1.06</td>
</tr>
<tr>
<td>0.4</td>
<td>0.95</td>
<td>-0.50</td>
<td>0.92</td>
<td>1.09</td>
</tr>
<tr>
<td>0.3</td>
<td>0.92</td>
<td>-0.52</td>
<td>0.89</td>
<td>1.13</td>
</tr>
<tr>
<td>0.2</td>
<td>0.89</td>
<td>-0.55</td>
<td>0.86</td>
<td>1.21</td>
</tr>
<tr>
<td>0.1</td>
<td>0.88</td>
<td>-0.66</td>
<td>0.84</td>
<td>1.45</td>
</tr>
</tbody>
</table>

*: Figures are SWAT slopes divided by OLS slopes.
Likewise, the same method is used to test the association between property tax rollback and fiscal pressure. The construction of public roads is considered one of the basic services provided by county governments in Georgia. Therefore, counties with higher percentage of unpaved public roads are assumed to have fiscal pressure, and are expected to use the LOST proceeds more as additional revenues (Hypothesis 8b).

The featured group, in this case, consists of the 30 counties in the top quintile of UNPAVED. Summary statistics of this fiscal-stress group and the average group are compared in Table 6-6. The 30 counties with higher percentage of unpaved public roads tend to be rural counties with lower per capita income and lower educational attainment. As is addressed above, these variables may also contribute to the differences between the two groups, but the SWAT analysis remains valid in revealing the bivariate correlation between UNPAVED and the LOST’s effects.

Figure 6-3 is the slope-change graph, that is, the fiscal-stress parallel to Figure 6-2. As it shows, as the weights incrementally favor counties with higher percentages of unpaved public
roads, the property tax rollback provided by each dollar of LOST revenue is almost cut in half, from 46 cents to 28 cents. Thus Hypothesis 8b is also supported.

Table 6-6 Comparing Counties with Fiscal pressure and Average Counties

<table>
<thead>
<tr>
<th>Variables</th>
<th>Counties with Fiscal pressure</th>
<th>Average Counties</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Std. Dev.</td>
</tr>
<tr>
<td>Dependent Variable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PROPTAX</td>
<td>96.0</td>
<td>34.1</td>
</tr>
<tr>
<td>Independent Variables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TREND</td>
<td>22.5</td>
<td>5.2</td>
</tr>
<tr>
<td>LOSTSLAG</td>
<td>28.2</td>
<td>17.3</td>
</tr>
<tr>
<td>POP</td>
<td>14,581</td>
<td>8,266</td>
</tr>
<tr>
<td>DENSITY</td>
<td>32.7</td>
<td>12.9</td>
</tr>
<tr>
<td>AGE65</td>
<td>12.7%</td>
<td>2.5%</td>
</tr>
<tr>
<td>INCOME</td>
<td>9,976</td>
<td>1,143</td>
</tr>
<tr>
<td>UNPAVED</td>
<td>55.6%</td>
<td>5.6%</td>
</tr>
<tr>
<td>HMOWNER</td>
<td>73.7%</td>
<td>5.2%</td>
</tr>
<tr>
<td>EDULEVEL</td>
<td>8.4%</td>
<td>2.1%</td>
</tr>
<tr>
<td>REPUBLICAN</td>
<td>55.0%</td>
<td>8.5%</td>
</tr>
</tbody>
</table>

Change in slopes for Counties with Fiscal Stress

Figure 6-3 SWAT Analysis: Slope-changes with Respect to Fiscal pressure

87
SWAT analysis with respect to homeownership

The budgetary decisions regarding the LOST may also relate to the homeownership, that is, the percentage of housing units occupied by the owner. Homeowners tend to be more active in local political issues (Oates & Harriss, 2001). Therefore, their preference could be expected to have more impact on policy decisions. As homeowners are more aware of and care more about their property tax burden, it is expected that counties with higher level of homeownership will use higher percentages of the LOST for property tax relief (Hypothesis 8c).

In this step of the analysis the featured group consists of the 30 counties in the top quintile of HMOWNER. Summary statistics of the featured group and the average group are compared in Table 6-7. The 30 counties with the highest homeownership are very much like the other counties except for fewer people and lower population density. Therefore, should any difference be found in the LOST’s effects between the two groups, it can be attributed to the variable of homeownership.

Figure 6-4 is the slope-change graph of the SWAT analysis with respect to homeownership. As it shows, the property tax rollback provided by each dollar of LOST revenue increases from 46 cents to 55 cents, as the higher-homeownership counties are weighted more heavily in the regressions. Therefore, Hypothesis 8c is also supported.
Table 6-7 Comparing Counties with High-Level Homeownership and Average Counties

<table>
<thead>
<tr>
<th>Variables</th>
<th>High-Homeownership Counties</th>
<th>Average Counties</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Std. Dev.</td>
</tr>
<tr>
<td>Dependent Variable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PROPTAX</td>
<td>101.4</td>
<td>33.1</td>
</tr>
<tr>
<td>Independent Variables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TREND</td>
<td>22.5</td>
<td>5.2</td>
</tr>
<tr>
<td>LOSTSLAG</td>
<td>33.8</td>
<td>17.8</td>
</tr>
<tr>
<td>POP</td>
<td>25,640</td>
<td>26,751</td>
</tr>
<tr>
<td>DENSITY</td>
<td>84.2</td>
<td>91.5</td>
</tr>
<tr>
<td>AGE65</td>
<td>11.6%</td>
<td>3.9%</td>
</tr>
<tr>
<td>INCOME</td>
<td>11,436</td>
<td>2,321</td>
</tr>
<tr>
<td>UNPAVED</td>
<td>37.2%</td>
<td>14.8%</td>
</tr>
<tr>
<td>HMOWNER</td>
<td>81.1%</td>
<td>3.2%</td>
</tr>
<tr>
<td>EDULEVEL</td>
<td>11.8%</td>
<td>6.2%</td>
</tr>
<tr>
<td>REPUBLICAN</td>
<td>59.0%</td>
<td>11.6%</td>
</tr>
</tbody>
</table>

Figure 6-4 SWAT Analysis: Slope-changes with Respect to Homeownership

**SWAT analysis with respect to tax exportation**

Finally, it is expected that counties with higher levels of tax exportation will use the LOST more as additional revenues (Hypothesis 8d). The higher levels of tax exportation, the bigger changes occur in homeowner’s tax price, as they have shifted larger part of their tax burden
outside of their jurisdictions. As a result, local residents will be more willing to support a higher level of public expenditure (Wildasin, 1977).

The featured group consists of the counties in the top quintile of EXPORT, the level of tax exportation measured as the ratio of taxable sales base to personal income. Table 6-8 presents summary statistics of the featured group and the average group. These tax-exporting counties seem to be quite different from others. They generally have much higher population densities, higher per capita personal income, higher education attainment, higher per capita property tax, and lower percentage of unpaved public roads. That means, should any difference be found in the LOST’s effects between the two groups, it cannot be easily attributed to the variable of EXPORT alone.

Figure 6-5 is the slope-change graph with respect to sales tax exportation. In contrast to the expectation, the graph shows that these tax-exporting counties actually use a much higher percentages of the LOST as property tax relief: the rollback of property tax increases from 46 to 68 cents when the tax-exporting counties are weighted 10 times than others. Thus Hypothesis 8d is rejected. Several reasons are plausible for this finding. First, these counties have higher property tax burden, and thus the pressure of property tax relief may be higher (Besley & Case, 1995; Heyndels & Vuchelen, 1998). Second, these counties have less fiscal pressure, so the need for additional revenue is not as urgent as that in other counties (Alm et al., 1993). Third, these counties have much higher average education attainment. This difference may matter as well – people with higher levels of education know more about governments, care more about governments, and may have better chances to hold local governments accountable (Chelf, 1984).
Table 6-8 Comparing Counties with High-Level Tax Exportation and Average Counties

<table>
<thead>
<tr>
<th>Variables</th>
<th>Tax-Exporting Counties</th>
<th>Average Counties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dependent Variable</td>
<td>Mean</td>
<td>Std. Dev.</td>
</tr>
<tr>
<td>PROPTAX</td>
<td>118.9</td>
<td>59.2</td>
</tr>
<tr>
<td>Independent Variables</td>
<td>Mean</td>
<td>Std. Dev.</td>
</tr>
<tr>
<td>TREND</td>
<td>22.5</td>
<td>5.2</td>
</tr>
<tr>
<td>LOSTSLAG</td>
<td>36.8</td>
<td>24.6</td>
</tr>
<tr>
<td>POP</td>
<td>141,978</td>
<td>173,715</td>
</tr>
<tr>
<td>DENSITY</td>
<td>352.3</td>
<td>390.2</td>
</tr>
<tr>
<td>AGE65</td>
<td>10.2%</td>
<td>2.6%</td>
</tr>
<tr>
<td>INCOME</td>
<td>13,325</td>
<td>2,636</td>
</tr>
<tr>
<td>UNPAVED</td>
<td>16.9%</td>
<td>14.5%</td>
</tr>
<tr>
<td>HMOWNER</td>
<td>67.7%</td>
<td>8.2%</td>
</tr>
<tr>
<td>EDULEVEL</td>
<td>17.5%</td>
<td>7.4%</td>
</tr>
<tr>
<td>REPUBLICAN</td>
<td>59.6%</td>
<td>10.4%</td>
</tr>
</tbody>
</table>

Figure 6-5 SWAT Analysis: Slope-changes with Respect to Tax Exportation

In sum, this section is a preliminary test of the LOST’s effects across counties. The results suggest that the levels of fungibility are depending on the fiscal and socioeconomic conditions of the counties. As is expected, counties with higher property tax millage rates tend to use higher percentages of the LOST proceeds as property tax relief, while counties with fiscal pressure tend
to use the LOST more as additional revenues. In addition, the rollback from each dollar of LOST proceeds is higher in counties with high homeownership. These findings provide additional support for the hypothesis that the budgetary effects of the LOST might be taxpayers’ rational choices.

It has been noted repeatedly, however, the SWAT analyses do not sufficiently control other dependent variables that can intervene with the “feature” variable. To some extent, the SWAT analyses are analogous to bivariate analyses that deal only with the correlation between two variables without fully controlling for other variables. Nevertheless, these analyses contribute by revealing the fact that earmarking behaviors cannot be stereotyped, and this set of findings deserves further investigations in future studies.
CHAPTER 7: CONCLUSIONS

This study examines the adoption and budgetary effects of the general-purpose Local Option Sales Tax in Georgia counties. The two research questions are tested in one conceptual framework, thereby enhancing the ability to answer both questions. The first section of this chapter summarizes research findings about the adoption of the LOST. The second section summarizes findings about the budgetary effects of the LOST. The third section discusses some theoretical and empirical implications of the study. The final section addresses limitations and directions for future study.

7.1 The Adoption of the LOST in Georgia Counties

This study examines the adoption of the LOST in Georgia counties with a discrete-time event history analysis, using socioeconomic and fiscal data during the period 1975-2002. The dependent variable is whether a county that is eligible for the LOST will adopt it in a particular year. According to Mohr’s theory of organizational innovation, it is hypothesized that the probability of adoption is negatively related to the strength of the obstacles to innovate, and positively related to (1) the motivations to innovate and (2) the availability of resources for overcoming the obstacles. Most of the hypotheses are supported by the maximum likelihood estimations.

First, it is expected that the “motivations” for the adoption be related to property tax burden, fiscal pressure, and tax exportation. The findings suggest that counties with higher property tax millage rates and/or higher potential of sales tax exportation have higher propensity to adopt the LOST, and these effects are especially strong in the early years. The results about the effect of fiscal pressure are mixed. The percentage change of real property and utility digest does not have a significant effect, while the percentage of unpaved public roads has some effect only in
the early years. Second, it is expected that the “obstacles” to innovate are related to existing sales tax rate, tax competition, and Republican ideology. It is found that counties with higher existing sales tax rates have lower propensity to adopt the LOST, so do counties within Atlanta Metropolitan Statistical Area in which there is a high level of spatial competition among shopping centers. However, the effect of Republican ideology, although with the expected sign, is not significant, although the coefficient does have the expected sign. Third, it is expected that the “resources” are related to tax mimicking behavior. The results suggest that the decision for a county to adopt is significantly influenced by those in their neighboring areas, and this effect is stronger in the later period when many counties have already adopted the tax.

7.2 The Budgetary Effects of the LOST in Georgia Counties

This study also examines the budgetary effects of the LOST in Georgia counties, that is, to what extent the LOST has been used to reduce property tax burdens or to provide additional services. Based on previous studies of earmarking behavior, the study proposes several competing scenarios for testing. In particular, a “fiscal illusion” scenario assumes that property tax revenue is rolled back after the LOST adoption, but it increases faster in the post-LOST period, which eventually results in an even higher property tax level. Alternatively, in a “rational choice” scenario, after the instant rollback the property tax revenue gradually increases to a new “equilibrium,” which is affected by the counties’ fiscal and socioeconomic conditions.

The analyses are conducted with two separate pooled time-series regression models. The first model is used to disentangle the short-term and long-term effects of the LOST on property tax millage rates. As is expected, the millage rates are rolled back after the second year of the LOST (the short-term effect), but they increase faster in the post-LOST period (a long-term effect). The results, nevertheless, reflect a combination of “rational choice” and “fiscal illusion.”
On the one hand, in accordance with the “rational choice” scenario, the long-term effect of the LOST is curvilinear – it is significant in the first several years of the post-LOST period, but levels off over time. On the other, as is illustrated in Figure 6-1, the millage rates gradually recovered from the rollback within 10 years or so and eventually exceed the pre-LOST trend. This pattern lends partial support to the “fiscal illusion” scenario.

The second model examines the fungibility of the LOST proceeds and how the pattern varies across counties. On average, it is found that an extra dollar of the LOST reduced 46 cents of the property tax to be collected in the second year, while it increased total revenue by 74 cents and total expenditure by 65 cents. Moreover, it is found that the levels of fungibility vary across counties in accordance with their fiscal and socioeconomic conditions. For instance, counties with higher property tax millage rates use the LOST more as property tax relief, while counties with higher levels of fiscal pressure tend to use the tax more as additional revenues. These findings also provide additional support to the “rational choice” hypothesis.

7.3 Implications of the Study

The study has two major theoretical implications. First, it adds to the literature of policy innovation and diffusion. Previous studies of policy innovation and diffusion in the United States were almost exclusively focused at the state level. The major reason has been data availability rather than theoretical or epistemological considerations (Blomquist, 1999). In terms of revenue policies, almost no study of policy innovation and diffusion has been done except for the introduction of lotteries in the American states (Alm et al., 1993; Berry & Berry, 1990; Furlong, 1998), mostly because few new revenue sources have been created and widely considered in recent decades (Berry, 1988). The adoption of the local option taxes provides an opportunity to further this line of inquiry. A case can be made, in fact, that the study of policy
innovation and diffusion may be better conducted at the local level than at the state level. The number of Georgia counties is several times larger than that of the set of American states (more degrees of freedom), these counties operate within an institutional homogeneous setting (more comparable), and they are close to each other and therefore share geographical proximity (easier for the test of policy diffusion).

Second, the study adds to the literature of earmarking and fungibility. In recent years there have been a number of studies about the fungibility of earmarked revenues, especially the state lotteries which are normally earmarked for public education. While some scholars still attempt to generalize about how the lotteries have affected educational expenditure across the states, others have realized that the level of fungibility “varies between the states and over the years following adoption” (Spindler, 1995:60). However, few studies have been conducted to analyze these variations. This study extends this line of inquiry to the local level. It not only examines the general effects of the LOST, but also tracks its variation over time and across space. The longitudinal analysis reveals the dynamic effects of earmarking; the cross-sectional analysis explores the comparative features of fiscal decision-making in local government.

The study has policy implications as well. In recent decades, local option sales taxes have become a major alternative to the property tax. This study of the LOST provides insight into the nature of the tax and the related fiscal behavior of local governments, which is critical for state and local governments as well as the public to make informed decisions. With this knowledge, states can be more prepared while considering enactment of similar laws or making changes of their current ones. They can have a better idea about how local governments may respond to the tax, and can design better policy instruments to safeguard the use of earmarked revenues on its designated purpose (Lauth & Robbins, 2002). For instance, the state government can establish a

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79 For a survey, see Lauth and Robbins (2002).
fixed cap or equation for the would-be property tax without the LOST \((PT^*_t)\), making the property tax rollback by the LOST a binding requirement. At the local level, knowing the factors influencing adoption helps policy entrepreneurs to better assess the “policy windows” for innovation (Kingdon, 1984), and thus they can adjust their policy agenda and “marketing” strategies in order to change policy successfully (Singer, 1987). Knowing the nature of the new tax, especially understanding its budgetary effects, helps members of the public to make rational decisions when they cast their votes in referenda, and helps their efforts to hold their governments accountable.

### 7.4 Limitations and Directions for Future Study

This study examines the adoption of the LOST using discrete-time event history analysis, and explores the budgetary effects of the LOST through pooled time-series regressions. Several caveats have been pointed out in the earlier chapters. First, some measurements in the adoption study, such as that of fiscal pressure and Republican ideology, can be improved if additional data are available. Further studies about adoption may also employ variables that are related to policy activities, for instance, the timing of hearings and referenda, the strategies for public involvement, or some mechanisms that can potentially hold government accountable in the process of policy implementation. These variables are controllable by human beings, and the findings thereof can have more implications for public policy and public management.

Second, caution should be advised while interpreting the LOST’s effect on millage rates, as the rates may also go up after the LOST because of decreased tax base due to tax competition. Further studies will be conducted to test how the LOST affects the counties’ tax bases, including the property tax digest and the taxable sales base. Likewise, this effect is expected to vary across counties, as they are involved with different levels of tax competition. The millage rates may
also increase over time because of increased level of homestead exemption at the local level. To what extent the exemption would affect the millage rates involves another empirical test.

Third, it has been noted that the study about the levels of fungibility across counties is preliminary, because the SWAT analyses do not sufficiently control for over variables. This study identifies several factors that can affect the earmarking behavior, but better research designs or better research methods are in order to disentangle the effects of these factors.

This study also has other limitations because of its scope. It is a single state study about a single type of new revenue. To generalize findings across states, this research may be replicated in other states where similar types of local option sales tax have been authorized. Furthermore, research can be extended to other types of revenue sources that are local optional and/or earmarked, such as the SPLOST (Special-Purpose Local Option Sales Tax) or the ELOST (Education-purpose Local Option Sales Tax). Since local governments have been decreasing their reliance on property tax revenues, these programs have become increasingly popular across states. They provide new sources of revenue, incur new policy issues, and dictate the directions for future studies.
REFERENCES


