

OPTIONS FOR TENNESSEE'S TAX SYSTEM:
A PROSPECTIVE PORTFOLIO ANALYSIS

By

Rose M. Naccarato

Dissertation

Submitted to the Faculty of the
Graduate School of Vanderbilt University
in partial fulfillment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

in

Leadership and Policy Studies

August, 2006

Nashville, Tennessee

Approved:

Kenneth K. Wong

Stephen Buckles

Stanley Chervin

Malcolm Getz

Mark W. Lipsey

*To my daughter, Sophia Marie
whose impending arrival inspired me to finally complete this project*

and

To my husband Mark, whose endless patience and support made this possible

ACKNOWLEDGEMENTS

All of the members of my Dissertation Committee, past and present, helped to make this possible, with their patience, support, and knowledge.

I also owe my thanks to Dimitri Shvorob, whose extensive SAS knowledge and patience for the many times I revised my input data made the analysis in this paper possible.

My family has always been there for me, encouraging me to finish and expressing their pride in my work. I would especially like to acknowledge my mother and stepfather, Richard and Mary Oshlag, whose nagging kept the project on my mind, even when I was not working on it. I must also give special recognition to my husband Mark, who always believed I would finish this in the end. Without them, I likely would have abandoned this project some time ago.

TABLE OF CONTENTS

	Page
DEDICATION	ii
ACKNOWLEDGEMENTS	iii
LIST OF TABLES	vi
LIST OF FIGURES	vii
Chapter	
I. INTRODUCTION	1
A History of State Taxation	1
States in Fiscal Crisis	6
Recession	9
Medicaid	9
Court Rulings	10
Tax Systems	10
Corrections Policy	11
II. EVALUATING STATE TAX SYSTEMS	12
Criteria	13
Efficiency	14
Sufficiency	14
Stability	15
Equity	15
Simplicity	16
How Different Types of Taxes Rate on the Criteria	17
Sales Tax	17
Income Tax	20
Business Tax	22
Excise Taxes	24
State Lotteries	26
Optimal Taxation Theory	29
The Portfolio Approach	35
Micro-Simulation Tax Models	49
III. THE TENNESSEE TAX SYSTEM	55

A Brief History of Taxation in Tennessee	55
Tennessee’s Current Tax Structure	67
Does Tennessee Need Tax Reform?	69
 IV. METHODOLOGY	 74
Taxes Currently in Use	74
General Sales and Gross Receipts.....	75
Corporation Franchise Tax	76
Corporation Net Income Tax	76
Hall Income Tax	77
Taxes Not Currently in Use	77
Motor Vehicle Tax.....	77
Income Tax	78
State Real Property Tax	79
Constraints	80
Equity.....	80
Efficiency.....	80
Competitiveness.....	81
Simplicity.....	81
Sufficiency	81
Data Analysis.....	82
 V. MODEL	 83
 VI. RESULTS AND POLICY RECOMMENDATIONS	 87
Static Models	87
Optimization Results.....	93
The Current System	93
The Commission’s Proposed System with an Income Tax	98
The Commission’s Proposed System with a Motor Vehicle Tax and a Real Property Tax.....	102
All Major Taxes	106
Policy Recommendations.....	109
 Appendix	
SAS PROGRAM LANGUAGE USED TO RUN OPTIMIZATION	119
 BIBLIOGRAPHY.....	 126

LIST OF TABLES

Table	Page
1. Tennessee Tax Revenue and Tax Base Information.....	70
2. Tennessee’s Current Tax System.....	88
3. Tennessee Tax Structure Study Commission Proposal One.....	89
4. Tennessee Tax Structure Study Commission Proposal One.....	92
5. Current Tax System Optimization Results	94
6. Current Tax System Plus Flat Tax Optimization Results	96
7. Commission Proposal with Progressive Income Tax Optimization Results	99
8. Commission’s Proposed Income Tax System with Flat Income Tax Optimization Results.....	101
9. Commission Proposal with Motor Vehicle Tax and Real Property Tax Optimization Results.....	103
10. All Major Taxes Optimization Results	107

LIST OF FIGURES

Figure	Page
1. Theoretical Growth-Instability Frontier.....	36
2. Sources of Tennessee State Tax Revenue.....	67

CHAPTER I

INTRODUCTION

Judge Gideon J. Tucker of New York once said “No man’s life, liberty, or property are safe while the Legislature is in session.”¹ Amusing quotes notwithstanding, a vast majority of the country’s population has agreed that collective investment is sometimes required, and that the government must raise revenue to make these investments. This revenue is derived from taxing the population of the jurisdiction wishing to invest. Some level of taxation is a certainty in most jurisdictions, but analyses of the best mix of taxes for a jurisdiction are rarely available. This paper aspires to so analyze the tax structure of the state of Tennessee. This paper does not attempt to analyze the level or content of the expenditures of the state.

The paper begins by examining the evolution of taxation at the state level and defining the criteria on which state taxes are to be judged. The paper proceeds to review methods analysts have previously employed to evaluate state tax structures. A history of the development of Tennessee’s tax structure is then provided, leading into a model for analyzing and evaluating that structure. Finally, an analysis using that model provides the basis for recommended changes to the Tennessee tax system

A History of State Taxation

States were the first United States government entities to take an active role in the development of infrastructure through the use of taxes. In a 2000 article, John Joseph Wallis reports the following on early changes in the financial systems of the United States:

The first financial system lasted from 1790 until about 1842. In this period state governments took the active lead in promoting economic development through infrastructure investment and legal innovation to promote corporations and banks. Infrastructure investment and land sales offered governments the opportunity to collect “asset income.” State governments were uniquely situated to charter corporations and create asset income in the process. Given the national government’s unwillingness to participate in transportation improvements, states took the lead in those investments as well. By the 1830s, state debt was roughly eight times the debts of the national and local governments combined.²

From the mid-1840s to the eve of the Great Depression, local governments took the lead with property taxation as the primary source of revenue behind investment in education, highways, railroads, water systems, sewer systems and public utilities. The federal government used an income tax and various excise taxes to fund the Civil War, and the Supreme Court initially upheld these. A post-war income tax levy was overturned by the Supreme Court, however, leading to the ratification of the sixteenth amendment, specifically allowing federal income taxes, in 1913.³ The Great Depression and New Deal marked the beginning of the federal government’s lead role in raising revenue, though much of that revenue went to state and local governments as grants for infrastructure investment. Income and sales taxes became the dominant source of revenue at both the national and state levels, and they remain so today.⁴

State and local revenues were, prior to the twentieth century, made up almost exclusively of property taxes, various business taxes and excise (selective consumption) taxes. In addition, states funded infrastructure improvements by taking on long-term debt through bond sales that were generally tied to specific projects. The move toward more progressive and diverse tax systems began in Wisconsin in 1911 with the passage of the first modern state income tax.

¹Platt, 1992

²Wallis, 2000, p. 62

³Fox, 1986, pp. 1-2

⁴Wallis, 2000, p. 62

Proponents of the Wisconsin tax were less enthused about taxing income than they were about reducing (or halting the growth) of property and excise taxes. State income taxation failed to “spread like wildfire,” as the Wisconsin Tax Commission had predicted, but other states slowly began to follow suit. Between 1911 and 1929, ten more states added the income tax to their revenue portfolios.⁵

The Advisory Commission on Intergovernmental Relations (ACIR) listed three reasons for the relatively slow progress on the income tax front prior to the Great Depression:

First, most states were able to meet their expenditure requirements by increasing reliance on consumer taxes (selected excises) and by financing capital projects with long-term debt issues...
Second, it was difficult to muster sufficient political support for a progressive income tax in a state that was confronted with neither a fiscal crisis nor a strong demand for property tax relief...
Third, constitutional restrictions on the power of state legislatures to impose taxes also retarded the state income tax movement...⁶

The Great Depression created both state fiscal crises and demand for property tax relief. Between 1929 and 1938, eighteen states instituted broad-based personal income taxes, and the number of states with a general retail sales tax rose from zero to twenty-four. The general retail sales tax was first imposed in Mississippi, when that state converted its low-rate business tax into a two-percent sales tax in 1932.⁷ By 1938, seventeen states had diversified their revenue portfolios to the point of including both of these taxes.⁸ The growth of the federal income tax, spurred mostly by the need to finance World War II and the Korean War, slowed the progress of state tax diversification over the next few decades. Only one state, Alaska, added a state income tax between the years 1939 and 1960. During this same time period, however, ten more states instituted state sales taxes.

⁵Shannon, 1987, p. 11

⁶ACIR, 1965, p.54

⁷Due & Mikesell, 1994, p. 1

The baby boom fueled the next wave of state tax diversification. The pressure that the explosive population growth put on public school systems again created fiscal crises and demands for property tax relief. “Between 1960 and 1971, nine states adopted personal income taxes and eleven states joined the general sales tax ranks – the number of states with both levies rose to thirty-six.”⁹ The 1960s also saw large growth in state corporate income taxes. These were often instituted at the same time as state personal income taxes.

In 1967, the ACIR offered its support to the diversification born of fiscal pressures:

While the champions of the graduated personal income tax and the sales tax advocates still engage in political sniping, this contest has lost much of the bitterness that in former times had transformed the state tax arena into a dark and bloody political battleground. The importance of the change cannot be overemphasized because bitter clashes between sales and income tax advocates for years hamstrung efforts to create a more diversified and productive state tax system.

The perennial sales versus income tax debate is now a luxury few states can afford...

A broad-based sales-personal income tax combination enables a state to create a diversified and productive revenue system while holding tax rates to moderate levels. To put the issue more sharply, it enables a state to maximize its revenue potential while minimizing vulnerability to interstate tax competition.¹⁰

The enthusiasm of the ACIR for these changes notwithstanding, little happened in the next few decades to diversify the tax structures of the fourteen states which did not have both sales and income taxes. New Jersey adopted a personal income tax in 1976. This was offset by Alaska’s repeal of its state personal income tax in 1979 due to its increasing oil-related prosperity.

The 1980s ushered in changes in business taxes, largely as a result of changes in corporate taxes at the federal level. The Federal Tax Reform Act of 1986 included provisions

⁸Shannon, 1987, p. 12

⁹Shannon, 1987, p. 12

that widened the corporate tax base but lowered corporate rates. States with corporate income taxes tended to follow suit, as keeping the state definition of the tax base equivalent to the federal definition makes state-level accounting much easier. Corporate income taxes, which date back to 1909, are not the only type of business taxes collected at the state level. Business franchise fees and/or excise taxes are collected in most states, and are either flat-fee taxes or are based on business assets (rather than net income).

The 1980s ushered in a decrease in state corporate tax revenues. Though states did not generally repeal the taxes, many offered credits and deferments to businesses moving into the state. State competition for economic growth became, and remains, fierce. The effectiveness of these credits and deferments in fueling state income and/or GDP growth is hotly debated. Since these tax expenditures are made to corporations through the tax system rather than through a spending mechanism, the details are not generally available to the public. Most states, as well as the federal government, have laws that prevent the disclosure of tax information. While state governments will supply numbers (total tax dollars waived for corporations, etc.), they will not generally disclose which companies receive how much in tax breaks. This makes research on the effectiveness of such breaks difficult.¹¹

Another “tax” to gain widespread state popularity in the 1980s was the lottery. Lotteries have a long history in the United States. A lottery was used to help finance the Virginia Companies’ Jamestown venture in early colonial America. By the latter part of the eighteenth century, lotteries were common in the colonies, and lottery revenues funded both public and

¹⁰ACIR, 1967, p. 21

¹¹Pomp, 1988, pp. 73 – 76

private projects. Lottery sales were even used to raise a small amount of the cost of the Revolutionary War.¹²

As states began to find alternative ways to raise revenue, lotteries began to lose favor. In the nineteenth century, opposition to lotteries grew for two reasons:

- 1) Gambling was considered to be morally wrong; and
- 2) Lotteries were seen as having ill effects on low-income and minority groups.

Following Congressional action banning use of the mail for lotteries (1890) and banning lotteries from interstate commerce (1895), there were no government sponsored or other legal lotteries in the United States until 1964.¹³ New Hampshire re-introduced the state lottery in 1964 with the novel idea of earmarking the funds for education. Though some other states followed suit, lotteries did not begin to turn big profits for states until New Jersey introduced some innovations in the 1970s. Low-priced tickets, instant winners and heavy promotion helped make the New Jersey lottery a revenue-raising success. Many states began to follow suit. State-operated lotteries were one of the fastest-growing industries in the United States in the 1980s.¹⁴ By 2001, only twelve states had failed to jump on the lottery bandwagon.¹⁵

States in Fiscal Crisis

States spent the latter part of the twentieth century looking for new and less painful ways to raise revenues. While many Americans seemed content to let the briefly projected federal budget surplus stay in Washington, state-level taxes have often been under attack. A phenomenon that became known as the Tax Revolt began in the United States during the late

¹²Borg, Mason & Shapiro 1991, p. 2

¹³*Ibid*

¹⁴*Ibid*, p. 3

¹⁵*International Gaming and Wagering Business*, 2001

1970s and continues today. California's overwhelming passage of Proposition 13 in June 1978, which substantially limited that state's local governments' ability to tax property by preventing increases in assessed residential property values, marked the beginning of the Tax Revolt. By 1982, nineteen states had passed some form of limitation on the level (or growth) of state general expenditures or revenues.¹⁶ Nonetheless, for many states, a balanced budget law is the only form of fiscal constraint facing state government, though a number of other fiscal discipline mechanisms (including extraordinary majority votes required for tax increases, line-item gubernatorial vetoes, debt limitations and income tax indexation) are in effect in states across the country.¹⁷

The unwillingness of Americans to accept tax increases at the state and local levels contributed to fiscal crises in several states (California, Connecticut, Florida, Massachusetts, Michigan and Minnesota are some of the more prominent examples) in the 1990s. Though recent economic growth has improved the situation for most states, those with tax systems that are relatively unresponsive to growth continue to face revenue shortfalls. The lack of tax increases alone would have been unlikely to cause serious fiscal problems in most states, and researchers have identified several contributing factors. One of the most important was the increasing use of unfunded mandates on the part of the federal government. Education, corrections and medical care are among the services on which federal minimum standards have been raised, but federal financing of improvements in these services has not kept pace with program costs. Indeed, in some cases no additional federal funds were supplied to meet the demands on states of minimum service levels mandated by the federal government.¹⁸

¹⁶Elder, 1992, p. 47

¹⁷*Ibid*, p. 51

¹⁸Roin, 1999, pp. 355 - 356

In response to increasing pressure from state and local governments, Congress enacted the Unfunded Mandates Reform Act of 1995 (UMRA, PL. 104-4), which took effect on January 1, 1996. The UMRA requires Congress to consider the financial impact on state, local, and tribal governments and the private sector and to consider whether to provide funding for mandates which will cost governments more than \$50 million to implement. The Act defines “mandate” very narrowly, however, leaving many programs states must fund by federal regulation out of the definition. Furthermore, Congress can separate mandates into smaller bills, each of which will fall below the \$50 million mark. A recent review of Congressional response to the new safeguards reports the following:

In the eight years since UMRA took effect, both the amount of information about the cost of federal mandates and Congressional interest in that information have increased considerably. In that respect, title I of UMRA has proved to be effective. Moreover, numerous pieces of legislation that originally contained a significant number of unfunded mandates were amended before enactment to either eliminate the mandate altogether or to lower its costs... Few intergovernmental mandates with costs over the UMRA threshold have been enacted into law since UMRA's enactment. Only three mandates with annual costs of at least \$50 million became law: an increase in the minimum wage (1996); a reduction in federal funding to administer the Food Stamp program (1997); and a preemption of state authority to assess a premium tax on certain prescription drug insurance coverage (2003). Those enacted mandates represent far less than one percent of the intergovernmental mandates that the Congress has considered since UMRA took effect... Furthermore, four intergovernmental mandates that CBO identified as having costs over the threshold when they were approved by authorizing committees were amended before enactment to bring their costs below the thresholds: a requirement for mental health parity in insurance plans (1996), a requirement that driver's licenses contain Social Security numbers (1996), a preemption of state authority to assess fees on certain securities transactions (1997), and a prohibition on certain Internet-related taxes (1998). In all of these cases, there is evidence that lawmakers altered the legislative proposals

specifically to reduce the costs of federal mandates before enacting them.¹⁹

Portions of state budgets that are targeted to compliance with federal mandates are not eligible for budget cuts. This leaves governors and state legislators with somewhat limited flexibility to cut spending when citizens choose that alternative over tax increases.

Recession

The recession of 1990-91 left many states with revenue deficiencies at a time when welfare and demand for kindergarten through twelfth grade education, as well as aid for higher education, increased. Between July, 1989 and January, 1992, Aid to Families with Dependent Children (AFDC) benefits rose 24.8% nationally. Though the national recession officially ended in March, 1991, many states suffered recession effects for varying lengths of time. One fourth of the states still had falling employment rates as late as fall of 1993.²⁰ After the strong resurgence of most state finances in the late 1990's, many suffered again with the recession of 2001. Several states have not yet fully recovered, though a spate of post-recession state tax increases have contributed to healthier state finances in the past few years.²¹

Medicaid

Sustained growth in the cost of medical care, coupled with federal mandates requiring states to provide more services than many of them had previously offered, caused Medicaid to become an increasingly heavy financial burden on states in the early 1990s. According to the National Association of State Budget Officers (NASBO), Medicaid spending from state general

¹⁹Gullo, 2004, p. 567

²⁰Gold, 1995, pp. 6 – 7

²¹ Jenny, 2005

funds increased by 16.7% in 1991 and by an additional 19.6% in 1992.²² A booming economy in the latter part of the decade helped remove people from Medicaid rolls, but the rapid increase in the cost of medical care continues. A report by the National Conference of State Legislatures' Health Policy Tracking Service notes that states are increasingly dealing with exponential Medicaid cost increases by cutting both eligibility and benefits.²³

Court Rulings

Federal and state court decisions that increased state costs and/or reduced revenues also played a role in state fiscal stress. Many states were forced to spend more on mental health programs (due to inadequate care) and on prison systems (due to overcrowding). Also affecting some states were decisions requiring them to pay more to health care providers and to fundamentally alter the traditional methods used to fund kindergarten through twelfth grade education. Revenues were adversely affected in income tax states when federal courts required state income tax systems to give equally favorable treatment to the pensions of federal retirees as they gave to those of retired state and local government employees.²⁴

Tax Systems

Many states failed to reform their tax systems to reflect changes in the economy, and many states found their revenues growing more slowly than personal income. This phenomenon is often described as a tax elasticity problem, where elasticity measures the percentage change in tax revenue resulting from a one percent growth in personal income. Inelasticity is especially serious with regard to the sales tax. Most states tax goods more heavily than services, making

²²Coughlin, 1994

²³ National Conference of State Legislatures Health Policy Tracking Service, 2003

sales tax revenues less and less responsive to personal income growth as our economy becomes increasingly service-oriented.

At the same time, personal income taxes have become less responsive to economic growth. In the 1980s, many states indexed the tax to offset the effects of inflation or reduced the progressivity of income tax rates. Both of these actions reduce the elasticity of the tax.²⁵ Some states have not revised their tax rates in twenty years or more, so a large proportion of taxpayers are in the highest tax bracket, which also leads to low elasticity.²⁶

Corrections Policy

The fastest-growing element of state budgets in the 1980s and early 1990s was corrections spending, which quadrupled in that time period. The main causes of the increase were tougher sentencing laws and the war on drugs. The probability of being incarcerated, especially for a non-violent offense, is much greater than it used to be.²⁷

²⁴ The Council of State Governments, 2003, pp. 9 – 10

²⁵ Income tax indexation allows a state to adjust its income tax brackets annually by the rate of inflation as determined by the Consumer Price Index (CPI). Economists have long argued whether or not the CPI adequately represents the inflation rate with many believing that inflation is overstated by the CPI. If this is the case, then tax brackets will creep upward more rapidly than income as indexing adjustments are made. This reduces the income elasticity of the income tax and makes it less responsive to economic growth, though many such income taxes remain elastic (tax revenue grows by more than 1% for every 1% increase in personal income).

²⁶ Gold, 1995, p. 11

²⁷ The Council of State Governments, 2003, p. 5

CHAPTER II

EVALUATING STATE TAX SYSTEMS

Two types of economic analysis are required in the evaluation of a tax system: positive and normative. Positive analysis is descriptive in nature. In this type of analysis, one explains how the tax system works. The questions to be answered by positive analysis in the taxation context are “Who pays the tax?” and “Who receives benefits from government expenditures?” In addition, positive analysis is used to determine the distorting effects of a tax on the economy. When the natural workings of a market are impacted by taxation, both market prices and quantities are likely to be affected. When losses to consumers and producers due to a tax exceed the revenue raised by the tax, a deadweight social loss occurs. Minimizing deadweight social loss is one goal of positive analysis.

Normative analysis is used to judge the outcome in society as a result of a tax. Normative analysis attempts to answer questions such as “Who should bear the burden of a tax?” and “To what extent should society attempt to redistribute income among its members?” Economists approach these questions armed with social welfare theory. Social welfare theory attempts to judge the Pareto efficiency of changes in the economy. A Pareto efficient outcome produces a situation in which no one can be made better off without someone else being made worse off in the process. Many different outcomes may be Pareto-efficient. Choosing among the available Pareto-efficient outcomes is a goal of normative analysis. Rigorous evaluation used to make policy recommendations requires both types of analyses.

Criteria

While different sources give many and varied criteria for evaluating state tax systems, the literature consistently reflects five basic principles, which are discussed individually below. Two of these rely on the concept of elasticity. Elasticity is a measure of responsiveness to changes in economic conditions. Price elasticity of demand, for example, measures the responsiveness of quantity demanded to changes in price. When prices change as a result of tax policy, the inefficiency created in the market can be determined by measuring the degree to which quantities of items demanded change in response. Price elasticity of demand is defined as the percentage change in quantity demanded divided by the percentage change in price. If the percentage change in quantity equals the percentage change in price, the absolute value of the resulting ratio is one, and the good or service in question is characterized as having unitary elasticity of demand. It is neither elastic nor inelastic. If quantity demanded changes by a smaller percentage than price, the absolute value of the resulting ratio is less than one, and the good or service is described as having inelastic demand. If quantity demanded changes by a larger percentage than price, the absolute value of the resulting ratio is greater than one, and the good or service is described as having elastic demand.

The concept of elasticity can be used to measure the responsiveness of many economic indicators to changes in the economic climate. Different types of taxes can be compared in terms of revenue elasticity to determine their responsiveness to economic growth. Economic growth is generally accompanied by increases in population and income, which increase the demand for government services. The degree to which tax revenues respond to economic growth and/or increases in personal income helps determine whether or not revenues will continue to be adequate to meet service demands. The percentage change in tax revenues over time can be measured against the percentage change in gross state product or personal income. Both tend to

move together, but personal income is more commonly used. Elasticity of tax revenue in this case is defined as the percentage change in tax revenue divided by the percentage change in personal income.

Efficiency

An efficient tax system is one that raises revenue with the least amount of market distortion. Taxing a good or service makes that good or service more expensive to the consumer, without increasing the return to the seller. This gap between what is paid and what is received guarantees that the market will not end up at the most efficient outcome. Taxes on goods and services create deadweight social losses. The revenue raised is less than the combination of revenue and consumer and producer surplus lost due to market distortions.

These distortions can be minimized by taxing goods and services in inverse proportion to their elasticities of demand. Deadweight social losses occur because the quantity of the good or service traded in the market changes when the price of the good increases. If the revenue raised from the tax exactly equals the loss consumers suffer by paying the tax, demand for the product is perfectly inelastic and quantities demanded are unaffected by price. The more inelastic the demand, however, the smaller the market distortion due to taxation, and, thus, the smaller the deadweight social loss. If all goods and services are taxed in inverse proportion to their elasticities of demand, deadweight social losses due to market distortions are minimized.²⁸

Sufficiency

A sufficient tax is one that raises the revenue required. The fact that many states are in fiscal crisis suggests that many state taxation schemes are not sufficient. Tax systems that are

sufficient for low levels of tax revenue might not be sufficient when called upon to raise higher levels of revenue. As taxes become increasingly burdensome on any particular good, service or activity, people are discouraged from further consumption of that good, service or activity, which reduces the tax revenue raised from it. Furthermore, as income increases, consumption of highly-taxed goods and services will not likely rise in tandem, reflecting tax inelasticity. Thus, the income elasticity of the resulting tax revenue is decreased.

Stability

Stable taxes are not highly responsive to business cycle fluctuations, and the revenue raised from them reflects growth in state population and/or gross state product. Income taxes, for instance, tend to be more affected by business fluctuations than most sales and excise taxes. Anything that drives up unemployment or drives down wages will decrease income tax revenue. A system relying solely on income taxes will experience revenue fluctuations as the economy goes through its normal cycles, and it will not be very stable. Some types of taxes, such as broad-based sales taxes, are stable but produce revenues that lag behind growth. As income increases, consumers tend to save a higher percentage of their income and to spend a higher percentage on often untaxed services. This means that any percentage income increase will generally create a smaller percentage increase in sales tax revenue. Thus, the revenue from such a tax can only keep pace with growth if tax rates are increased.

Equity

Equity in a tax system can be defined in many ways. It can be that all people pay the same amount. It can be that all households pay the same amount. It can be that everyone pays

²⁸ For a full discussion of why deadweight social losses occur, see Rosen, 1995, pp. 328-343.

the same percentage of income/assets. It can be that everyone pays according to the ability of each to do so. The definition of equity is a matter of opinion, and it is generally a political decision made by the people in the jurisdiction to be taxed. It is important for a quality tax system to include a definition of equity, and for it to be equitable according to that definition.

Equity in tax enforcement is also important. All citizens must face the same probability of being discovered if they dodge taxes. Due to the budget limits under which they work, however, revenue departments choose whom to audit based on the amount of revenue they can hope to regain through the audit practice.

Simplicity

A simple tax system is important because it minimizes the resources that must be committed to tax collection and enforcement. If people understand their tax system, then tax compliance is generally higher, and tax non-compliance is more likely to be intentional. Furthermore, complicated tax systems require more resources. People spend more time figuring out what they owe and how to avoid owing as much, often hiring accountants to ensure that their tax burden is minimized and they are in full compliance with the law. The complexity of the federal income tax system is almost entirely responsible for the high percentage (more than 50%) of tax returns prepared by professional tax services.²⁹

Additionally, a complex tax system requires the state to expend more resources ensuring compliance. A simple tax can save time, money and resources for taxpayers as well as for the state.

²⁹ Block, 2003

How Different Types of Taxes Rate on the Criteria

Sales Tax

A sales tax is simple. It is easy to administer and difficult to dodge. Sales taxes are generally collected by vendors for government agencies. They are among the easiest taxes to collect. In exchange for collecting and remitting sales tax revenues, many states compensate retailers by providing a discount of 1 to 5 percent of the taxes collected.³⁰ Retailers, then, have little incentive to try to circumvent the tax, and consumers will have to pay it at the point of purchase. If it is set at a high enough rate, it will be sufficient. Even low general sales tax rates produce considerable revenue because of the breadth of the tax base, though many states exempt food and other goods considered to be necessities, thus narrowing the tax base and reducing the tax revenue. In addition, relatively low sales tax rates are easier to sell to the electorate than are higher property and income tax rates, at least partially because well-designed sales taxes export part of the tax to non-residents (and to various extents, to business), shifting some of the tax burden.³¹

Problems with sufficiency can come about due to interstate competition. States lack legal authority to require out-of-state vendors to collect and remit complementary use taxes (sales taxes charged on items residents buy in other states), and except for a few registered items such as motor vehicles, it is difficult to collect from the final consumer. One of the fastest-growing problem areas relates to the fact that sales made in one state for delivery in another are not taxable in the former, unless the out-of-state seller also has "nexus" (generally defined as a

³⁰Due & Mikesell, 1994, p. 289

³¹Hy & Waugh, 1995, p. 82

physical presence) in the purchaser's state.³² While mail order sales used to be the primary beneficiary of this loophole, television, telephone and internet sales now benefit as well. Congress has recently legislated a moratorium on new internet sales taxes.³³ Internet sales are likely to increase exponentially over the next decade or so, and state sales tax revenues may be significantly adversely affected.³⁴

Sales taxes tend to get low marks for efficiency, stability and equity. Sales taxes are rarely charged at different rates for different goods and services. They do not take the elasticity of demand for the good or service in question into account. When they do have varying rates, lower rates tend to be assigned to the more inelastic goods and services. Many states exempt food (for home consumption), some clothing, prescription drugs, utilities, and many or most services. Some of these exemptions exist to keep the system equitable. Demand for a good or service is often inelastic if that good or service is a necessity, but taxing necessities means poor people pay a disproportionately larger percentage of their income on sales taxes than do wealthier people (this is partially addressed by the fact that the federal governments does not allow food stamp sales to be taxed in any states). Taxing all goods and services at different rates would be incredibly complex. While the administration of such varied tax levels is becoming feasible as bar-coding of goods for purchase becomes ubiquitous, determining elasticities with precision is difficult. In addition, keeping track of changing elasticities, and updating tax levels to reflect them, would be a nearly impossible administrative burden. Sales taxes will be inherently inefficient because the resources required to make them efficient are too great.³⁵

³²Due & Mikesell, 1994, p. 12. Nexus generally refers to physical plant.

³³See H.R. 4105 and S.442, each known as The Internet Tax Freedom Act

³⁴Swope, 2000, pp. 20-23

³⁵Due & Mikesell, 1994, p. 15

A sales tax is often an inelastic tax because, by definition, tax revenues grow slowly in response to long term growth and changes in income. Income increases as a result of higher real wages, inflation, and population growth. As personal income increases, so does the demand for public goods. Education is one of the first areas to require expansion due to population growth, but demands for such varied public goods as police service, street maintenance, and garbage collection also grow. Those public services are not subject to sales taxes. Additionally, because of changes in patterns of savings and consumption as income increases, sales tax revenue is inelastic. This implies that sales tax revenue lags behind growth, and a structural deficit problem can emerge if the revenue required to fulfill increased demand for public services is not available.³⁶

Sales taxes are often considered inequitable because they are believed to be regressive. A regressive tax is one that takes a larger portion of the income of lower-income groups than of those with higher incomes. This is a result of different spending behaviors: higher-income families, on average, save greater percentages of their incomes than do those in the lower-income groups, and spend greater percentages on various untaxed services. Federal surveys of household spending behavior consistently reflect this pattern.³⁷ Most studies show that, based on these surveys of household spending patterns, lower-income groups pay a higher percentage of their income in sales taxes than do higher-income groups. The difference in burden tends to be small among the income groups in the middle 80% of the household distribution. Burdens on the poorest 10% and the wealthiest 10%, however, show significant sales tax regressivity.³⁸ An additional equity concern emerges when sales taxes are levied on food and other necessities at the same rate as on all other goods and services. Many states exempt goods considered to be

³⁶The Tennessee Advisory Commission on Intergovernmental Relations, 1998, pp. 17-18

³⁷ Consumer Expenditure Survey, 2001-2002

necessities, as poorer families spend a larger portion of their income on these items than do wealthier families. States that do not exempt such items tend to have more regressive sales taxes than those that do.

Income Tax

Income taxes can generate substantial revenue at moderate rates, contributing to a tax system's sufficiency. An income tax can be quite simple or very complex depending upon its structure. Flat-rate taxes are simple and easy to administer. Graduated-rate taxes can be slightly more complex, but a good tax guide will get most taxpayers through it fairly easily. Deductions are what make most income tax systems complex. Tax systems allowing itemized deductions are generally accompanied by a complex set of regulations. Considerable time and resources can be spent by both taxpayers and tax administrators as a result of itemized deductions.³⁹ States can minimize the additional burden to taxpayers by adopting the federal definition of adjusted gross income, and thereby not require taxpayers to calculate a totally different starting point. Since most taxpayers must file federal tax returns, the use of federal tax definitions reduces additional filing burdens.

Itemized deductions are also a source of inequity in income tax systems. Many deductions come about as the result of lobbying efforts by higher-income groups, corporations, state governments, and certain industries. Without much political influence, poorer families tend to have few, if any deductions (though the income equivalent of many subsidized social services received by poor families often need not be reported). Deductions can also contribute to inefficiency. In an attempt to shelter income from taxation, people put their money in sheltered

³⁸Due & Mikesell, 1994, pp. 9-12

³⁹Hy & Waugh, 1995, pp. 53-56

investments. This alters investment patterns, and can cause over-investment in tax-deductible areas.⁴⁰

Income taxes are generally more progressive than other types of state taxes. A tax is progressive if tax rates rise as income rises, meaning that more affluent people pay a larger percentage of their incomes than do their less wealthy counterparts. If a flat tax rate is used, the tax still tends to be progressive because a fixed amount of income is usually exempt from taxation. As income increases, the exempt amount becomes a smaller percentage of total income, and the percentage of income taxed thus becomes a larger percentage of total income. Income tax schemes with graduated rates (the rate increases as income increases) are generally more progressive than flat-rate taxes.⁴¹

Income taxes can, however, cause inefficiency in the labor market. The difference between the salary an employer pays and the salary an employee receives can be quite substantial. As one's income increases, the portion of new income that goes to taxes generally increases as well. It is argued that this depresses the labor market and discourages workers from pursuing advancement. The structure of the tax can make a difference here. A flat-rate income tax could discourage workers from entering the labor market, but should not discourage them from pursuing advancement. If an income tax depresses the labor market, state revenues can suffer substantially from slower economic growth, stagnant economies, or recessions.⁴²

Income taxes are mixed in their stability ratings. Revenues from income taxes are dependent on business cycles; recessions cause decreases in income tax revenues. Income taxes do, however, keep pace with economic growth. One of the first results of economic growth is

⁴⁰*Ibid.*, p. 52

⁴¹Galper & Pollock, 1988, p. 124

⁴²Several sources offer a full discussion of the effects of income taxation on the labor market. See, for instance, Brown, 1983

increased employment, and income tax revenues reflect the additional wages immediately. Because revenues do not rely on the portion of new income spent on consumption, changes in wages are fully reflected in changes in income tax revenue.⁴³ Income tax stability varies among states, with differences mostly attributable to the tax structure, the types and relative amounts of income received, and the sensitivity of the state's economy to the national economy.

Business Tax

The simplicity of a business tax, again, depends on its structure. Its sufficiency depends on the tax base and level at which it is levied. Stability depends somewhat on structure. Business income tax revenues are subject to cyclical peaks and troughs as are personal income tax revenues. Gross receipts taxes, taxes based on total revenue rather than on profit, also face cyclical peaks and troughs. Taxes on business assets are more stable than taxes on business income, but asset-based taxes are still sensitive to large booms and recessions. Franchise fees (generally flat taxes on some measure of business activity, such as assets, required in order legally to run a business) are the most stable of business taxes. Only a recession that caused many businesses to close down or substantially curtail operations would cause a decline in franchise fee revenue.

The efficiency of business taxation again depends upon the type of tax. Corporate income taxes raise the same efficiency questions as do personal income taxes. If investment is discouraged because of business taxation, economic growth can be slowed. Personal income taxes discourage labor in the production mix, and corporate income taxes discourage capital investment.⁴⁴ Asset-based taxes would likely cause the same problems because capital

⁴³Holcombe & Sobel, 1997, p. 42

⁴⁴Myles, 1995, pp. 247 - 254

investment tends to be investment in assets. Gross receipts taxes may cause less distortion because taxing total revenue implicitly taxes all inputs, rather than just capital. Flat-rate franchise fees are unlikely to cause much distortion. It is possible that some small businesses would find them prohibitive, and, thus, would be unable to start or maintain operations, but most franchise fees are not set at prohibitive levels.

Arguments concerning equity come from both sides of the business tax question. Some argue that taxing business revenue can be a form of double-taxation. Despite the fact that most businesses are taxable entities, they are not people. Income does not go to the business and stop there. It is spread among owners, managers/employees and shareholders. Income that is taxed once at the business level will generally be partially taxed again when it reaches its final destination. The other side argues that incorporation carries legal and economic privileges and that the gains and benefits resulting from these privileges should be taxed. One such privilege is the limited liability that shareholders enjoy in the case of bankruptcy.⁴⁵ Additionally, income is “double taxed” in many cases. Wages, for example, are taxed through income and payroll taxes, but these same wages are taxed again through all other taxes that wage earners pay on consumption, property, etc.

Others argue that corporate profits are at least partially a result of government goods and services, like interstate, railroads, a trained and able work force, etc.; and that corporations should be required to pay their fair share toward such goods and services.⁴⁶ In addition, there are concerns that allowing business income to remain untaxed encourages business owners and shareholders to leave income “officially” reinvested in the business. Without business income taxes, this reinvested income will not be taxed, and it can (and is) used to purchase non-business-

⁴⁵*Ibid*, p. 234

⁴⁶*Ibid*, p. 235

related assets for use by owners and shareholders. Vacation timeshares, company cars, country club memberships, tickets to arts or sporting events, and travel-related expenses are some of the uses for “reinvested” business income.

The gross receipts tax is one form of business taxation that is generally poorly-regarded among those who study tax systems, but it is still used in some states. As its name suggests, a gross receipts tax is charged to a business on the basis of revenue rather than profit. A company that makes and sells expensive goods might have much higher revenues than one that makes and sells less expensive goods, yet their profits could be quite similar. The company selling the expensive goods would be penalized by a gross receipts tax, and could find this tax a significant burden to continued operation. Gross receipts are not the best measure of corporate assets or corporate profits, and can thus distribute the tax burden inequitably among different types of businesses.

Interstate tax treatment of businesses is also an equity concern. Businesses bring jobs, and employment increases are good for state economies, as well as for re-election campaigns. Many states offer tax credits to encourage businesses either to expand in the state or relocate to the state.⁴⁷ For businesses that would find relocating prohibitively expensive (such as auto manufacturers), tax breaks will rarely be offered, as the threat of losing the employer is reduced. The increasingly service-oriented nature of our national economy has made businesses generally more mobile and, thus, more able to negotiate favorable state and local tax treatment.

Excise Taxes

Excise and commodity taxes are selective sales taxes. True sales taxes are levied only on purchases made at their final stage and are collected from sellers. Selective sales taxes are

usually included in the retail price of a purchase, with wholesalers acting as collection agents of the government. Excise and commodity taxes are levied on designated types of commodities, predominantly motor fuels, tobacco, and alcoholic beverages. These taxes are designed to raise revenues, although some are also intended to discourage certain types of behavior. Moreover, excise and commodity tax revenues are often earmarked for particular purposes, while sales and use tax revenues are usually deposited in the government's general fund.⁴⁸

Excises taxes alone are very unlikely to provide sufficient revenue to a state government, but they can be dependable, stable sources of additional revenue. The products on which excise taxes are most often levied tend to be products with inelastic demand. To the degree that the state sales tax rate is too low to optimally tax these inelastically-demanded goods and services, excise taxes can increase efficiency in a state tax system.⁴⁹ If states raise excise tax rates, however, consumers are motivated to purchase taxed goods in other states with lower excise tax rates when possible.

Excise taxes are simple taxes. They are usually paid by manufacturers or wholesalers, and are passed on to consumers via higher product prices. If higher prices might decrease usage (due to strong competition or elastic demand), manufacturers will end up bearing some of the tax burden themselves. They may alleviate the burden somewhat by lowering expenses, such as employee wages.⁵⁰ Excise and commodity taxes are most often levied as per-unit taxes or *ad valorem* taxes, making tax burden easy to figure. Compliance is not as easy to track as it is in the case of sales taxes, especially when states have significantly different excise tax levels on products. Consumers can purchase taxed goods in a neighboring state with lower tax rates on

⁴⁷For a detailed discussion of types of credits and recent trends in this area, see Hy & Waugh, 1995, pp. 211-229

⁴⁸Hy & Waugh, 1995, pp. 111-112

⁴⁹Myles, 1995, p. 371

⁵⁰Noto & Talley, 1993

that good, and state governments have no effective method for tracking such activity, nor any legal method for preventing it.⁵¹

The stability of an excise tax system depends upon the income elasticity of the taxed goods. Consumers' purchases of sin-tax items (such as alcoholic beverages and tobacco) are very stable over the business cycle because they do not fluctuate much when income fluctuates. Luxury-tax goods are much less likely to produce stable revenues, because consumer purchases of these goods do fluctuate with income fluctuations.⁵²

Excise taxes on goods other than luxury items tend to be quite regressive. Hy and Waugh⁵³ report that, as income for a family of four rises, the percentage of income paid as excise and commodity taxes decreases. Using data from 1991, they find the following:

Families with a household income of less than \$13,000 per year pay almost two percent of their income in excise and consumption taxes. By contrast, families making \$54,000 per year pay less than half that amount. Of all the excise and consumption taxes, tobacco and alcoholic beverage taxes are the most regressive, while food and lodging taxes are the least regressive.

State Lotteries

Like the excise taxes on alcohol and tobacco, the implicit lottery tax rate is quite high, but, unlike the taxes on alcohol and tobacco, the purpose of the high marginal tax rate is not to discourage consumption. Rather, the purpose is to raise as much revenue for the state as possible. In order to gain approval for a state lottery, many states earmark the potential lottery

⁵¹Rosen, 1995, pp. 477-478

⁵²Holcombe & Sobel, 1997, pp. 68-69

⁵³Hy & Waugh, 1995, pp. 114-118

revenues for specific purposes (e.g., education, elderly services, or other socially advantageous alternatives). Borg, Mason, and Shapiro⁵⁴ report the following:

The results of various studies indicate that whether lottery revenues are designed to supplement education or some other earmarked beneficiary (for example, programs for the elderly in Pennsylvania), lotteries have not supplemented the overall allocations of their designated beneficiary. Rather, these studies imply that lotteries have replaced previously allocated funding, with the end result being that, at least in the case of education, funding in those states with lotteries is comparatively inferior to funding in those states that have resisted the gambling tax bug.

In Florida, for example, lottery funds began supplementing educational funding in 1987-1988. In 1986-1987, education's share of the Florida general revenue funds was 61.2%, in 1987-1988, its share was 59.7%, in 1988-1989, its share was 58.4%, and in 1989-1990, its share was 57.3%.⁵⁵ In any case, a lottery is unlikely to provide sufficient funds for a large budget item like education. Lottery dollars are a small part of general revenue for any state. In 1986, net lottery revenues as a percent of state revenues varied from a range of one to five percent, with the average being only 3.3%.⁵⁶

The efficiency aspect of a lottery depends upon the demand elasticity for lottery tickets. However, since lottery tickets are almost uniformly priced at \$1.00, demand elasticity is empirically difficult to measure. Some researchers have looked at how the number of tickets purchased varies with potential winnings in order to determine elasticity. Such studies have shown that larger dollar prizes garner proportionately greater ticket sales than do smaller prizes. This suggests that demand for lottery tickets is somewhat elastic, and that the lottery tax is, thus, likely to be economically inefficient.⁵⁷

⁵⁴Borg, Mason & Shapiro, 1991, pp. 12-13

⁵⁵Hegarty, 1989

⁵⁶Clotfelter & Cook, 1989, p. 37

⁵⁷Borg, Mason & Shapiro, 1991, pp. 36-38

Various studies of the income elasticity of lottery tickets (that is, how much lottery ticket purchases change with changes in income) show that the number of lottery ticket purchases decreases as income rises. This suggests that state lotteries are not a stable source of income, as growth in lottery revenues will not keep pace with a state's economic growth. Furthermore, Borg, Mason and Shapiro⁵⁸ conclude the following concerning where lottery dollars come from:

[L]ottery households spend more on mortgages or rents, groceries, tobacco products, gambling activities other than the lottery, home furnishings, and home services than identical households that do not play the lottery. Their higher expenditures cannot be attributed to higher incomes or demographic differences because these factors have been held constant in the regression models. We also know that the only expenditure category in which lottery households spend less than their non-lottery counterparts is charitable giving... however... lottery households had no significant change in their charitable giving relative to non-lottery households during [the period in which the lottery was instituted]... The only evidence of lottery households reducing their expenditures since the lottery began is seen in the alcohol category.

Because little change was seen in the consumption spending of those who buy lottery tickets, these results suggest that lottery dollars come mostly from potential savings, and, thus, lottery revenues are likely to be unstable over business cycles as well.

Lotteries are a very simple tax. State lotteries are generally privatized, and the state need only collect revenues from companies contracted to run lotteries. States generally retain only 30% to 40% of total lottery revenues.⁵⁹

As previously stated, most researchers on the subject have found lotteries to be regressive. Lower-income households spend a higher percentage of their incomes on lottery tickets than do higher-income households. In terms of equity, then, state lotteries do not receive high marks.

⁵⁸*Ibid*, pp. 97-98

⁵⁹*Ibid*, pp. 47-48

Optimal Taxation Theory

In the optimal taxation literature, the public sector must optimize within the constraints of preexisting failures within the private sector. An individual's willingness and ability to pay for public goods is complicated by the nature of public goods. Because an individual can see that the benefit she gains from a public good is but a very small portion of the benefit gained by society, she is tempted to withdraw her monetary support for public goods. The overall benefit to society is great enough that the good will still be provided even if some members of society refuse to contribute. In addition, those who do not contribute generally cannot be excluded from the benefits of the public good. A sufficient, well-trained police force, for instance, protects even those who do not pay for it.⁶⁰

Because individuals will attempt to become "free riders" with respect to public goods, taxation by government agencies is considered to be necessary, even though it can cause deadweight social losses. Optimal taxation theory begins in a second-best world and attempts to optimize taxation and public-good provision from that perspective. Because markets are interconnected, optimal taxation theory takes a general equilibrium approach. Taxation of one commodity will affect that commodity's prices as well as those of other commodities. The increase in prices of some inelastically-demanded goods will cause decreases in real consumer income. If the amount of the commodity traded in the market is significantly decreased, people might lose jobs. The question optimal taxation theory attempts to answer through general equilibrium analysis is "What change in fiscal measures will raise the requisite revenue with the least loss in economic well-being?"⁶¹

⁶⁰ For a general discussion of the free riding problem of public goods, see Rosen, 1995, pp. 66 – 71.

⁶¹ Haveman, 1994, pp. 247-249

Optimal taxation theory uses a social welfare function to represent the costs and benefits of policies to society. This function is then optimized, and the least distortionary levels of taxation and expenditures are derived from the results. As long as the social welfare function is fully defined and accurately represents society, this approach will yield useful results. Unfortunately, such a social welfare function would be incredibly complex and is probably impossible to define. Simplifying assumptions which make the problem more tractable are generally made, and several guidelines for policy-makers have been derived from the results. A sampling of these guidelines as they relate to commodity taxation follows:

*The inverse elasticity rule*⁶²

Given the need to collect some amount of revenue via taxes on commodities, set the tax rates so that the percentage reduction in the quantity demanded of each commodity is the same. This means that tax rates should be inversely proportional to elasticities of compensated demand. Compensated demand differs from what one generally thinks of as demand in that income effects are removed. When the price of a good increases because of a tax, one either has less money to spend (because some went to pay the tax) or must buy a less-preferred good to avoid the tax. In either case, one has lost something as a result of the tax. If one is compensated for this loss, so that well-being remains unchanged despite the change in the price of the taxed good, then the resulting schedule of prices and quantities is compensated demand.

*The leisure-complementarity rule*⁶³

When there are two commodities that are to be taxed, impose the higher tax on the commodity that is more closely associated with the consumption of leisure time.

⁶²Often referred to as the “Ramsey rule,” after the author of one of the earliest papers in this area (Ramsey, 1927)

⁶³Also known as the “Corlett-Hague rule,” named after the authors of another prominent paper (Corlett & Hague, 1953)

The “if equity counts” rule

If, in addition to minimizing efficiency losses, society wishes to equalize the distribution of well-being, the taxes placed on commodities in whose consumption the well-to-do specialize should be higher than the taxes levied on the commodities on which the poor concentrate their spending.⁶⁴

Robert Haveman reports on the progress optimal commodity taxation has made over the years:⁶⁵

Since the early contributions that yielded these rules, optimal commodity taxation literature has been expanded in a number of ways. Researchers have relaxed assumptions, introduced additional constraints and intertemporal considerations, and derived the implications for worlds in which some commodities are both consumed and used as inputs, or where duties on imported goods exist, or where there are preexisting “market failures” that cannot be undone, or where there are administrative costs associated with taxing commodities.⁶⁶

Optimal income taxation theory attempts, using general equilibrium analysis, to answer the question: “Knowing consumer preferences, technology and market structure, and given a public revenue requirement to be raised by a distorting income tax, what is the efficient structure of the income tax?”⁶⁷ Early efforts to define optimal income taxation used the “representative consumer” model. In this model, all individuals in society are homogeneous. The results of this simple model of income taxation are quite clear- choose the combination of linear income tax with refundable tax credit that simultaneously raises the required revenue and maximizes utility. That tax will have a single marginal tax rate and will yield a lower level of utility than would a

⁶⁴This rule is often known as the “Diamond-Feldstein rule,” after the earliest authors to incorporate the assumptions in their research models (Diamond, 1975; Feldstein, 1972).

⁶⁵Haveman, 1994, pp. 247-249

⁶⁶*Ibid*

⁶⁷*Ibid*, p. 250

lump-sum tax. The utility decrease (in monetary units) is the deadweight social loss of the income tax.

Results of optimal income taxation analyses vary greatly with the underlying assumptions incorporated into the model. As models have become more complex, including heterogeneous consumers with differing and imperfectly substitutable labor abilities, additional guidelines have emerged:

*Marginal tax rates should be low (20 to 30 percent)*⁶⁸

Marginal tax rates are the rates paid on the last dollar earned. High marginal tax rates can discourage people from working more hours, or from working at all, depending on their economic circumstances. Beyond a certain level of income, one which provides necessities and some leisure consumption, additional consumption and additional leisure time are assumed to be very substitutable. Under such conditions, if marginal tax rates are too high, people are likely to begin consuming more leisure and fewer goods and services; that is, they will work less. This discourages economic growth.

*Marginal tax rates should be generally constant over the income distribution.*⁶⁹

This conclusion results from the assumption that, once necessities are met, people have generally the same elasticity of substitution between consumption and leisure. More simply stated, as one makes more money, one continues to value leisure at roughly the same percentage of income. If one makes \$10 per hour, he will be willing to work additional hours as long as he takes home \$7 or \$8 of the additional hourly income. If one makes \$50 per hour, she will be willing to work additional hours as long as she takes home \$35 to \$40 of the additional hourly income.

⁶⁸*Ibid*, p. 251

*Marginal tax rates should be zero (or even negative) at the highest levels of income.*⁷⁰

This conclusion results from the assumption that, beyond a certain level of income, leisure becomes relatively more desirable than additional consumption. As long as this (very reasonable) assumption is in place, even if equity is a strong consideration in the formation of the social welfare function, this result of a zero marginal tax rate on the highest levels of income persists.

This result is dependent, however, on the idea that additional income earned by those at the highest levels of income is a result of additional work that contributes to economic growth. The exponential increases in compensation at the highest income levels over the last few decades at least raise the question of whether or not individuals at those income levels are really doing anything to merit the increases. Some of the more egregious corporate scandals show evidence that these income increases are simply gifts that the few in the highest income brackets give to one another, to the detriment of stockholders and lower-level employees.

The general rules derived from optimal taxation theory suggest that optimal income taxation is best achieved by either flat-rate or decreasing-marginal-rate (regressive) tax systems. Robert Haveman argues that this conclusion misinterprets the optimal income taxation literature by combining portions of different guidelines without all of the assumptions of both:⁷¹

[The] literature...permits the optimal income tax rate schedule to have a negative intercept, in effect allowing a refundable tax credit to individuals at the bottom of the distribution. With such a negative intercept and proportional marginal tax rates, average tax rates will increase over the income distribution. If tax progressivity is defined in terms of average tax rates, an optimal linear [flat-rate] income tax can also be a progressive tax. [Some] have taken the conclusion of early analyses (low progressivity) and the mathematical form of later analyses ([flat rate] linear tax

⁶⁹*Ibid*

⁷⁰*Ibid*

⁷¹*Ibid*, pp. 251-252

schedules) and have persuaded themselves and others that flat taxes without income guarantees for the poor are optimal...Those advocating this view caricature the optimal income tax literature.

Despite the general guidelines that have been developed through optimal taxation research, economists and public policy analysts tend to agree that the literature does not offer concrete guidance on specific policy questions. Simplifying assumptions are necessary to keep optimal taxation models tractable, but these assumptions make the results more useful as guidelines than as directives. If all of the elements of production, worker ability, various taxes at all levels of government, heterogeneous consumer utility, and instances of asymmetric information could be clearly quantified, then policy analysts would need only to plug numbers into the equations and generate optimal results from them. In this world of perfect information, tax efficiency could be achieved by equalizing the marginal deadweight social loss of each type of tax. Such quantification is, however, impossible in any modern society. For this reason, optimal taxation literature cannot offer all the answers concerning tax efficiency to the policy analyst.

Policy analysts must also consider goals other than efficiency. Optimal taxation theory has not produced much in the way of general principles concerning stability, equity or simplicity. These elements could always be added to a tax optimization problem, but only if they are precisely defined. There is no consensus on the definition of an equitable tax system. Simplicity might be defined in terms of cost (both administrative and in terms of taxpayer time), but it would be difficult to measure. Stability is generally one of the first qualities of tax systems to be lost in the simplifying assumptions of an optimal taxation model. Fluctuations in revenue due to changing business cycles and patterns of saving and consumption are difficult to predict; they are different in different time periods, at different levels of inflation, in different regions of the

country, etc. Such variation makes general rules difficult to generate, so these variations are usually removed from the model.⁷²

Empirical research on optimal state tax systems should always include the principles of optimal taxation theory, but it must include other approaches as well. While the complexity of modern economies at the state level requires studies of individual tax systems to be very state-specific, there have been recent attempts to derive general principles concerning tax stability and tax system equity through approaches other than constrained revenue maximization.

The Portfolio Approach

The portfolio approach grew out of reconsideration of revenue stabilization as a goal for tax policy analysts. Though earlier works in public finance stressed the importance of stabilization, this goal had, for many years, been lost. Research in public finance in the early 1970s insisted on rigorous microeconomic foundations, a requirement that was hard to reconcile with the Keynesian macroeconomics of that era. Since then, the microfoundations of macroeconomics have been made much stronger, but the reintroduction of stabilization policy into public economics has been slower.⁷³ Fred White introduced the portfolio approach to address stability concerns as a consideration in decisions on tax structures.⁷⁴

His theoretical model is based on the trade-off between revenue growth and instability (variance of actual tax revenues around expected tax revenues) in tax systems documented in much of the mid-century public finance literature.⁷⁵ Figure 1 shows a set of possible tax combinations that make up the theoretical growth-instability frontier. Point “A” lies on the

⁷² White, 1983, p. 103

⁷³ Arnott, 1994, pp. 265-266

⁷⁴ White, 1983, pp. 103-114

⁷⁵ See Groves, 1952, pp. 87-102; Wilford, 1965, pp. 304-312; and Williams, Anderson & Lamb, 1973, pp. 267-273

frontier, and, thus, is efficient in terms of growth and stability. Point “B” lies to the left of the frontier. It is inefficient because the tax package described by Point “B” could become more stable without decreasing the growth rate, an improvement in quality of the system.

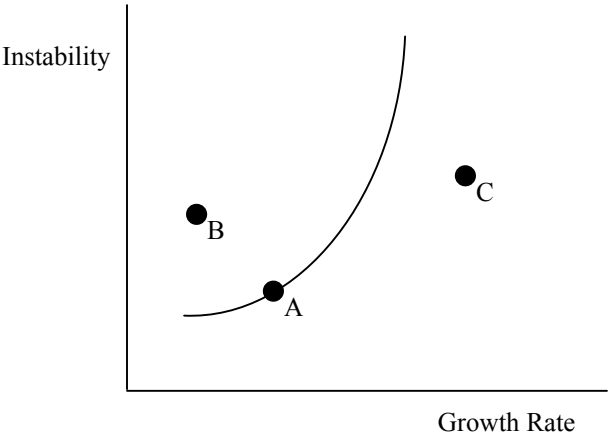


FIGURE 1: Theoretical Growth-Instability Frontier

Alternately, the tax package described by point “B” could be made to exhibit greater growth without sacrificing stability, also a quality improvement. Points such as “C,” to the right of the frontier, represent unattainable combinations of growth and stability. The slope of the frontier is positive, meaning that the level of instability and the growth rate move in the same direction. The more quickly that revenues grow, the more volatility one observes in annual revenues from taxes.

White begins by considering the standard deviation of actual tax revenues around expected tax revenues. Expected revenues exhibit unitary elasticity in economic growth, meaning that they grow one percent for every one percent increase in gross state product (or alternate measure of economic growth). So, for a given tax:

$$\sigma_i = \sqrt{\frac{\sum_{t=1}^m \left[\frac{R_{it} - \hat{R}_{it}}{R_i \cdot} \right]^2}{m-1}} \quad (1)$$

These standard deviations have to be extended to measure instability in a tax structure that includes several taxes. By considering a combination of taxes with varying degrees of instability, and by including positive and negative correlations among the taxes in the model, White develops a model to minimize instability by diversifying the tax revenue portfolio. White models stability measurement through variances and covariances of several taxes:

$$\sigma_T^2 = \sum_{i=1}^n \sum_{j=1}^n R_i R_j \sigma_{ij} \quad (2)$$

where:

R_i is the level of revenue from the i^{th} tax;

R_j is the level of revenue from the j^{th} tax;

σ_{ij} is the covariance between the i^{th} and j^{th} tax when $i \neq j$, or the variance for the i^{th} tax when $i = j$;

n is the number of taxes.

Equation (2), then, figures the variance of total actual tax revenues around total expected tax revenues for a tax system made up of several different types of taxes. This variance is the revenue-weighted sum of the variances of each individual tax, weighted by the portion of total revenue that each tax generates. The variance of each individual tax is the square of its standard deviation from equation (1).

White's growth measure for a particular tax structure is defined as the weighted average of the growth rates for each individual tax in the system under consideration. This formulation is expressed as:

$$g_T = \sum_{i=1}^n \frac{g_i R_i}{R_T} \quad (3)$$

where:

g_T is the projected annual growth rate for the entire tax structure;

g_i is the projected annual growth rate for the i^{th} tax;

R_i is the revenue from the i^{th} tax; and

R_T is total revenue from taxes.

The growth rate for the i^{th} tax (g_i) is weighted according to R_i / R_T , the fraction of total revenue generated by the i^{th} tax.

White uses a single regression equation to quantitatively estimate both growth and stability.

$$R_{it} = e^{(a + bt + cr_{it})} \quad (4)$$

where:

R_{it} is revenue from the i^{th} tax in year t ;

t is the time variable indicating year;

r_{it} is the tax rate for the i^{th} tax in year t ; and

a , b and c are regression coefficients.

The annual growth rate is the regression coefficient “ b ” multiplied by 100 to convert it to percent, and instability (σ_i) is calculated from the deviations between actual and predicted revenues. In the case of a linear regression, these deviations equal the residual values.

White estimated this regression equation for seven major Georgia state taxes (sales, motor vehicle, motor fuel, alcoholic beverages, tobacco, personal income, and corporate) for the period 1970 to 1981. His results show that no single tax combines the highest growth rate with

the least instability, so White concludes that a portfolio of taxes is most likely to produce an efficient combination of growth and stability in tax revenues over time.

White then uses a quadratic programming model to develop the set of feasible tax structures having the property that overall variance is minimum for associated overall growth rate. He defines the quadratic programming model as follows:

Minimize σ_T^2

$$\sigma_T^2 = \sum_{i=1}^n \sum_{j=1}^n R_i R_j \sigma_{ij} \tag{5}$$

subject to

$$\sum_{i=1}^n \frac{g_i}{R_T^*} R_i = \lambda (\lambda = 0 \text{ to } \infty) \tag{6}$$

where:

R_T^* is the desired total revenue from taxes and

λ is a scalar.

The constraints incorporated in the model are of the following form and meaning. First the sum of the individual tax revenues must equal the desired aggregate level of tax revenue, assumed to be the state's 1981 level in this case.

$$\sum_{i=1}^n R_i = R_T^* \tag{7}$$

Second, the level of revenue from each individual tax must be either zero or positive, which is commonly referred to as the non-negativity constraint.

$$R_i \geq 0 \text{ (for all } i, i = 1 \text{ to } n) \quad (8)$$

Third, maximum upper limits are placed on the level of revenue that can be generated from each individual tax.

$$R_i \leq L_i \text{ (for all } i, i = 1 \text{ to } n) \quad (9)$$

In the base model, the revenue from each tax is allowed to vary between ± 100 percent of its 1981 level. Thus, the constraint given in equation (9) can be rewritten as:

$$0 \leq R_i \leq 2R_{i,1981} \text{ (for all } i, i = 1 \text{ to } n) \quad (10)$$

The summation term in equation (5) is the overall variance, and the summation term in equation (6) is the overall growth rate. Parameterizing λ from 0 to infinity produces a sequence of solutions of increasing overall growth rate and overall variance of tax revenue. The first solution gives the tax structure that can be characterized as the least unstable with the lowest overall growth rate. Additional solutions are obtained for critical turning points, such as that for the current overall growth rate and the point where the overall variance is minimum. The final solution in this sequence represents the maximum overall growth rate that can be obtained with the specified constraints. These solutions are sufficient to obtain the efficient growth-instability frontier.

White's results show that Georgia was to the left of its growth-instability frontier in its actual tax combination. This suggests that, by changing the tax mix, Georgia could have

achieved greater stability with no loss in growth rate of revenue, or a greater growth rate with no loss of revenue stability. Tax mixes along the frontier vary substantially depending upon the levels of growth and stability in the solution. Motor vehicle and tobacco taxes appear only in low growth/low instability solutions. Personal and corporation income taxes are prominent in high growth/high instability solutions. The alcoholic beverage tax never appears in any of the combinations along the efficient growth-instability frontier because it is inferior to other types of taxes on both measures. White makes clear that results are state-specific, and that no general rules should be inferred.

White's paper was followed up by Walter S. Misiolek and D. Grady Perdue, who examine the same Georgia data, but alter the model to account for inflation.⁷⁶ Their results are summarized as follows:

[T]he growth-instability frontier which appears to be efficient in nominal terms may be quite inefficient when seen from a perspective of real revenues...for comparable real growth rates, the real frontier portfolios rely less on sales taxes and more on personal income taxes and other taxes than the nominal frontier portfolios, and have substantially lower real standard deviations. The only tax not used in any real frontier portfolio is the corporate income tax, and every real frontier portfolio makes use of at least five of the seven taxes. The increased diversification in the real frontier portfolios as compared with the nominal frontier portfolios occurs because four of the five minor taxes are negatively correlated with either the personal income tax or the sales tax in real terms. Only the corporate income tax is positively correlated in real terms with both major taxes. Also having a lower real growth rate and a higher real standard deviation than the personal income tax, the corporate income tax is the only tax which offers no real revenue diversification advantages.⁷⁷

Richard F. Dye and Therese J. McGuire took a similar approach using national aggregate time-series data to estimate the trend rate of growth and the deviation from trend for several

⁷⁶Misiolek & Perdue, 1987, pp. 111-114

⁷⁷Misiolek & Perdue, 1987, p. 112

components of state general sales and individual income tax bases.⁷⁸ To analyze separately the individual income tax and the general sales tax, they use national data sets that approximate the underlying state tax bases. They estimate trend growth rates as the measure of growth and use the deviations from trend to calculate a separate measure of variability. Because they use national data sets to approximate the tax bases for all states, they did not need to track statutory tax rate and tax base changes that occurred during the period they analyzed. The advantage of this approach is that they are able to interpret their growth and variability results for any state (with more or less confidence, depending on the match between the national data sets and the actual state tax bases).

The data for the sales tax are from the National Income and Product Accounts, including observations on total personal consumption expenditures and on various subcategories of the total. By combining various subcategories, they are able to approximate most states' sales tax bases. The data used to evaluate the personal income tax are from the Current Population Survey. For each year they calculate the amount of total income attributable to each bracket of the income distribution. They treat the income amounts in the different brackets as components of a state's income tax base. They use real rather than nominal values for the expenditure and income data.

Dye and McGuire find that revenue growth and variability are not positively related for all components of the state tax bases. They find that personal spending on consumer services, for example, are both slower-growing and more variable than spending on recreation services. Also, in comparing possible sales tax structures and possible income tax structures, they find that a sales tax with a narrow tax base can be both slower-growing and more variable than a flat income tax. Their results also offer little in the way of general guidelines. They find that:

⁷⁸Dye & McGuire, 1991, pp. 55-66

When the underlying growth and variability characteristics of the components of the two tax bases are compared, we infer much variety in the actual growth and variability of state tax revenues. States that include a relatively broad spectrum of consumer expenditures under the sales tax can expect growth similar to the growth of sales tax revenues for states with narrowly-defined bases; the narrow base, however, exhibits much more variability than the broad base. States with virtually flat individual income tax structures should experience lower growth and less variability than states with progressive individual state income tax structures. Given these differences in the growth and variability characteristics across tax structures, it is clear that states with identical revenue shares for the two taxes can experience differences in growth and variability of their tax system revenues simply because of structural differences in tax base rules.⁷⁹

In a 1991 paper, D. Grady Perdue and Norman L. Weed used a portfolio analysis of Texas taxes in an attempt to determine the advisability of offering targeted tax credits for economic development.⁸⁰ They reported that literature on the subject showed little if any economic advantage to this strategy. Perdue and Weed adopted White's model with only one exception: revenue from business licenses was only allowed to vary +100 percent rather than the ± 100 percent allowed for other taxes. Their basis for this decision was that license fees are generally set as low as they can possibly be set while still producing revenue adequate to cover the cost of administration and regulation.

Perdue and Weed find that the Texas tax structure lands well left of the growth-efficiency frontier. They do not really draw conclusions concerning business tax credits. They report again that the literature offers little support for these policies, and conclude that developing a tax structure that is closer to (or on) the efficient frontier is more important.

One problem with the portfolio analysis is that growth and stability are not the only issues to be addressed when creating or reforming tax systems. Updates to the model, discussed

⁷⁹Dye & McGuire, 1991, pp. 64-65

⁸⁰Perdue & Weed, 1991, pp. 341-377

below, attempt to include equity, but no attempt has been made to include simplicity (and the attendant administrative costs) or efficiency.

Oskar Ragnar Harmon and Rajiv Mallick added a new dimension to the growth-stability frontier in their 1994 paper examining the New York state tax system.⁸¹ Since earlier studies had all shown actual state tax portfolios to be well inside (or below, representing inefficient combinations) of the growth-stability efficiency frontier, Harmon and Mallick chose to analyze how other competing goals, in addition to growth and stability, affect the frontier of optimal tax portfolios. In this paper, Harmon and Mallick introduce tax distributional considerations and estimate a three-goal efficiency frontier for New York.

Harmon and Mallick use data for the period 1970 – 1991. They adjust the individual revenue series for the effects of tax law changes that took place during that time period. During the period under examination, New York had a personal income tax and a general sales tax which together accounted for about 70 percent of total general fund revenues. In addition, New York had 16 other, separate taxes. To keep the analysis manageable, Harmon and Mallick divide those 16 taxes into five groups: transfer (estate and gift, real estate gains and real estate transfer); energy (corporate utility and petroleum business); corporate (bank, corporate franchise and insurance); sin (alcohol beverage, alcohol beverage license, cigarette and pari-mutuel); and transport (highway use, motor fuel and motor vehicles).

The data for each tax were tested for trend versus difference stationarity. If the data were trend stationary, tax growth was estimated from the following regression model:

$$\log R_{i,t} = a_i + b_i \log \text{YEAR}_{i,t} + e_{i,t} \quad (11)$$

where:

$R_{i,t}$ is tax revenue of the i^{th} tax in year t ;

a and b are coefficients;

YEAR is the number of years the particular tax has been in effect; and

e is the detrended error term.

If the data were difference stationary (the detrended errors are non-stationary), tax growth was estimated from the following regression model:

$$\log R_{i,t} - \log R_{i,t-1} = d_i + u_{i,t} \quad (12)$$

where:

$R_{i,t}$ is tax revenue of the i^{th} tax in year t ;

$R_{i,t-1}$ is tax revenue of the i^{th} tax in year $t-1$;

$\{u_{i,t}\}$ is stationary with mean zero and constant variance σ^2 ; and

d_i is a drift term representing long-term expected growth in revenue.

The instability of each tax was calculated from the variance/covariance matrix of the residuals from the above regression models.

Harmon and Mallick use the Suits Index, a measure of vertical equity, to measure the distributional effects of each tax.⁸² They make the following observations about the tax groups prior to statistical analysis:

⁸¹Harmon & Mallick, 1994, pp. 395-401

⁸²Suits, 1977, pp. 747-752

The Suits Index is: $1 - \frac{\text{percent of tax burden borne by an income group}}{\text{percent of income earned by that income group}}$. The index varies from +1 at the extreme of progressivity where the entire tax burden is borne by the members of the highest income bracket, through 0 for a proportional tax, to -1 at the extreme of regressivity where the entire tax burden is borne by members of the lowest income bracket. Consider an economy in which there are two income groups. The wealthier group makes 70% of the income and pays 60% of the taxes. The

First, the transfer taxes have the greatest growth (10.9 percent) and instability (with a standard deviation of 21.9 percent), and are the most progressive (with a Suits index of 0.60) of all the tax groups. Second, in comparing the characteristics of the income and sales taxes, it is seen that the income tax has slightly greater growth (8.4 percent versus 7.7 percent), slightly less instability (a standard deviation of 6.2 percent versus 6.7 percent), and substantially greater progressivity (a Suits Index of 0.20 versus -0.12) than the sales tax. And third, the sin and transport taxes are the most regressive (their Suits Indexes are -0.16 and -0.27) and have the least growth (0.6 percent and 0.2 percent) of all the tax groups...Some of the growth, instability, and vertical equity characteristics of each tax...are unique to New York's tax structure and may differ from the characteristics of taxes in other states. For example, the New York income tax has a markedly progressive Suits Index because its marginal tax rate starts at 4 percent for the lowest income level and rises to 7.8 percent at the highest income level. Also, New York's sales tax may have greater instability than sales taxes in other states because the exemption of food, prescription drugs, and consumer utilities results in a relatively narrow tax base.⁸³

At the conclusion of the analysis, Harmon and Mallick find that, while New York's tax portfolio is inefficient on the growth-stability efficiency frontier, it is only slightly inefficient on the three-dimensional frontier that includes vertical equity.⁸⁴

William M. Gentry and Helen F. Ladd added yet another dimension, "competitiveness," in their 1994 examination of the tax systems of Massachusetts and North Carolina.⁸⁵ They followed a methodology similar to the previous papers, but they included the additional competitiveness dimension. Competitiveness measures effective tax rates relative to the national average. The authors stated that one advantage of the competitiveness measure was to incorporate an efficiency component:

Suits Index for the wealthier group in this system would be $1 - (.6/.7) = .143$. For the poorer group, the measure would be $1 - (.4/.3) = -.333$. Assuming each group comprises $\frac{1}{2}$ of the population, the Suits Index as a whole would be $(1/2)(.143) + (1/2)(-.333) = .0715 - .1665 = -.095$.

⁸³Suits, 1977, p. 396

⁸⁴*Ibid.*, p. 401

⁸⁵Gentry & Ladd, 1994, pp. 747-772.

We incorporate some elements of efficiency by including the competitiveness of a state's tax structure as one of a state's policy goals. To maintain a competitive tax structure, a state must avoid imposing taxes at rates that greatly exceed those in other states, thereby minimizing tax-driven economic distortions associated with location decisions. However, our approach ignores distortions not associated with differential tax rates across states. For example, by not explicitly measuring deadweight loss, we fail to capture the advice from economic theory that source-based taxes are undesirable on efficiency grounds.⁸⁶

The authors, like those of the other referenced papers, do not attempt to measure deadweight loss. Such a measure would require knowledge of the shapes of supply and demand curves in individual markets as well as their interplay in general equilibrium. This information is simply unavailable and would be impossible to quantify with any level of confidence.

The authors reviewed a 21-year period (1970 – 1991) and found that both states experienced the fastest revenue growth in their income taxes, which they attributed both to the progressivity of the income tax and the accumulation of legislated changes to the taxes. Sales tax revenues grew faster in Massachusetts than in North Carolina, which was consistent with the narrower base of the Massachusetts tax. In both states, the lowest growth rates were associated with corporate income taxes and energy taxes.

Massachusetts' taxes showed greater instability in all major categories other than corporate income taxes. The authors pointed out that income instability over the period was 50% higher in Massachusetts, accounting for some of the difference. The remaining differences in instability likely result from the tradeoff between growth and instability. The Massachusetts taxes grew faster but were less stable.

Equity was measured only for the personal income taxes, sales taxes and selective sales taxes. The authors made the assumption that state policymakers are only concerned with

⁸⁶Gentry & Ladd, 1994, p. 749.

perceived burdens to individual taxpayers. Since the incidence of business taxes is unclear, to economists as well as to the general public, their equity analysis ignored business taxes. Using elasticity of the tax burden between income classes as the equity measure, Gentry and Ladd concluded that both state sales taxes were regressive, though the narrower base of the Massachusetts tax, which excludes food, made it less regressive than the North Carolina sales tax. Furthermore, the gasoline tax was regressive in both states, but more so in North Carolina, which has a heavier reliance on automobile travel than Massachusetts, especially among lower income groups. Both income taxes were progressive, though North Carolina's, with its larger exemption that mimics the federal tax exemption, was significantly more progressive. The authors incorporated equity into their portfolio model as a constraint, allowing the degree of progressivity to vary around the 1991 level within a limited range.

For the purposes of description, the authors compared tax rates in each state to the national average to determine competitiveness. North Carolina's rates were slightly above average for energy and wealth taxes, significantly above average for corporate and insurance taxes, and substantially above average for income taxes. The North Carolina sales tax rate was well below the average. Massachusetts was well below the average for sales and energy taxes, slightly above average for insurance taxes, well above average for income and corporate taxes, and in a league of its own for wealth taxes, with rates that average 256% of the national wealth tax average.

Gentry and Ladd included competitiveness as a constraint in the portfolio analysis. They defined each state's revenue from each kind of tax if that state applied the average tax rate to its tax base as its tax capacity. They then measured tax effort, which they defined as the ratio of the revenue the state actually collects on a tax to its capacity for that tax. They constrained the tax

effort of the state to the 95th percentile of tax effort across all states. Using this formula, they found that both states could double their reliance on corporate and sales taxes, and could substantially increase insurance taxes, without bumping against the competitiveness constraint. On the other hand, neither state had much room to maneuver with its income tax.

Micro-Simulation Tax Models

In a 1988 paper, Harvey Galper and Stephen H. Pollock report on micro-simulation models, created for the evaluation of tax systems by Peat Marwick's Policy Economics Group.⁸⁷

Galper and Pollock describe the models thus:

The micro-simulation model... calculates tax liability for thousands of families and individuals (the "micro" units in the economy) who are representative of the entire tax-filing population of a jurisdiction. It is the scope and quality of the underlying database along with the ability to simulate quickly and accurately the effects of major structural tax changes that distinguishes micro-simulation tax models from the typical representative taxpayer approach... The analytical database in its simplest form is a statistically drawn sample of tax returns with each return weighted so that the sample represents the entire tax-filing population. A sample is used as a lower cost but still highly accurate alternative to a data base composed of every tax return filed in the jurisdiction. Ideally, tax returns showing very low and very high levels of income are sampled more heavily and thus have lower weights.⁸⁸

The representative taxpayer model attempts to define, as well as possible, the social welfare function from the optimal taxation literature by separating the population into related subgroups (usually related by income) and developing a mean taxpayer to represent each group. Two traditional problems with representative taxpayer models are their inability to capture the effects of a whole range of new policy scenarios and the difficulty in extrapolating future

⁸⁷Galper & Pollock, 1988, pp. 107-128

⁸⁸*Ibid*, pp. 112-113

representative taxpayer models from current data. Because it relies on a larger sample of individual behaviors, the micro-simulation tax model allows one to address both of these problems with greater effectiveness than does a typical representative taxpayer model.

To deal with these problems, the database for the micro-simulation model can be enhanced. One can, with authorization, combine data from state and federal tax returns or statistically match tax return data with census data. The latter approach results in a database that contains substantial demographic and economic information including income from nontaxable sources (such as transfer payments), an indicator of pension coverage, and an indicator of the dependent status of family members. The census data also contain information on individuals and families that do not file tax returns.

The data can also be enhanced by the imputation of information gathered from independent sources. Variables that typically are imputed include consumption by type of good or service (providing a measure of excise and sales and use tax burden), itemized deductions for non-itemizers, industry in which the taxpayer is employed, and student status. During the imputation process, consistency checks are employed to assure that the totals for each of the imputed items match the aggregate data.

Galper and Pollock contend that the problem of the timeliness of the database can be dealt with by extrapolation. The database is extrapolated to reflect how the jurisdiction's economy will look in years beyond the base year from which the data have been taken. They claim that the detail and quality of the micro-simulation database allows a high level of confidence in these extrapolation results. However, extrapolation of this sort, when combined

with the statistical matching and data combinations already suggested, can make the accuracy of the resulting database suspect.⁸⁹

Galper and Pollock used micro-simulation models to estimate the effects of the Tax Reform Act of 1986 on five states: California, Colorado, Nebraska, Oklahoma, and Virginia. These states were selected to represent the various types of tax changes enacted at the state level in response to federal tax reform and to provide regional and economic diversity. Three dimensions of each income tax system are examined: the progressivity of each system, the revenue responsiveness to real economic growth, and the treatment of low-income taxpayers.

Data were gathered on the distribution of income for the nation as a whole and for each selected state. Progressivity of state and federal income tax systems, both pre- and post-reform, are deduced from these data. Before the Tax Reform Act of 1986, on a national level, middle- and lower-income families claimed a smaller share of income than their share of the population, but they paid an even smaller share of tax. After tax reform, the share of tax liabilities paid by this group declines, and the share paid by upper-income taxpayers increases, reflecting a tilt toward even greater progressivity.

All of the states also showed varying degrees of increased progressivity following tax reform. A major reason in all cases is the inclusion of all capital gains (rather than only 40% under previous law) and the elimination of tax shelters, such as real estate partnerships. As a result of these changes, taxable income increased by a much larger proportion at high income levels than at lower income levels. The income tax in Colorado became much more progressive even with a system having a single tax rate. This result occurred because under the prior law the top rate came into effect at a low income level (\$14,150), while under the new law the personal exemption and the standard deduction were increased to the higher federal levels. The Virginia

⁸⁹ Citro, 1991, pp. 74 - 77

income tax also became more progressive as a result of both a higher income threshold for the top tax rate (from \$12,000 to \$17,000) and a larger standard deduction and personal exemptions.

The California income tax became more progressive despite the flatter rate schedule because of more liberal credits, stricter conformity to federal Adjusted Gross Income (AGI), and an increased minimum tax. The Oklahoma tax system became more progressive because the tax base was broadened at higher income levels due to changes in the federal AGI. Also the lower federal income taxes imply increased state income taxes for those taxpayers claiming the deductibility option for the state. Progressivity of the Nebraska and federal tax systems did not change much because the higher personal exemptions and standard deductions were offset by a flatter rate schedule.

The federal and state tax systems became less elastic with respect to income after tax reform despite the increase in progressivity of each. Prior to tax reform, the real elasticity of the federal income tax and the income tax systems of California, Nebraska, and Oklahoma were all in the vicinity of 2.0; that is, a 5% increase in real income across the board would increase tax liabilities by 10%. For Colorado and Virginia, the elasticity was on the order of 1.5; a 5% increase in real income would increase liabilities by 7.5%. The relative elasticities across states roughly matched the relative progressivity indices prior to tax reform.

After tax reform, however, each of the income tax systems examined by Galper and Pollock had lower elasticity. The reason for this outcome is that the elasticity measures are dominated by the flatter rate schedules and lower rates at the top of the income scale, whereas the progressivity measures are more affected by the reductions at the bottom. As incomes grow, the flatter rate schedules generate less revenue than did the prior structure. Nonetheless, at the time they were introduced, the new systems were more progressive.

Oklahoma had the largest relative change in its elasticity. This is because many of its taxpayers were induced to switch from the highly progressive tax schedule, under which federal tax payments are deductible, to the flatter tax schedule with no deduction for federal taxes. Due to the implications of the new, flatter rate schedules, tax changes that are revenue neutral in the short run may not be revenue neutral over time. In a few states, such as Nebraska and Oklahoma, the changes are fairly significant (a decline in elasticity of 12% and 14%, respectively).

The number and percentage of families with positive tax liabilities by state under the new federal and state tax laws decreased. This was primarily due to higher personal exemptions and standard deductions. The number of families with state income tax liabilities greater than federal income tax liabilities (before the earned income credit) decreased in every state except Oklahoma, which did not change its tax schedule. Thus, the states examined by Galper and Pollock in this paper did an even better job than the federal government in reducing taxes for lower-income taxpayers. After tax reform, there are fewer anomalous cases of taxpayers who pay higher taxes to their state governments than they pay to the federal government.

Galper and Pollock conclude the following:

This [paper's] primary message is that computer-based micro-simulation tax models can be extremely useful tools in analyzing federal and state tax policies. We have used these tools to examine the federal and selected state individual income tax systems before and after tax reform. Three dimensions of each income tax system have been examined: the progressivity of each system, the revenue responsiveness to real economic growth, and the treatment of low-income taxpayers... Our findings are that each of the tax systems examined became more progressive after tax reform but also less productive of revenue with respect to real economic growth. At the same time, thousands of federal and state taxpayers have been removed from the tax rolls and, with the exception of one state,

fewer taxpayers pay higher income taxes to the state than to the federal government.⁹⁰

As data from each source are added to the model, one must make statistically valid linkages to the taxpayers in the sample. Tennessee does not have enough specific information on its individual taxpayers (due to the lack of the individual tax forms that come with a state income tax) to hope to compile enough data to do a thorough microsimulation model.

⁹⁰Galper & Pollock, 1988, p. 128

CHAPTER III

THE TENNESSEE TAX SYSTEM

A Brief History of Taxation in Tennessee

Tennessee became the sixteenth state of the United States on June 1, 1796. As part of the requirement for application for statehood, Tennessee had called a constitutional convention and approved a constitution earlier in 1796. This first state constitution made the following provisions for the raising of revenue by the state:

All lands liable to taxation in this state held by deed grant or entry, shall be taxed equal and uniform, in such a manner that no one hundred acres shall be taxed higher than another, except town lots, which shall not be taxed higher than two hundred acres of land each. No free man shall be taxed higher than one hundred acres, and no slave higher than two hundred acres on each poll.⁹¹

Changes in Tennessee's population and demographics, among other issues, led Governor William Carroll to call a constitutional convention in 1834, which produced a new state constitution that was ratified by the people in 1835. Some significant changes were made in several areas, including major changes in the judicial system and the system of taxation. The new provisions with regard to taxation permitted the legislature to tax "land, slaves between the ages of twelve and fifty years, and such other property as it deemed expedient."⁹² In the constitution of 1834, property was to be taxed according to its value, rather than under the flat tax system adopted in 1796. The legislature was not allowed to tax articles manufactured of the produce of the state, other than to charge any applicable inspection fees. Poll taxes were continued, and the tax base was enlarged to include merchants, peddlers, and privileges. The

⁹¹ Combs & Cole, 1940, p. 13

⁹² *Ibid*, p. 21

general assembly could delegate taxing power to counties and incorporated towns, but only to the extent that the taxes they levied followed the principles established for state taxation.

In the aftermath of the Civil War, Reform Governor William G. Brownlow served as Tennessee's chief executive. Anyone who had participated in fighting the Union was disenfranchised, while former slaves were freed and enfranchised. This dramatic shift in political power was much resented by those who lost their right to vote, and the resignation of Governor Brownlow (tendered so that he could accept a United States Senate seat) in February of 1869 paved the way for change. Speaker of the Senate Dewitt Senter became Governor at the resignation of Brownlow, but a general election was to be held later that year. Though Senter had supported Brownlow's policies, he campaigned on the policy of re-enfranchisement of a vast majority of white, male Tennesseans. The number of people voting in the 1869 election left no doubt that Senter had, in fact, re-enfranchised these citizens prior to the election, and that they had voted almost exclusively for him. His opponent appealed to Washington to investigate the election for fraud, but neither President Grant nor Congress chose to intervene.⁹³

Governor Senter called a constitutional convention in 1870, and Tennessee's current constitution was born. The post-Brownlow anti-government sentiment ran high, and Tennessee's newest constitution reflected a great distrust of state government. While provisions for taxation were not seriously altered, the state government was restricted from investing in private corporations or railroads, as the Brownlow government had left Tennessee with a substantial debt due mostly to embezzled and misused railroad investments. In addition, the legislature was prohibited from spending more in any given year than was available from revenues and reserves.⁹⁴

⁹³ Greene, Grubbs & Hobday, 1975, p. 18

⁹⁴ Smith, M. Lee, 1998, pp. 10-11, 19

Tennessee faced a tax crisis in the early 20th century, as the economy moved from one based on agriculture to one based on business and industry. By the Roaring Twenties, most Tennesseans were no longer farmers, and the property tax on which the state relied for most of its income was no longer adequate. The tax burden fell heavily on some Tennesseans, and not at all on others. The state found itself unable to fund even the modest level of government services provided during that era.⁹⁵

The biggest obstacle to tax reform was the uniform rule of taxation, which stated that all property must be taxed at the same rate. Several arguments were made against this provision, including:

- 1) the requirement is impractical because some forms of property cannot be discovered by the government;
- 2) valuing some kinds of property is difficult;
- 3) the state was prevented from applying different kinds of taxes to different kinds of property in order to distribute the tax burden more equitably or to achieve other social or economic goals; and
- 4) taxing corporate wealth as well as income from stocks and bonds is a form of double taxation.⁹⁶

In 1923, Governor Austin Peay pushed through tax reform that adapted Tennessee's tax structure to the 20th century economy. He replaced the property tax with others that applied more broadly but at lower rates, including selective sales taxes on items such as liquor, tobacco, gasoline, and guns. Tennessee sales taxes are considered to be privilege taxes, and, therefore, may be charged at non-uniform rates. The most controversial of the new taxes was the corporate

⁹⁵ Greene, Grubbs & Hobday, 1975, pp. 177-179.

⁹⁶ Combs & Cole, 1940, pp. 180-183

excise tax, levied at 3% of net earnings. The tax was immediately challenged on the grounds that it unconstitutionally violated the uniformity clause. The Tennessee Supreme Court sustained the act, finding that the tax was one on the privilege of doing business in Tennessee, and that a privilege tax need not be levied uniformly. Governor Peay's reforms, combined with a large increase in the state's long-term debt, stabilized the budget and made possible improvements that ushered in a period of progress for Tennessee. Among the new areas of government spending were better funding for public education, the first state funds for colleges and universities, the first good roads spanning the state, and the beginnings of the state park system and the Great Smoky Mountains National Park.⁹⁷

Governor Henry Horton presided over the passage of the next controversial tax, the Hall Income Tax, in 1929. This tax was levied at the rate of 5% on income from stocks and bonds, though the *ad valorem* tax on stocks and bonds was simultaneously removed to meet constitutional requirements. A constitutional challenge to this tax was also mounted and lost. The Tennessee constitution makes only one mention of income taxation, in Article II, Section 28, which states that "The Legislature shall have the power to levy a tax upon incomes derived from stocks and bonds that are not taxed *ad valorem*." The Tennessee Supreme Court upheld the right of the legislature to levy the tax, finding that the clause was to be interpreted as being an exception to the general rule that all property be taxed according to value.⁹⁸

Testing their earlier constitutional successes, legislators passed an income tax in 1931. After some debate, it was levied progressively on personal incomes and as a flat rate tax on corporate incomes. A rival plan had attempted to classify "any business, trade, calling, occupation, profession, or employment in the State of Tennessee for profit" as a privilege, and

⁹⁷ Sundquist, 1999, pp. 17-19.

⁹⁸ Combs & Cole, 1940, pp. 188-194.

thus open to taxation in whatever form the legislature saw fit. The court had previously found that “A privilege is whatever the Legislature may choose to declare to be a privilege and to tax as such,” so constitutional problems were expected to be avoided. The success of other states in introducing income taxes despite constitutional language similar to Tennessee’s, however, led the legislature to adopt a straightforward income tax. When the court challenge came, the Tennessee Supreme Court found that:

- 1) The constitution in Article II, Section 28, establishes a general rule of taxation, which is that property shall be taxed uniformly and equally, according to value.
- 2) The provision conferring upon the legislature power to tax incomes derived from stocks and bonds that are not taxed *ad valorem* is an exception to the equality and uniformity clause.
- 3) In granting power to tax particular incomes, the constitution thereby denies, by implication, the right to tax other forms of income.

This decision left the legislature seemingly unable to tax non-security-derived income at all without a constitutional amendment.⁹⁹ Current legal opinion generally holds that a uniform income tax could pass constitutional muster as a property tax, and that a tax on the privilege of working in the state might be levied progressively without violating the state constitution.¹⁰⁰ Any new income tax is certain to undergo a constitutional challenge, the outcome of which will likely depend upon the ideological makeup of the Tennessee Supreme Court at the time.

Minor changes were made to the tax system over the next ten years, including an additional privilege tax on Tennessee businesses, and some expansion of the excise tax (though not beyond a list of items specified by the legislature). Governor Hill McAlister attempted to

⁹⁹ Combs & Cole, 1940, pp. 188-194

¹⁰⁰ Laska, 1998, p. 19

pass a general sales tax in 1935, but it was ultimately defeated in a bitter political fight. Governor Jim McCord, in a successful effort to establish a minimum wage scale for teachers and modernize Tennessee schools, pushed a 2% general sales tax through the legislature in 1947. McCord had been the candidate of choice of former Memphis Mayor, and powerful political “boss,” Ed Crump. McCord failed in his bid for a third term as Governor, as former Governor Browning, returning from the battlefields of WWII, hooked up with sales tax opponents and took on his nemesis, Crump, and Crump’s boy, McCord. Browning, Governor again after a 12-year hiatus, successfully increased public school spending and attempted to make some constitutional changes affecting taxation that failed at the time, but which reappeared later under Governor Frank Clement.¹⁰¹

The period 1953 to 1971 in Tennessee is often referred to as “the Clement-Ellington years.” Frank Clement was Governor from 1953 to 1959, and again from 1963 to 1967. Buford Ellington, Clement’s close friend and Cabinet member, led the executive branch from 1959 to 1963, and again from 1967 to 1971.

Governor Frank Clement fought for, and won, an increase in the sales tax from 2% to 3% during his first two terms in office, as well as an extension of the sales tax to cover utility services. Ellington campaigned on a platform of “no new taxes,” as he deemed the additional revenue from the recent increase sufficient for his programs. In his third term, Clement eschewed tax issues and concentrated on state congressional apportionment and civil rights. Ellington moved back to tax issues in his third term, pushing for a constitutional convention.¹⁰²

A limited constitutional convention and public referendum in 1971 succeeded in modifying the uniformity clause of the State Constitution, allowing, for the first time, the

¹⁰¹ Corlew, 1990, pp. 491-493.

¹⁰² Corlew, 1990, pp. 572-587.

classification of property to achieve non-uniform tax rates. The amendments that emerged from this convention were approved, and concluded that property fell into three categories (personal, tangible and intangible), and that tangible property could be divided into four categories with different assessment rates for each category:

- 1) Public utility property was to be assessed at 55%;
- 2) Industrial and commercial property were to be assessed at 40%;
- 3) Residential property was to be assessed at 25%; and
- 4) Agricultural property was to be assessed at 25%.
- 5) The convention also established a personal property tax exemption of \$7,500, and allowed for legislative tax relief to the elderly and needy.¹⁰³

A tax modernization and reform commission created in 1972 was the first to report that Tennessee's tax structure was deficient in two major areas: it is significantly regressive at low levels of income, and it is relatively unresponsive to economic growth. But, in 1972, in the midst of extreme civil rights disputes in the south, Tennessee elected its first Republican governor in over 50 years, Winfield Dunn. Governor Dunn had several spending programs in mind, and he battled the legislature for a spending increase, including a proposal for a state income tax. Dunn's programs, including a statewide kindergarten program, improved conditions in mental health facilities, and a pay raise for a portion of state employees who he deemed underpaid, were funded through a 0.5% sales tax increase. The legislature approved his increase in one of their longest and most heated sessions, but they did cut a third of the proposed spending from his budget, reducing the scale of his programs.¹⁰⁴

¹⁰³ Smith, M. Lee, 1998, pp. 11-12

¹⁰⁴ Corlew, 1990, p. 589.

Governor Dunn floated the idea of a state general income tax as tax revenue fell in the recession of the mid-70s, but the legislature never gave the issue consideration. Governor Ray Blanton, who succeeded Governor Dunn, got his legislation for a sliding rate progressive state general income tax to the floor of the legislature, but there it died.¹⁰⁵

When Governor Lamar Alexander took office in 1979, he proposed new spending for education in the form of merit pay for successful teachers. It was an expensive program, and the sales tax was raised to 5.5% in order to pay for it, as well as for other new and existing programs. At that point, Tennessee had the highest combined state and local sales tax rate in the nation, and counties along the state's borders were beginning to complain that their customers were crossing into Tennessee's border states to make purchases at a lower sales tax rate.¹⁰⁶

Governor Ned McWherter and Governor Don Sundquist both waited until their second terms to attack the explosive issue of tax reform. McWherter proposed a 4% flat income tax on federally adjusted taxable income, and he visited every county in the state in his attempt to sell it, but the legislature would not follow. In the next election cycle, many Democratic legislators thought it necessary to sign "No Income Tax" pledges in order to keep their seats.¹⁰⁷

McWherter also obtained the first Medicare waiver granted to a state and developed TennCare, a program designed to insure more people while reducing health care costs to the government. It has, indeed, insured more people, but it has failed to reduce expenditures. Tennessee's health care expenditures have skyrocketed along with the country's as a whole. TennCare is one of the first programs that anti-tax advocates propose to put on the chopping block whenever revenue shortfalls threaten.

¹⁰⁵ Bergeron, Ash & Keith, 1999, p. 330.

¹⁰⁶ Langsdon, 2000, pp. 388-389

¹⁰⁷ de la Cruz & Cheek, 1999, p. 4

Governor Sundquist initially began with a proposal to lower sales taxes, remove the sales tax from food, and reform and raise business taxes. The average voter had no quarrel with this plan, but the legislators feared the loss of jobs and were generally too beholden to business interests to give it any consideration.¹⁰⁸ Governor Sundquist regrouped and came back with a revised plan with fewer cuts to the sales tax and a smaller increase to businesses, but the legislature remained unmoved. Finally, Governor Sundquist proposed an income tax, and a small, but highly vocal, part of the Tennessee citizenry exploded. In the end, legislators rejected the income tax, amidst a rowdy demonstration by anti-tax activists. When the legislature cobbled together a budget that relied on tobacco settlement funds to balance, Governor Sundquist gave it a resounding veto. The legislature overrode his veto, but the subsequent downgrading of Tennessee's bond rating left lawmakers aware that the tax issue would be back to haunt them in the near future.

Debate during recent tax reform efforts has been fierce, and a summary of some of the arguments gives a fair picture of the daunting challenges facing anyone who tries to reform the Tennessee tax system, especially if that reform includes an income tax. The April 20th, 1999 *Tennessean* sported the following headline on its local news front: "State Income Tax Gains Steam." The next day, two headlines countered: "Senate's Stall Could Kill Income Tax Deal" and "Anti-Tax Barrage Hits Fast." The latter quoted several state lawmakers who said the faxes, e-mails and telephone calls opposing the income tax were coming fast and furiously. "I don't want to use a four-letter word," the story quoted Senator Lincoln Davis (D-Pall Mall) as saying, but "People are using four-letter words in saying 'no.'"

After a public opinion poll showed much skepticism of the Governor's claims of a revenue shortfall without new tax revenue or new spending cuts, Sundquist's press secretary said

¹⁰⁸ *Nashville Business Journal*, 1999

“I think the governor would challenge anyone who believes that to please send him recommendations on exactly what we’re going to cut.” Taxpayer answers were always the same: “Cut waste, fraud and abuse in TennCare.” Few taxpayers were able to pinpoint any waste, fraud or abuse in the program, but they were certain that it was there. The legislature closed its special session in April, 1999 with no resolution.

Governor Sundquist kept the issue alive and pushed for tax reform again in a 2000 special session and in a 2001 special session. Anti-tax advocates were prepared. In a 2001 effort led by Rep. Marcia Blackburn (R-Brentwood) and local talk radio hosts Steve Gill and Phil Valentine, massive demonstrations against an income tax reminded the General Assembly daily that many opposed the tax. On the night of the final vote, Blackburn sent a frantic fax from the floor of the General Assembly to Steve Gill demanding “Send Troops!”¹⁰⁹ And what many journalists called “an angry mob,” that challenged police and broke a window or two, answered the call. Lawmakers rejected tax reform again. Though Sundquist vetoed their budget, the General Assembly overrode his veto.

When Governor Sundquist released his budget for fiscal year 2002-2003, it contained some severe cuts in some areas, but the overall level of spending increased. Governor Sundquist’s budget required an increase in tax revenues. State House Democrats released a “no new taxes” budget proposal in February. According to a Tennessean report, they called it the “Downsizing Ongoing Government” plan, but it was affectionately known as the DOG. Critics who wished to reform taxes said the budget would “slash existing education funding, drop 300,000 people from state-subsidized health care, cut most state agencies by 10%, and eliminate

¹⁰⁹ Walker, Henry, 2001

the Departments of Tourism and Economic Development.”¹¹⁰ Critics who wanted no new taxes said the proposed program cuts were meant to scare lawmakers into raising taxes.

Alternate budget plans abounded, with all submitted characterized by their sponsors as budgets that would maintain necessary services at the least cost to the taxpayer. Legislators argued mightily, tax protestors led horn-honking displays opposite the state capital, and nothing passed. Tax reform supporters soon took over the prime Charlotte Avenue sidewalk space across from the capital, maintaining a 24-hour presence with signs of support for tax reform.

In June of 2002, House Speaker Jimmy Naifeh submitted a new income tax plan that he claimed would leave 65% of the state's taxpayers contributing less to the state coffers than they do under the current plan. Generally speaking, this 65% was on the low end of the income scale. The debate rapidly grew even uglier, and legislators could not agree. The Senate agreed to adopt a limited (1%) income tax as a stopgap measure until a statewide referendum on the income tax could be taken. If the referendum approved the income tax, it would rise to 3%. If the referendum denied the income tax, it would be replaced with a sales tax increase. The House would not budge. When there was no budget by the June 30, 2002 deadline, legislators allowed the state government to shut down for the first time in its history. Non-essential state workers stayed home for a week while legislators battled over various proposals.

During the shutdown, Governor Sundquist proposed a plan similar to the one the Senate had passed, but he was ignored. His own party (the Republican Party) had completely broken with the Governor over the issue, and they criticized him harshly and constantly. The Democratic Party, which controlled both state Houses, was split over the issue, with many fearing they would lose their seats if they supported even a temporary, limited tax. Jimmy Naifeh simply could not amass the necessary votes. The tax reformers blinked first, and, just

¹¹⁰ Shiffman & Johnson, 2002, p. 1A

before the July 4th holiday, legislators agreed to a 1% state sales tax increase. State government reopened on July 5th.

The income tax issue still would not die. As Governor Sundquist's second term drew to a close, the battle for the Governor's mansion began to take shape. Republican nominee Van Hilleary made opposition to a state income tax the basis of his campaign. He promised there would never be an income tax on his watch, and he mocked Democratic nominee Phil Bredesen for refusing to make the same definitive promise. Former Nashville Mayor Bredesen would only say that Tennessee did not need an income tax now, but that he refused to close off any options for the future. He promised he would not support an income tax in his first term, and he would not support it in his second term unless he openly advocated an income tax plan in his re-election campaign. Phil Bredesen won a tight race against Congressman Hilleary, and the income tax issue, indeed the entire issue of reform in the tax system, was dead until at least 2006.

Governor Bredesen went on to enact policies similar to those in the DOG budget, cutting 9% from state government across the board and disenrolling about 300,000 people from TennCare. His argument has been clear: no tax exhibits the kind of revenue growth necessary to keep up with health care expenses, and other state services, namely kindergarten through twelfth grade education, are suffering from the squeeze created by TennCare spending. In true “Nixon Goes to China” fashion, Governor Bredesen appears to have gotten away with the cuts in a way that no Republican likely could have. As Governor Bredesen’s re-election campaign has geared up, he has made it clear that he sees no need for tax reform, so the issue is likely dead for the near future. But Tennessee’s tax system deficiencies persist, and the tax reform issue will almost certainly rise again.

Tennessee's Current Tax Structure

Tennessee relies on the general sales tax for over half of its tax revenue (60%). Franchise and excise taxes supply 12% of tax revenue, and gasoline taxes make up 8% of total state tax revenue. Additional revenue sources include taxes on gross receipts and privileges (5%), insurance and banking (4%), income and inheritance (2%), motor vehicles (2%), and tobacco, beer and alcoholic beverages (2%). The remaining 5% of state tax revenue comes from a variety of sources.¹¹¹ For a few years during the worst of tax fights, years, the largest portion of this category was legal settlements related to health care cost lawsuits brought by the states against tobacco companies. Those funds have now largely been used.

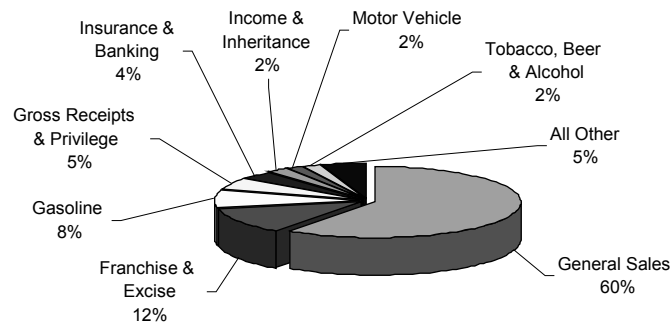


FIGURE 2: Sources of Tennessee State Tax Revenue

Leaving federal funds aside, Tennessee was ranked 50th in the nation in per capita tax revenue in fiscal year 1999 at \$3082.62, or 73% of the national average.¹¹² Tennessee's rank in per capita expenditures in 1999 was a bit higher at 48th, representing a per capita expenditure of \$2,897.76, or 79% of the national average. At 24.95% of state revenue (including federal funds),

¹¹¹ Bredeesen, 2005, p. A-2

¹¹² United States Census Bureau, 1999.

Tennessee's dependence on sales taxes ranks third in the nation behind Florida (28.21%) and Washington (25.24%).¹¹³

Tennessee has a low corporate tax burden compared to other states. A Wisconsin Department of Revenue study indicates that Tennessee's tax burden on manufacturing firms is far lower than the average of the nineteen states compared in the study. The study, which compared tax burdens on hypothetical firms for Tennessee and eighteen other states, showed that the average total local and state tax burden on manufacturing firms in Tennessee is 73.8% of the study average for all seven hypothetical corporations. Tennessee's manufacturing firms had higher than average franchise and corporate income tax burdens, but lower than average sales and property tax burdens. Findings reported by the Tennessee Board for Economic Growth support those of the Wisconsin study. These findings report that Tennessee's corporate tax burden, calculated as the excise, franchise, and sales tax liability for an average manufacturer, is the third lowest in the region.¹¹⁴

The state and local tax burden on non-manufacturing firms in Tennessee is close to that of other states in the region. A 1994 study by the Public Affairs Research Council of Louisiana demonstrated that the tax burden on non-manufacturing firms in Tennessee represents a larger percentage of the regional average than does the burden on manufacturing firms. Among the eleven southern states discussed in the study, Tennessee's corporate tax burden was lower than the average on wholesale firms (95%), but higher than the average on construction (111%) and retail firms (113%). Non-manufacturing firms in Tennessee experienced greater burdens than

¹¹³ Rochelle, Robert, 1999, p. 10.

¹¹⁴ Green & Lippard, 1988, p. v.

manufacturing firms for sales and corporate income taxes. Likewise, incorporated businesses carry a greater tax burden than do unincorporated businesses and limited liability companies.¹¹⁵

Tennessee has one of the lowest marginal tax rates in the nation. Zsolt Becsi of the Federal Reserve Bank of Atlanta reports that Tennessee has an 8.64% marginal tax burden, the lowest in the nation between 1977 and 1992. Becsi defined marginal tax rates as the additional taxes paid resulting from a small change in personal income.¹¹⁶

Does Tennessee Need Tax Reform?

Revenue stability is a standard goal for good tax systems, and Tennessee's tax system does not produce revenue stability. The heavy reliance of the Tennessee tax structure on sales taxes makes Tennessee's tax revenue more vulnerable to recession and less responsive to growth than other, more balanced systems. States that succeed with this type of tax system tend to have a large portion of their tax revenues coming from tourism or from natural resources. Florida and Nevada depend heavily on tourism. Texas and Alaska benefit from taxes on oil. Tennessee has something of a tourist industry, but tourist traffic fluctuates widely as the popularity of country music waxes and wanes. Tennessee's tourism industry cannot be depended upon to produce a steady stream of tax revenue.

Tax reform need not include tax increases. Tennessee could benefit from lower tax rates over a broader tax base. By reforming business taxation, adding an income tax, and/or taxing services (to name a few of the proposals that have been made), Tennessee can broaden its tax base and create a more stable revenue system.

¹¹⁵ Green & Lippard, 1988, pp. v-vi.

¹¹⁶ Becsi, Zsolt, 1996, pp. 24-25.

TABLE 1: Tennessee Tax Revenue and Tax Base Information¹¹⁷

Item	Tax Base and Rate	Amount (in thousands)	Per Capita	Percent of Tax Revenue
Sales and gross receipts		6,061,656	1,054.31	75.36%
General sales and gross receipts	7% on final retail sales; 6% on grocery food; many services exempt	4,704,130	818.20	58.48%
Selective sales taxes		1,357,526	236.12	16.88%
Alcoholic beverages	Wholesalers pay \$4.40/ gallon on distilled liquor, \$1.21/ gallon on wine, 15¢ per case enforcement tax on liquor and wine, \$4.29/ barrel of beer, and 17% on the wholesale price of beer. 15% of gross receipts on alcoholic beverage sales at liquor by the drink establishments.	78,471	13.65	0.98%
Insurance premiums	.7% on life premiums, 1% on accident and health premiums, 1.3% on property and casualty premiums.	296,496	51.57	3.69%
Motor fuels	20¢ per gallon on regular (unleaded) gasoline, 17¢ per gallon on diesel, 13¢ per gallon on natural gas used in motor vehicles, 14¢ per gallon on liquefied petroleum gas, and 1¢ per gallon inspection fee on all fuels. Aircraft fuel is exempt, but subject to the regular sales tax.	774,689	134.74	9.63%
Pari-mutuels	Wagering tax (range 2% - 4%), .5% racing development tax on wagers, 15¢ admission tax, 67% tax on "breakage" and unclaimed prizes. Pari-mutuels failed their 1987 ballot test and are not legal.	X	X	X
Public utilities	Credit for franchise and excise taxes paid. Gas cos pay 1.5% on gross receipts over \$5,000, water and electric cos pay 3% on gross revenues over \$5,000, and all others (excluding telecom, which is subject to the sales tax with telemarketing exemptions) pay 3% on gross receipts.	3,998	0.70	0.05%
Tobacco products	1¢/cigarette and 6.6% of wholesale on other tobacco products	81,671	14.21	1.02%
Other selective sales	Includes consignments, flea market booths, some services, etc.	122,201	21.25	1.52%
Licenses		878,136	152.74	10.92%
Alcoholic beverages	Paid by manufacturers, distilleries, wineries, wholesalers, retail stores and liquor by the drink establishments (range \$400-1000)	2,275	0.40	0.03%
Amusement	\$100 per coin-operated machine, "flipper" machines excluded	58	0.01	0.00%
Corporation franchise	.25% on the higher of net worth or book value	480,242	83.53	5.97%
Hunting and fishing	\$8 - \$136 for residents, \$9 - \$401 for non-residents.	24,782	4.31	0.31%
Motor vehicle	\$13.50/motorcycle, \$20.50/passenger car, trucks by weight (\$20-1333)	225,933	39.30	2.81%
Motor vehicle operators	\$19.50 per five-year license	37,268	6.48	0.46%
Public utility	.3% on gross repts \$5000-\$1 million, .2% on amounts over \$1 million.	6,236	1.08	0.08%
Occupation and business, NEC	65% of the gross receipts from all retail and wholesale sales; rates vary by merchandise class from 1/60 of 1% to 1/8 of 1%.	96,821	16.84	1.20%
Other	Includes professional (\$200), marriage (\$15), vending machine (\$2 per company plus \$1 per machine), etc.	4,521	0.79	0.06%
Other taxes		1,103,555	191.94	13.72%
Individual income (Hall Inc. Tax)	6% of interest and stock/ bond dividends with \$1250 exempt per payer	198,071	34.45	2.46%
Corporation net income	6.5% on federal taxable income with some adjustments - main adjustment is apportionment, figured as [TN property/Total property + TN payroll/Total payroll + 2(TN receipts/ Total receipts)]. LLC's and LLP's must refigure federal amount.	673,465	117.14	8.37%
Inheritance and gift	Gift: Exempt \$10,000 for family or \$5000 for other. On taxable portion for families (in thousands): \$0 - \$40 (5.5%), 40 - \$240 (6.5%), \$240 - \$440 (7.5%), \$440 and above (9.5%) On taxable portion for non-family (in thousands): \$0 - \$50 (6.5%), \$40 - \$100 (9.5%), \$100 - \$150 (12%), \$150 - \$250 (13.5%), \$250 and up (16%). Inheritance: Exempt \$1,000,000. Rates on remaining portion match the rates on gifts to families above.	84,140	14.63	1.05%
Documentary and stock transfer	.37% on value. If related to debt, .115% on value over \$2000.	117,780	20.49	1.46%
Severance	20¢ per ton on coal, and 3% of the sale price on oil and gas.	1,131	0.20	0.01%
Other	Includes investment cos (2% gross profits), Industrial loan /thrifts (.2% on gross receipts, min. \$300, max. \$1000), Production credit assns (3.75% on net receipts), Tire disp. (\$1 per tire), Bail bonds (\$12), etc.	28,968	5.04	0.36%

¹¹⁷ Revenues: United States Census Bureau, 2001. Rate and Tax Base: Forrister & Buechler, 2003.

In recent years, Tennessee's budgets have relied on an influx of cash from legal settlements with tobacco companies. These settlements have now been spent, and Tennessee's failure to reform its tax system caused the state's bond rating to drop from AAA to AA after the passage of the 2001-2002 budget. Tennessee had revenue troubles while the nation was experiencing explosive growth; though the economic recession leveled the field a bit, as Tennessee's sluggish revenue system is also stable in the face of slow or negative growth.

The state has managed to limp along as a low-service, low-tax state without tax reform, but increases in the sales tax were required to fund even the modest levels of education and social programs that are required by federal law. Since the passage of a sales tax increase to fund the 2002-2003 budget, Tennessee's sales tax level is now the highest in the nation (when state and county/local option levels are combined), and, as sales tax rates begin to rival shipping charges, Tennessee will find it more and more difficult to compete with catalog and internet companies for retail business.

Included in the bill that raised the sales tax was the requirement that the state set up a commission to study the Tennessee tax system and make recommendations for reform. The Tennessee Tax Structure Study Commission ("Commission") issued its final report in December, 2004, in which it concluded that:¹¹⁸

- the current tax structure is anti-competitive;
- the Tennessee sales tax rate is too high;
- the sales tax base is eroding;
- the current structure lacks balance and stability;
- the current structure is inelastic;

¹¹⁸Tennessee Tax Structure Study Commission, 2004, pp. 8-9.

- the current tax structure is too regressive;
- the business franchise tax discourages capital investment and expansion in Tennessee;
and
- the narrow tax base yields high tax rates.

These conclusions are similar to those in this analysis.

The Commission made several recommendations for changes to the state's tax structure.¹¹⁹ Those recommendations are listed below.

1. Reduce the general state sales tax rate to 6%, and eliminate the general local option sales tax. This would reduce the overall general state and local sales tax rate from a maximum of 9.75% to 6%.
2. Reduce the state sales tax rate on grocery food to 4%, and eliminate the local option sales tax on grocery food. This would reduce the overall state and local sales tax rate on grocery food from a maximum of 8.75% to 4%.
3. Repeal the Hall income tax.
4. Eliminate the property basis of the business franchise tax, and reduce the rate by 50% to \$0.125 per \$100 of assessed value.
5. Implement a local "hold harmless" provision such that local governments are not harmed by the recommended changes.
6. In fairness to taxpayers, introduce an independent review of all tax appeals, and eliminate pay-to-play requirements for tax appeals.
7. Limit state tax growth.

These recommendations, if enacted, were expected to reduce revenue by more than \$3 billion.

¹¹⁹ *Ibid*, p. 10.

The Commission considered several different types of taxes to make up the revenue loss, as its members had agreed early in the process to produce revenue-neutral recommendations. These included the enactment of numerous modified consumption taxes, a pure value added tax, a single-rate exchange tax, a health care provider tax, a business entity tax, an intangible property tax, a wealth equity tax, gas tax increases, a single-rate sales tax, a dramatically broadened sales tax on services, a personal income tax, a state *ad valorem* tax on registered motor vehicles, and a statewide real property tax.¹²⁰

The Commission invited presentations on these tax options, and, after consideration of what these experts considered important simplicity and competitiveness constraints, presented two comprehensive options to recover the lost revenue.¹²¹ Both of the proposals were estimated to recover the full \$3 billion in revenue required for a revenue-neutral structural reform.

The first option proposed a broad-based personal income tax with a graduated rate ranging from 3.5% to 6%, exemptions from \$15,000 to \$30,000, a \$2,000 deduction per dependent, and a credit against the professional privilege tax for the amount of income tax paid.

The second option proposed the enactment of a statewide personal property tax on motorized, registered items (like boats, automobiles, motorcycles, airplanes, etc.) with an average assessment of \$100 per item, and a statewide real property tax at a rate of \$2.60 per \$100 of taxable value.

These two proposed tax packages form the basis of further analysis in this paper using a portfolio model to evaluate revenue stability versus revenue growth.

¹²⁰ *Ibid.*

¹²¹ *Ibid.*, pp. 10-11.

CHAPTER IV

METHODOLOGY

I examine Tennessee's tax system using a portfolio model as described earlier in this paper. The model used is the basic White model and is designed to map a function of tax systems that optimize growth and stability, while recognizing that the two operate in a "trade-off" relationship. Tennessee's current system is compared to the two tax reform packages proposed by the Tennessee Tax Structure Study Commission ("Commission"), as well as to an optimal frontier of tax packages that minimize instability while growing at least as fast as the state economy. While the Commission proposed two tax mixes with particular rates for each type of tax, the rates of the types of taxes they proposed are allowed to vary in the creation of the optimal frontier by allowing the revenue each type of tax generates to vary.

Taxes Currently in Use

For the current system, actual tax revenue data are used for the period of 1992 to 2001. This data is as reported by the United States Census Bureau. Growth is measured as the average annual percentage change in tax revenue above expected tax revenue for each type of tax over those ten years. Expected tax revenue is defined as revenue that grew at the same rate as gross state product ("GSP"). Legislated changes are noted where appropriate, but they are not taken into account in the growth section. No legislated changes took place in the major tax areas during the period under study; few took place among the smaller tax types. Instability is measured as the variance around expected revenue.

The major taxes that are included in the analysis are discussed below. The smaller taxes, licenses and fees are included, but they are not discussed in detail.

General Sales and Gross Receipts

This tax is currently levied at 7% on non-grocery food items and at 6% on grocery food items. There is also a local option sales tax that is not levied at the state level and thus is not included in the analysis. One of the recommendations made by the Commission, however, was to remove the local option sales tax and replace that revenue at the state level. Since the Commission's recommendations are taken as a starting point for the optimal tax frontier analysis, that revenue is required to be replaced in the tax packages based on the Commission recommendations. The sales tax was 6% on all items during almost all of the years being analyzed, so that is how it is counted when examining the current system (and the local option revenue is not expected to be generated by the state under the current system, as it is not so generated now). The state tax rate changed from 5.5% to 6% in May of 1992. In order to make 1992 comparable to the other years in the analysis, an estimate of ten months of revenue (figured as 5/6 of the full fiscal year revenue) was divided by the 5.5% rate to get the tax base, then multiplied by 6% to estimate revenue if the rate had been 6% for the entire fiscal year.

In the portfolio analysis, grocery food and other taxable items are separated, but their growth and instability values are the same. This is a result of the fact that the two had to be estimated using just two years of data. The two categories have been separately taxed since after the beginning of the fiscal year in 2003. This mid-year rate change made the 2003 fiscal year unusable for estimation purposes. In fiscal years 2004 and 2005, grocery purchases made up 8.45% of total taxable purchases, so this is the percentage used to estimate the two separate

revenue categories for the purpose of this analysis. This steady percentage assignment of revenues to each category produced three categories with the same growth rates and variance measures, but with different levels of revenue.

Corporation Franchise Tax

This tax is currently levied at 0.25% on the higher of a) net worth or b) depreciated value of real and tangible property. The Commission recommended removing the latter as one of the options and cutting the rate in half. This would make the tax just 0.125% on net worth. Actual revenues are used over the 1992 - 2001 time period for the evaluation of the current system, but the tax base changes to the new definition for the evaluation of the two Commission proposals.

The tax base with the property basis removed was provided by the Tennessee Department of Revenue. In order to determine tax liability, the Department of Revenue has both net worth and property value numbers on record. The department provided the revenue that would have been raised if only net worth was used to determine tax liability, and it added back the corporate net income tax credits that would have been lost due to lower tax liabilities for those businesses that were actually taxed at the higher property value rates. The Department of Revenue provided this data for the years 1999 through 2003. Actual data were used for 1999 through 2001, while the average annual growth rate over the five years provided was used to estimate the revenues for 1992 through 1998.

Corporation Net Income Tax

This tax is currently levied at 6.5% of apportioned federal taxable income with some adjustments for state apportionment and for LLC's and LLP's. Actual revenues are used in

analyzing the current system and the two Commission-proposed systems, which did not alter this tax.

Hall Income Tax

The Hall income tax is currently levied at 6% of bond interest and stock dividends after a \$1,250 exemption per payer. Actual revenues for the 1992 to 2001 period are used in the analysis. Since the Commission recommended removing this tax from the system, it is not included in the analyses of either of the tax packages based on Commission recommendations. This does not require an increase in the total revenue required, however, because Hall income tax revenue is already counted in state tax revenue.

Taxes Not Currently in Use

For the taxes not currently in use (the personal income tax, the motor vehicle tax and the state real property tax), revenue is estimated for each of the ten years under analysis by estimating the tax base and applying the proper rate. In the case of the optimal tax frontier analysis, revenues are allowed to vary.

Motor Vehicle Tax

The Commission defined the motor vehicle tax as one on all motorized, registered vehicles, which include cars, light trucks, motorcycles, boats and airplanes. It is not clear whether the Commission intended to include what the federal Department of Transportation calls “truck tractors”, which generally haul tractor trailers and are registered in multiple states. For those registered in many states, tax payments are split among those states based on annual mileage driven in each. Owners of these trucks would be unlikely to stand for a property tax, but

would label a state other than Tennessee as their state of residence to avoid it. A similar problem exists with airplanes.

For cars, trucks and motorcycles, the federal Department of Transportation report of numbers of registered vehicles is used, and the truck tractor number is subtracted from the total. The number of registered boats is added in as reported by the Tennessee Wildlife Commission, which registers all Tennessee boats. The Wildlife Commission provided full data for the years 2000 and 2001. Actual data were used for those years, while the growth rate between the two years was used to estimate the number of boats registered for 1992 through 2000.

The Federal Aviation Administration kept records of general aircraft registered by state through 1993. Actual data for 1992 and 1993 are used, as reported in the Tennessee Statistical Abstract. The Federal Aviation Administration can still provide the current number of registered general aircraft, so that number is used, with the 1992-1993 data, to find an average annual growth rate and estimate the numbers for 1994 to 2001.

The Commission specified that this tax would be levied such that the average payment would be \$100. Revenue, then, is estimated as \$100 times the number of qualified registered vehicles. In the optimization model, revenue is allowed to fluctuate.

Income Tax

For the income tax, the representative income groups created by the Commission in its equity analysis are used as the tax base. The data used to create this are from the Bureau of Labor Statistics' Consumer Expenditure Surveys and from the United States Census Bureau's Current Population Surveys from 2000 to 2002 and represent 2001 in the analysis. Income is reduced for each representative group by the rate of change of wages in Tennessee over the nine

years previous to 2001, as reported in the United States Statistical Abstract by the Bureau of Economic Analysis. When figuring revenue from the different tax proposals, the “representative income” for each bracket (determined by the Commission) represents that bracket. When, for instance, the bracket runs from \$10,000 to \$17,999 and is represented by \$14,854, no one in the bracket is assumed to pay any income tax when the exemption is \$15,000. The representative income for the bracket falls below the \$15,000 level, so all members of the bracket are counted as below the exemption. This duplicates the process used by the Commission in its equity and revenue analyses.

Though the Commission recommended a progressive-rate system, the analysis includes a flat-rate possibility, as even a flat-rate income tax is considered to be more progressive than the major revenue generator for the state, the sales tax. The flat-rate tax revenue estimates are based on a \$10,000 exemption for single households, a \$15,000 exemption for single heads of household, and a \$20,000 exemption for married households. The rate is set at 4%. This largely mirrors the flat tax proposal made by Governor Ned McWherter in his second term. The exemption is somewhat higher, partly to reflect inflation since then, and partly for simplicity.

State Real Property Tax

The state does not currently have a statewide real property tax, though such a tax is the main source of funds for most local governments. The tax base, property assessments, are as reported by the Tennessee Comptroller of the Treasury. The rate recommended by the Commission was \$2.60 per \$100 of taxable value, and this is the rate used to estimate revenue for the 1992 to 2001 period. In the portfolio analysis, revenue is allowed to vary. Equalized assessments are used to make all taxable values comparable.

Constraints

Throughout the literature, while optimizing growth and stability, constraints are imposed on optimal tax systems.

Equity

Equity was considered by the Commission in the process of building the reform tax package proposals. The Commission included an extensive equity analysis in its final report,¹²² and the results of that analysis were used in determining which types of taxes made it into its final proposal. That analysis serves as an excellent equity constraint by allowing only those tax types that were considered equitable by this Commission, the makeup of which was designed to fairly represent Tennessee's citizenry fairly.¹²³

Only those taxes that the Commission proposed adding or continuing are used in the models based on Commission tax packages. Other tax packages are also analyzed, and the extent to which they part from Commission equity concerns are discussed in the policy recommendation section.

Efficiency

Efficiency is very difficult to measure, as deadweight social losses can only be determined with current, detailed information on all markets affected by a tax. Since such information is not available, efficiency can only be estimated using the guiding principles derived from optimal taxation theory. Discussions of these principles and their applications to Tennessee tax policy are included in the policy recommendation section of the paper.

¹²² *Ibid*, pp. 62–89.

¹²³ Tennessee Public Acts, 2002. Chapter No. 856, Section 12.

Competitiveness

Gentry and Ladd include a “competitiveness” variable in their analysis to address some elements of efficiency. This variable compares the state tax rate to the national mean for each type of tax. Competitiveness was one of the criteria used by the Commission in its choice of tax types, with special concern shown about the types and rates of taxes compared to neighboring states and the chilling effect that some business taxes might have on investment in Tennessee.¹²⁴ This constraint was used to narrow the list of proposed reform taxes, and, again, the Commission is in the best position to define competitiveness for Tennessee. The extent to which any taxes emerging from the analysis fail to meet the competitiveness standards set by the Commission are discussed in the policy recommendation section of the paper.

Simplicity

Simplicity is also difficult to measure. While it is theoretically possible to estimate compliance time and value that time using an average or median wage, the exercise is unlikely to produce anything that a general policy discussion would not. As compliance time would have to be estimated, general principles would likely dominate such an analysis. This topic is further discussed in the policy proposal section of the paper.

Sufficiency

Sufficiency is determined by setting total revenue at the 2001 level. This analysis is not meant to judge revenue levels, but to examine the best way of raising a given level of revenue.

¹²⁴ Final Report of the Tennessee Tax Structure Study Commission, 2004, pp. 10, 34.

Data Analysis

All data analyses are performed using Excel and SAS; the program language used for the optimization in SAS is attached in the Appendix.

CHAPTER V

MODEL

The model used in this portfolio analysis is the basic White model, which minimizes the variance of the tax system as a whole, subject to total revenue and individual revenue constraints.

The model is described by the following equations:

Minimize σ_T^2

$$\sigma_T^2 = \sum_{i=1}^n \sum_{j=1}^n R_i R_j \sigma_{ij} \quad (13)$$

subject to

$$\sum_{i=1}^n \frac{g_i}{R_T^*} R_i = \lambda (\lambda = 0 \text{ to } \infty) \quad (14)$$

where:

R_T^* is the desired total revenue from taxes and

λ is a scalar .

Covariance is:

$$\sigma_{ij} = \rho_{ij} \sigma_i \sigma_j \quad (15)$$

where:

$$\sigma_i = \sqrt{\frac{\sum_{t=1}^m \left[\frac{R_{it} - \hat{R}_{it}}{R_i \cdot} \right]^2}{m - 1}} \quad (16)$$

R_{it} is the revenue from the i th tax in year t

\hat{R}_{it} is the expected revenue from the i th tax in year t , if revenue grows at the same rate as GSP

ρ_{ij} is the correlation coefficient between the i th tax and the j th tax and

$R_{i \cdot}$ is mean revenue for $t = 1$ to m .

The constraints incorporated in the model are of the following form and meaning. First the sum of the individual tax revenues must equal the desired aggregate level of tax revenue, assumed to be the state's 2001 level in this case.

$$\sum_{i=1}^n R_i = R_T^* \quad (17)$$

Second, the level of revenue from each individual tax must be either zero or positive, which is commonly referred to as the non-negativity constraint.

$$R_i \geq 0 \text{ (for all } i, i = 1 \text{ to } n) \quad (18)$$

Third, maximum upper limits are placed on the level of revenue that can be generated from each individual tax.

$$R_i \leq L_i \text{ (for all } i, i = 1 \text{ to } n) \quad (19)$$

In the optimization problems, the revenue from each tax is allowed to vary to plus or minus 100% of its 2001 revenue.

The summation term in equation (13) is the overall variance, and the summation term in equation (14) is the overall growth rate. Parameterizing λ from 0 to infinity produces a sequence of solutions of increasing overall growth rate and overall variance of tax revenue. In the optimization problem, points chosen for lambda represented overall growth rates at 1% intervals from 0% to 12%. Negative overall growth rates were not considered; points were chosen between 0% growth and 12%, as that is the point at which enough revenue could be generated by the highest-growth taxes to make a solution possible.

The model is run using six different sets of possible taxes, including the current system, the two systems proposed by the Commission, a few variations on those, and a set of all of the major taxes from all of the systems.

The first is the set of current taxes, including the general sales and use tax, the corporate franchise and excise taxes in their current forms, the Hall income tax, and the many selective sales taxes and fees that make up the rest of the system. The few taxes and fees that fell into “other” revenue categories were left out. Revenue generated by this tax system represented 98.06% of total actual revenue in 2001, and provided the target revenue for all systems expected to raise 2001’s total revenue.

The Commission’s first proposal includes separate sales taxes for grocery food and all other taxable sales, the corporate franchise tax with the property base removed, the Commission’s proposed progressive income tax (but no Hall income tax), and the many selective sales taxes and fees that make up the rest of the system. In addition, the Commission’s proposal that the local sales tax be removed and replaced by state revenue makes the total required revenue higher. In 2001, local sales tax revenues totaled \$1,448,653,767 (as reported by the Tennessee Department of Revenue). Following that formula, the tax systems based on

Commission proposals are expected to raise an additional \$122,411,243 in total revenue to make up for the local revenue losses.

The Commission's second proposal includes separate sales taxes for grocery food and all other taxable sales, the corporate franchise tax with the property base removed, the Commission's proposed motor vehicle tax, the Commission's proposed state real property tax, no Hall income tax, and the many selective sales taxes and fees that make up the rest of the system. In addition, the Commission's proposal that the local sales tax on food also be removed and replaced by state revenue makes the total required revenue increase by \$1,348,653,767.

Both the current tax system and the Commission's first proposal are evaluated with the addition of a flat income tax (or a substitution for the progressive income tax in the Commission proposal's case). Total revenue required is the same for the current system as it is without the income tax, and it is the same for the Commission proposal as it is with the progressive income tax.

All of the major taxes from all of the systems are included in one analysis that is expected to raise the same amount of revenue as the current tax system.

CHAPTER VI

RESULTS AND POLICY RECOMMENDATIONS

Static Models

The first step of the analysis is to look at three static tax systems, including the state's current system and the two systems proposed by the Tennessee Tax Structure Study Commission ("Commission"). Table 2 shows the current tax system. The overall average annual growth rate of the system was 8.34% over the 1992 - 2001 time period. During the same time period, Gross State Product (GSP) grew at an average annual rate of 6.87%.¹²⁵ It is true that the time period under consideration began during an economic recession, proceeded through an economic boom, and ended just before another economic recession, but these phenomena also affect GSP. Tennessee's tax system performed better than many of its critics suggest. Nonetheless, Tennessee did suffer revenue shortages in the late 1990's, when income was growing rapidly.¹²⁶

The fastest growing tax in the system was the corporation net income tax, which sometimes showed revenue increases of over 20% in a single year. It was also one of the most volatile taxes in the system, with a coefficient of variation of 23.51%. Not surprisingly, inheritance and gift tax revenues showed the most variation, with a coefficient of variation of 34.72%. With an average annual growth rate of 8.21%, the sales tax was not among the slowest growth taxes, but it also failed to show the level of stability it is sometimes credited with having.

¹²⁵United States Bureau of Economic Analysis

¹²⁶ This analysis does not consider population changes, and Tennessee's population did increase over the time period analyzed. An analysis of per capita revenues would not change the relationships of the revenue amounts to one another, as dividing all of the amounts in the optimization problems by a constant would not change the comparative results. Nonetheless, a per capita analysis might show Tennessee's sales tax revenue growing at a slower pace, more closely matching expectations.

TABLE 2: Tennessee's Current Tax System

Current System Tax Type	2001 Revenues	Average Annual Growth Rate	Coefficient of Variation of 1992 to 2001 Revenue	System Growth
Total Revenue	\$7,887,599,000			
Sales/Gross Receipts	\$4,704,130,000	8.21%	18.37%	4.90%
Corporation Franchise	\$480,242,000	12.01%	29.99%	0.73%
Motor Vehicle Licensing Fee	\$225,933,000	4.71%	12.31%	0.13%
Corporation Net Income	\$673,465,000	14.23%	23.51%	1.22%
Hall Income	\$198,071,000	12.46%	29.12%	0.31%
Alcoholic Beverage Tax	\$78,471,000	2.68%	7.77%	0.03%
Insurance Premium Tax	\$296,496,000	10.12%	22.87%	0.38%
Motor Fuels Tax	\$774,689,000	2.00%	6.90%	0.20%
Public Utilities Tax	\$3,998,000	-3.16%	13.78%	0.00%
Tobacco Tax	\$81,671,000	0.22%	2.93%	0.00%
Alcoholic Beverage License Fee	\$2,275,000	4.43%	16.02%	0.00%
Hunting & Fishing License Fee	\$24,782,000	2.42%	12.93%	0.01%
Motor Vehicle Operators License Fee	\$37,268,000	4.16%	10.72%	0.02%
Public Utility License Fee	\$6,236,000	5.87%	19.04%	0.00%
Occupation and Business License Fee	\$96,821,000	7.96%	17.90%	0.10%
Inheritance and Gift Tax	\$84,140,000	10.93%	34.72%	0.12%
Documentary and Stock Transfer Tax	\$117,780,000	13.03%	27.05%	0.19%
Severance Tax	\$1,131,000	-0.63%	12.74%	0.00%
System Variance	4.28817E+17		System Growth	8.34%

TABLE 3: Tennessee Tax Structure Study Commission Proposal One

Commission Proposal One Tax Type	2001 Revenues	Average Annual Growth Rate	Coefficient of Variation of 1992 to 2001 Revenue	System Growth
Total Revenue	\$15,009,757,718			
Estimated Grocery Food	\$264,999,323	8.21%	18.37%	0.14%
Estimated Non-Grocery Food and Non-Food	\$4,306,631,015	8.21%	18.37%	2.36%
Estimated Corporation Franchise - Property Basis Removed	\$196,052,950	4.57%	15.45%	0.06%
Actual Motor Vehicle Licensing Fee	\$225,933,000	4.71%	12.31%	0.07%
Actual Corporation Net Income	\$673,465,000	14.23%	23.51%	0.64%
Estimated Commission Income Tax Proposal	\$7,736,918,430	11.02%	24.05%	5.68%
Actual Alcoholic Beverage Tax	\$78,471,000	2.68%	7.77%	0.01%
Actual Insurance Premium Tax	\$296,496,000	10.12%	22.87%	0.20%
Actual Motor Fuels Tax	\$774,689,000	2.00%	6.90%	0.10%
Actual Public Utilities Tax	\$3,998,000	-3.16%	13.78%	0.00%
Actual Tobacco Tax	\$81,671,000	0.22%	2.93%	0.00%
Actual Alcoholic Beverage License Fee	\$2,275,000	4.43%	16.02%	0.00%
Actual Hunting & Fishing License Fee	\$24,782,000	2.42%	12.93%	0.00%
Actual Motor Vehicle Operators License Fee	\$37,268,000	4.16%	10.72%	0.01%
Actual Public Utility License Fee	\$6,236,000	5.87%	19.04%	0.00%
Actual Occupation and Business License Fee	\$96,821,000	7.96%	17.90%	0.05%
Actual Inheritance and Gift Tax	\$84,140,000	10.93%	34.72%	0.06%
Actual Documentary and Stock Transfer Tax	\$117,780,000	13.03%	27.05%	0.10%
Actual Severance Tax	\$1,131,000	-0.63%	12.74%	0.00%
System Variance	2.30918E+18		System Growth	9.50%

With a coefficient of variation of 18.55%, the sales tax certainly demonstrated more volatility than expected. Much of the sales tax revenue's growth occurred between 1994 and 1995; sales tax revenues grew at a much slower pace in the late 1990's. The severance tax and public utilities tax were the only two to show average revenue declines over the time period. As a group, the license fees were among the slowest-growing but most stable revenue sources.

Table 3 shows the Commission's first proposal, which was projected to raise almost twice the revenue as the current system. Though this system needed to raise additional revenue in order to replace the recommended loss of the local option sales tax, it is projected to raise far more than necessary to achieve that goal. Both its growth rate and its system variance are somewhat higher than the current system. A few of the recommended changes are of particular interest.

The system lost the Hall income tax, which is one of the faster growing and more volatile taxes in the current system, but it gained the Commission's proposed progressive-rate income tax. This tax proves to be an enormous revenue source, far outperforming the non-grocery portion of the sales tax, which was recommended to be reduced by 1%. This tax alone is projected to produce almost as much revenue as the whole state system did in 2001. The proposed progressive income tax was estimated to grow at a rapid annual average clip of 11.02%, though it is also one of the less stable revenue sources, with a coefficient of variation of 24.05%.

Another big change in this system is the corporation franchise tax base and rate. The Commission recommended removing the property basis for the tax, and basing it solely on corporate net worth. The Commission also recommended cutting the rate of the tax in half. As a result, this tax was projected to raise a little over 40% of the revenue it raised in the current

system over the same time period. Its growth rate fell to just over a third of what it was previously, but it also became a much more stable revenue source.

Finally, this proposed tax system separates the sales tax on grocery food and non-grocery food, cutting the rate on the former to 4% and on the latter to 6%. Because data were unavailable to generate separate growth rates and coefficients of variation on these taxes, the effects of such a change are hard to see here. Nonetheless, there is general agreement that the more inelastic demand for grocery food makes the sales tax base more stable, but slower-growing. It would likely become a less dependable revenue source with that portion of the base taxed at a lower rate..

The results of the Commission's second proposal are shown in Table 4. This system also cuts the sales tax rates, separates the sales tax bases, and both alters and cuts the rate of the corporate franchise tax. These differences have the same effects as they did in the Commission's first proposal. The changes here are that the progressive rate income tax has been replaced by a motor vehicle tax and a state real property tax. The motor vehicle tax is a very stable revenue source, with a coefficient of variation of only 6.59%, but it also grows very slowly, with an average revenue growth rate of only 1.21%. The motor vehicle tax was based on the Commission's idea that it would be levied at an average of \$100 per vehicle. In truth, it was proposed as a tax on property value, and, even if set to average \$100 per vehicle, would presumably increase with vehicle values over time. This was impossible to estimate, however, so the Commission's assumptions were used. The tax would probably exhibit somewhat higher growth and variability than estimated. The state real property tax exhibits a more rapid growth rate, with revenues increasing 9.59% annually. But it is still a rather volatile revenue source for its growth rate; the coefficient of variation is 22.68%.

TABLE 4: Tennessee Tax Structure Study Commission Proposal Two

Commission Proposal Two Tax Type	2001 Revenues	Average Annual Growth Rate	Coefficient of Variation of 1992 to 2001 Revenue	System Growth
Total Revenue	\$10,188,063,582			
Estimated Grocery Food	\$264,999,323	8.21%	18.37%	0.21%
Estimated Non-Grocery Food and Non-Food	\$4,306,631,015	8.21%	18.37%	3.47%
Estimated Corporation Franchise - Property Basis Removed	\$196,052,950	4.57%	15.45%	0.09%
Actual Motor Vehicle Licensing Fee	\$225,933,000	4.71%	12.31%	0.10%
Actual Corporation Net Income	\$673,465,000	14.23%	23.51%	0.94%
Estimated Motor Vehicle Tax	\$525,607,500	1.21%	6.59%	0.06%
Estimated Real Property Tax	\$2,389,616,794	9.59%	22.68%	2.25%
Actual Alcoholic Beverage Tax	\$78,471,000	2.68%	7.77%	0.02%
Actual Insurance Premium Tax	\$296,496,000	10.12%	22.87%	0.29%
Actual Motor Fuels Tax	\$774,689,000	2.00%	6.90%	0.15%
Actual Public Utilities Tax	\$3,998,000	-3.16%	13.78%	0.00%
Actual Tobacco Tax	\$81,671,000	0.22%	2.93%	0.00%
Actual Alcoholic Beverage License Fee	\$2,275,000	4.43%	16.02%	0.00%
Actual Hunting & Fishing License Fee	\$24,782,000	2.42%	12.93%	0.01%
Actual Motor Vehicle Operators License Fee	\$37,268,000	4.16%	10.72%	0.02%
Actual Public Utility License Fee	\$6,236,000	5.87%	19.04%	0.00%
Actual Occupation and Business License Fee	\$96,821,000	7.96%	17.90%	0.08%
Actual Inheritance and Gift Tax	\$84,140,000	10.93%	34.72%	0.09%
Actual Documentary and Stock Transfer Tax	\$117,780,000	13.03%	27.05%	0.15%
Actual Severance Tax	\$1,131,000	-0.63%	12.74%	0.00%
System Variance	5.52368E+17		System Growth	7.94%

These two new taxes fail to offer the same kind of revenue potential created by the progressive-rate income tax in the Commission's first proposal. As a whole, this system has a slower growth rate than the Commission's first proposal, but it has a somewhat lower system variance as well. It is important to note, however, that this system has both a lower growth rate and a higher variance than the current tax system, making it inferior on both measures and unlikely to be recommended.

Optimization Results

The optimization problem was solved for six different tax system scenarios, all of which are described in detail earlier in the paper.

- The current tax system
- The current tax system with the addition of a flat income tax
- The Commission's progressive income tax proposal
- The Commission's motor vehicle tax and real property tax proposal
- The Commission's income tax proposal with a flat tax in place of the progressive one
- All of the major taxes in the above proposals

Since this was a quadratic problem with linear constraints, many taxes do not show up in the solutions at all. This does not mean that those taxes will be recommended to be removed from the Tennessee tax mix; this quadratic optimization is used as a guideline as other considerations come into play in the policy recommendations.

The Current System

The results from the current system's tax mix are shown in Table 5. Only the turning points are shown. The solution set was the same for both 0% growth and 1% growth, so 1% is

TABLE 5: Current Tax System Optimization Results

Tax Type	2001 Revenue	Maximum Revenue	Growth	1.00%	7.00%	8.00%	9.00%	10.00%
Sales/Gross Receipts	\$4,704,130,000	\$9,408,260,000	8.21%	\$6,612,293,458	\$6,371,002,336	\$5,742,671,804	\$6,183,743,903	\$4,830,637,753
Corporation Franchise	\$480,242,000	\$960,484,000	12.01%	\$0	\$474,983,975	\$540,717,800	\$451,383,418	\$960,480,000
Motor Vehicle Licensing Fee	\$225,933,000	\$451,866,000	4.71%	\$451,870,000	\$451,870,000	\$451,870,000	\$0	\$0
Corporation Net Income	\$673,465,000	\$1,346,930,000	14.23%	\$0	\$0	\$0	\$539,913,077	\$1,346,900,000
Hall Income	\$198,071,000	\$396,142,000	12.46%	\$160,930,899	\$179,126,108	\$0	\$175,731,381	\$396,140,000
Insurance Premium Tax	\$296,496,000	\$592,992,000	10.12%	\$0	\$0	\$592,990,000	\$336,696,878	\$353,442,247
Motor Fuels Tax	\$774,689,000	\$1,549,378,000	2.00%	\$210,322,908	\$0	\$51,226,078	\$0	\$0
Public Utilities Tax	\$3,998,000	\$7,996,000	-3.16%	\$7,996,000	\$7,996,000	\$7,996,000	\$6,491,343	\$0
Tobacco Tax	\$81,671,000	\$163,342,000	0.22%	\$107,162,735	\$119,711,581	\$163,340,000	\$0	\$0
Alcoholic Beverage License Fee	\$2,275,000	\$4,550,000	4.43%	\$4,550,000	\$0	\$4,550,000	\$0	\$0
Hunting & Fishing License Fee	\$24,782,000	\$49,564,000	2.42%	\$49,564,000	\$0	\$49,328,318	\$0	\$0
Motor Vehicle Operators License Fee	\$37,268,000	\$74,536,000	4.16%	\$74,536,000	\$74,536,000	\$74,536,000	\$0	\$0
Public Utility License Fee	\$6,236,000	\$12,472,000	5.87%	\$12,472,000	\$12,472,000	\$12,472,000	\$0	\$0
Occupation and Business License Fee	\$96,821,000	\$193,642,000	7.96%	\$193,640,000	\$193,640,000	\$193,640,000	\$193,640,000	\$0
Severance Tax	\$1,131,000	\$2,262,000	-0.63%	\$2,262,000	\$2,262,000	\$2,262,000	\$0	\$0
Minimized Variance				1.05437E+17	1.15145E+17	1.45359E+17	1.76686E+17	3.7485E+17
Total Revenue				\$7,887,600,000	\$7,887,600,000	\$7,887,600,000	\$7,887,600,000	\$7,887,600,000

the first solution shown. Similarly, the optimal set of taxes was the same for 2% growth through 7% growth, so this solution is shown only at 7%. A new set was generated for 8% and 9% growth and again for 10%. No solution was possible at 11% growth. All of the solutions eliminate some of the smaller taxes, including the alcoholic beverage tax and license fee, the inheritance and gift tax, and the documentary and stock transfer tax, so these are not shown in the table.

The solution closest in growth to the 2001 system, rounding up to one with faster growth, is the one that generates 9% (as compared to the static 2001 system's growth of 8.34%). The variance of the 9% solution is less than half that of the actual tax system. It includes a sales tax that raises about 131% of the amount actually raised by the sales tax in 2001. In addition to the taxes that appear in none of the solutions (listed above), the 9% solution also excludes the motor vehicle licensing fee and operators license fee, the motor fuels tax, the tobacco tax, the alcoholic beverage and hunting/fishing license fees, the public utility license fee, and the severance tax. The corporation franchise tax is included at 94% of its 2001 revenue level, while the corporation net income tax weighs in at 80% of its 2001 level. The Hall income tax is included at 89% of its actual 2001 level. The insurance premium tax, public utilities tax and the occupation and business license fee (this is a Census category, but it includes revenue primarily from the gross receipts tax) are listed at revenue levels higher than the actual ones from 2001, with the gross receipts tax at near the maximum allowed by the model.

As growth is allowed to increase to 10%, the variance still stays below the level of the actual 2001 tax system. The reliance on the sales tax falls to just above its 2001 level; the corporation franchise and corporation net income tax revenues increases to the maximum allowed by the model, as does the Hall income tax. The insurance premium tax increases

TABLE 6: Current Tax System Plus Flat Tax Optimization Results

Tax Type	2001 Revenue	Maximum Revenue	Growth	7.00%	8.00%	9.00%	10.00%
Sales/Gross Receipts	\$4,704,130,000	\$9,408,260,000	8.21%	\$338,004,830	\$2,153,551,437	\$1,140,663,047	\$4,474,258,014
Corporation Franchise	\$480,242,000	\$960,484,000	12.01%	\$256,544,971	\$590,024,332	\$960,480,000	\$960,480,000
Motor Vehicle Licensing Fee	\$225,933,000	\$451,866,000	4.71%	\$451,870,000	\$0	\$0	\$0
Corporation Net Income	\$673,465,000	\$1,346,930,000	14.23%	\$0	\$445,174,129	\$1,155,175,498	\$1,346,900,000
Hall Income	\$198,071,000	\$396,142,000	12.46%	\$0	\$0	\$396,140,000	\$396,140,000
Estimated Flat Income Tax	\$8,906,365,551	\$17,812,731,101	6.78%	\$6,230,824,875	\$4,497,214,102	\$4,232,000,070	\$208,481,175
Insurance Premium Tax	\$296,496,000	\$592,992,000	10.12%	\$312,914,844	\$0	\$0	\$495,980,133
Public Utilities Tax	\$3,998,000	\$7,996,000	-3.16%	\$7,996,000	\$7,996,000	\$0	\$0
Tobacco Tax	\$81,671,000	\$163,342,000	0.22%	\$19,006,480	\$0	\$0	\$0
Motor Vehicle Operators License Fee	\$37,268,000	\$74,536,000	4.16%	\$74,536,000	\$0	\$0	\$0
Occupation and Business License Fee	\$96,821,000	\$193,642,000	7.96%	\$193,640,000	\$193,640,000	\$3,141,384	\$0
Documentary and Stock Transfer Tax	\$117,780,000	\$235,560,000	13.03%	\$0	\$0	\$0	\$5,360,678
Severance Tax	\$1,131,000	\$2,262,000	-0.63%	\$2,262,000	\$0	\$0	\$0
Minimized Variance				6.22652E+16	1.12466E+17	2.66762E+17	3.83979E+17
Total Revenue				\$7,887,600,000	\$7,887,600,000	\$7,887,600,000	\$7,887,600,000

slightly from its level in the 9% solution, while the public utilities and gross receipts taxes fall out of the solution.

These solutions suggest that our current tax system could have both higher growth and lower variance while still making use of just the taxes already in the system. The 10% growth solution would keep the sales tax near or just above its current levels, while shifting more burden to corporate taxes, as well as to financial and investment taxes, including the Hall income tax and the insurance premium tax. This would suggest that the initial impulse of the Sundquist administration, to make business taxes more fair and raise them somewhat, would have made a more efficient tax system. This solution gained no traction in the state legislature, however, as business groups were generally opposed to it.

Table 6 shows the results when the current tax system was combined with a flat income tax. The flat income tax had an average annual growth rate of 6.78%, and a coefficient of variation of 16.77%. So, while slightly more stable than the sales tax, its growth rate was less than that of the sales tax. Consequently, it only showed up in the lower growth, more stable solutions. In the 9% growth solution, the flat income tax was contributing a little less than half of its estimated 2001 revenue; it appears at just 2% of its estimated 2001 level in the 10% solution. This tax, while a solid revenue producer, is unlikely to add much to Tennessee's current tax system because it suffers from the same problems, and even more severely so, as the sales tax.

In the lowest growth solution (7%), the flat income tax largely replaced the sales tax. As growth increased, revenue requirements shifted from the flat income tax to the sales tax. Otherwise, the solutions in this scenario resembled those in the current system without the flat income tax, though the corporate taxes and the Hall income tax were at their maximum allowed

levels in both the 9% and 10% solutions, rather than just in the 10% one. In addition, the contribution of the gross receipts tax was minimal in the 9% solution.

The Commission's Proposed System with an Income Tax

The Commission proposed a progressive income tax, while lowering the sales tax, eliminating the local option sales tax and the Hall income tax, and restructuring and reducing the corporate franchise tax. Because of the proposed elimination of the local option sales tax, the Commission's proposed plans were required to produce additional revenue, enough to make up for local option sales tax revenue in 2001. The taxes that appear in none of the Commission's progressive income tax solutions are the corporate franchise and net income taxes, the alcoholic beverage tax, the motor fuels tax, the hunting and fishing license fees, the inheritance and gift tax, and the documentary and stock transfer tax. The solutions for the progressive income tax system are shown in Table 7.

The lowest growth solution was at 5%, and made use of the grocery sales tax at its maximum, and a sales tax on remaining taxable goods at higher than actual 2001 levels. It included the public utilities tax at its maximum, as well as the operator license fee and the gross receipts and severance taxes at their maximums. This solution had a relatively small contribution from the progressive income tax, at about 19% of its projected 2001 revenue. This solution did not change until the system was required to meet an 8% growth rate.

This 8% growth point made use of every tax not listed above as being in none of the solutions. At maximum allowed levels were the grocery food tax, the motor vehicle licensing fee, the public utilities tax, the alcoholic beverage, motor vehicle operators and public utilities license fees, the gross receipts tax and the severance tax. Other taxes that appeared at higher

TABLE 7: Commission Proposal with Progressive Income Tax Optimization Results

Tax Type	2001 Revenue	Maximum Revenue	Growth	5.00%	8.00%	9.00%	10.00%	11.00%
Estimated Grocery Food	\$397,498,985	\$794,997,970	8.21%	\$795,000,000	\$795,000,000	\$795,000,000	\$562,151,638	\$0
Estimated Non-Grocery Food and Non-Food	\$4,306,631,015	\$8,613,262,030	8.21%	\$6,821,850,297	\$5,577,014,685	\$4,111,598,739	\$2,815,926,543	\$50,578,003
Actual Motor Vehicle Licensing Fee	\$225,933,000	\$451,866,000	4.71%	\$0	\$451,870,000	\$451,870,000	\$0	\$0
Commission Income Tax Proposal	\$7,736,918,430	\$15,473,836,859	11.02%	\$1,441,015,703	\$2,079,657,948	\$3,606,998,564	\$5,958,221,819	\$9,285,721,997
Actual Insurance Premium Tax	\$296,496,000	\$592,992,000	10.12%	\$0	\$39,091,114	\$0	\$0	\$0
Actual Public Utilities Tax	\$3,998,000	\$7,996,000	-3.16%	\$7,996,000	\$7,996,000	\$7,996,000	\$0	\$0
Actual Tobacco Tax	\$81,671,000	\$163,342,000	0.22%	\$0	\$98,210,253	\$79,926,697	\$0	\$0
Actual Alcoholic Beverage License Fee	\$2,275,000	\$4,550,000	4.43%	\$0	\$4,550,000	\$0	\$0	\$0
Operators License Fee	\$37,268,000	\$74,536,000	4.16%	\$74,536,000	\$74,536,000	\$74,536,000	\$0	\$0
Actual Public Utility License Fee	\$6,236,000	\$12,472,000	5.87%	\$0	\$12,472,000	\$12,472,000	\$0	\$0
Actual Occupation and Business License Fee	\$96,821,000	\$193,642,000	7.96%	\$193,640,000	\$193,640,000	\$193,640,000	\$0	\$0
Actual Severance Tax	\$1,131,000	\$2,262,000	-0.63%	\$2,262,000	\$2,262,000	\$2,262,000	\$0	\$0
Minimized Variance				1.6282E+17	2.14332E+17	3.11063E+17	4.86074E+17	8.35122E+17
Total Revenue				\$9,336,300,000	\$9,336,300,000	\$9,336,300,000	\$9,336,300,000	\$9,336,300,000

than their actual or projected 2001 levels were the general sales tax (158% of 2001) and the tobacco tax (120% of 2001). Taxes that were included in the model at less than their actual or projected 2001 levels include the progressive income tax (27%) and the insurance premium tax (13%). The 9% solution changed little from the 8% one, with reliance on the sales tax and tobacco tax shifting somewhat to the progressive income tax, while the insurance premium tax and the alcoholic beverage license fee fell out of the solution set.

This 10% growth point was close in growth rate to the 2001 static model (which had a 9.5% growth rate), but its variance was significantly smaller. The 10% growth rate solution relied on sales taxes that, as a whole, were about 72% of their 2001 level. In addition, it required a progressive income tax that raised only about three quarters of the revenue that was estimated for 2001. The 11% growth rate solution is almost entirely made up of revenue from the progressive income tax, raising about 120% of its estimated 2001 total. It also included a sales tax at around 1% of its 2001 revenue. The variance of the 11% solution, while higher than the lower growth solutions, was still lower than the static model.

The sales tax and the progressive income tax are such completely different revenue sources that they seem to trade off with one another. Lower-growth systems rely almost entirely on the sales tax; higher growth systems rely almost entirely on the income tax. The one sort of midway point, the 9% growth rate system, put more weight on the sales than the income tax.

A different set of solutions entirely was obtained when the flat income tax was substituted for the progressive income tax. These results are shown in Table 8. Taxes excluded from any of the solutions were the alcoholic beverage tax and license fee, the motor fuels tax, the hunting and fishing license fees, the inheritance and gift tax and the documentary and stock transfer tax. In addition, the lower growth solutions rely heavily on the flat income tax and the

TABLE 8: Commission’s Proposed Income Tax System with Flat Income Tax Optimization Results

Tax Type	2001 Revenue	Maximum Revenue	Growth	4.00%	7.00%	8.00%	9.00%
Estimated Grocery Food	\$397,498,985	\$794,997,970	8.21%	\$795,000,000	\$795,000,000	\$795,000,000	\$795,000,000
Estimated Non-Grocery Food and Non-Food	\$4,306,631,015	\$8,613,262,030	8.21%	\$3,768,730,066	\$2,004,712,203	\$2,279,283,549	\$6,752,808,952
Estimated Corporation Franchise - Property Basis Removed	\$392,105,900	\$784,211,800	4.57%	\$0	\$211,700,904	\$0	\$0
Actual Motor Vehicle Licensing Fee	\$225,933,000	\$451,866,000	4.71%	\$363,057,748	\$451,870,000	\$0	\$0
Actual Corporation Net Income	\$673,465,000	\$1,346,930,000	14.23%	\$0	\$0	\$929,944,477	\$1,333,671,642
Estimated Flat Income Tax	\$8,906,365,551	\$17,812,731,101	6.78%	\$4,133,283,867	\$5,548,329,172	\$5,307,375,026	\$454,819,406
Actual Insurance Premium Tax	\$296,496,000	\$592,992,000	10.12%	\$0	\$0	\$21,215,287	\$0
Actual Public Utilities Tax	\$3,998,000	\$7,996,000	-3.16%	\$7,996,000	\$7,996,000	\$0	\$0
Actual Tobacco Tax	\$81,671,000	\$163,342,000	0.22%	\$0	\$43,601,844	\$0	\$0
Actual Motor Vehicle Operators License Fee	\$37,268,000	\$74,536,000	4.16%	\$72,330,319	\$74,536,000	\$0	\$0
Actual Public Utility License Fee	\$6,236,000	\$12,472,000	5.87%	\$0	\$2,651,877	\$0	\$0
Actual Occupation and Business License Fee	\$96,821,000	\$193,642,000	7.96%	\$193,640,000	\$193,640,000	\$3,481,661	\$0
Actual Severance Tax	\$1,131,000	\$2,262,000	-0.63%	\$2,262,000	\$2,262,000	\$0	\$0
Minimized Variance				7.48515E+16	7.95578E+16	1.59217E+17	2.6282E+17
Total Revenue				\$9,336,300,000	\$9,336,300,000	\$9,336,300,000	\$9,336,300,000

grocery food tax; the sales tax does not surpass its 2001 revenue level until the 9% growth level. This mix of possible taxes has no solution above that 9% growth level, though the solution sets are quite stable.

The highest growth solution, and the one that exceeds the growth rate of the current tax system, relies on just four taxes. Revenue from the sales tax on grocery food is at a maximum in this solution, and revenue from the tax on non-grocery food sales higher than its 2001 level. The corporation net income tax is at the maximum, while the flat income tax contributes just 5% of its projected 2001 level. This solution set has a growth rate just above the state's current system, though its variance is about half that of the current system.

The reliance on the sales tax at this growth point is higher than in the current system. The progressive income tax solution, on the other hand, allowed for a 10% growth rate with a variance just above that of the current system and relied much less on the sales tax. Thus, even though the addition of a flat income tax would be considered by many to be more progressive than no change, a tax mix that meets the necessary growth requirements for the state would likely still rely more heavily on the sales tax than on the flat income tax. A progressive-rate income tax, on the other hand, allows for stronger growth with a lower reliance on the sales tax and a more stable revenue system overall.

The Commission's Proposed System with a Motor Vehicle Tax and a Real Property Tax

This tax system, in the static 2001 model, was inferior to other systems on both measures. It had a lower growth rate and a higher variance than our current tax system. This system fares better when the revenues are allowed to vary in the optimization model, though, in order to meet

TABLE 9: Commission Proposal with Motor Vehicle Tax and Real Property Tax Optimization Results

Tax Type	2001 Revenue	Maximum Revenue	Growth	3.00%	5.00%	6.00%
Estimated Grocery Food	\$397,498,985	\$794,997,970	8.21%	\$795,000,000	\$795,000,000	\$795,000,000
Estimated Non-Grocery Food and Non-Food	\$4,306,631,015	\$8,613,262,030	8.21%	\$6,511,089,938	\$6,209,551,043	\$3,611,146,295
Actual Motor Vehicle Licensing Fee	\$225,933,000	\$451,866,000	4.71%	\$451,870,000	\$451,870,000	\$451,870,000
Actual Corporation Net Income	\$673,465,000	\$1,346,930,000	14.23%	\$0	\$0	\$0
Estimated Motor Vehicle Tax	\$525,607,500	\$1,051,215,000	1.21%	\$700,553,445	\$824,591,305	\$877,926,835
Estimated Real Property Tax	\$2,389,616,794	\$4,779,233,588	9.59%	\$0	\$3,501,652	\$3,141,560,870
Actual Insurance Premium Tax	\$296,496,000	\$592,992,000	10.12%	\$449,702,161	\$592,990,000	\$0
Actual Public Utilities Tax	\$3,998,000	\$7,996,000	-3.16%	\$7,996,000	\$7,996,000	\$7,996,000
Actual Tobacco Tax	\$81,671,000	\$163,342,000	0.22%	\$143,212,453	\$163,340,000	\$163,340,000
Actual Alcoholic Beverage License Fee	\$2,275,000	\$4,550,000	4.43%	\$0	\$4,550,000	\$4,550,000
Actual Motor Vehicle Operators License Fee	\$37,268,000	\$74,536,000	4.16%	\$74,536,000	\$74,536,000	\$74,536,000
Actual Public Utility License Fee	\$6,236,000	\$12,472,000	5.87%	\$6,438,004	\$12,472,000	\$12,472,000
Actual Occupation and Business License Fee	\$96,821,000	\$193,642,000	7.96%	\$193,640,000	\$193,640,000	\$193,640,000
Actual Documentary and Stock Transfer Tax	\$117,780,000	\$235,560,000	13.03%	\$0	\$0	\$0
Actual Severance Tax	\$1,131,000	\$2,262,000	-0.63%	\$2,262,000	\$2,262,000	\$2,262,000
Minimized Variance				1.22955E+17	1.35306E+17	1.67232E+17
Total Revenue				\$9,336,300,000	\$9,336,300,000	\$9,336,300,000

TABLE 9, Continued

Tax Type	2001 Revenue	Maximum Revenue	Growth	8.00%	9.00%	10.00%
Estimated Grocery Food	\$397,498,985	\$794,997,970	8.21%	\$795,000,000	\$795,000,000	\$703,065,522
Estimated Non-Grocery Food and Non-Food	\$4,306,631,015	\$8,613,262,030	8.21%	\$3,639,163,586	\$3,142,651,963	\$1,736,808,043
Actual Motor Vehicle Licensing Fee	\$225,933,000	\$451,866,000	4.71%	\$451,870,000	\$0	\$0
Actual Corporation Net Income	\$673,465,000	\$1,346,930,000	14.23%	\$0	\$352,026,169	\$1,346,900,000
Estimated Motor Vehicle Tax	\$525,607,500	\$1,051,215,000	1.21%	\$653,279,783	\$188,681,881	\$0
Estimated Real Property Tax	\$2,389,616,794	\$4,779,233,588	9.59%	\$3,222,601,330	\$4,779,200,000	\$4,779,200,000
Actual Insurance Premium Tax	\$296,496,000	\$592,992,000	10.12%	\$265,470,196	\$43,100,013	\$592,990,000
Actual Public Utilities Tax	\$3,998,000	\$7,996,000	-3.16%	\$7,996,000	\$7,996,000	\$0
Actual Tobacco Tax	\$81,671,000	\$163,342,000	0.22%	\$46,588,329	\$0	\$0
Actual Alcoholic Beverage License Fee	\$2,275,000	\$4,550,000	4.43%	\$0	\$0	\$0
Actual Motor Vehicle Operators License Fee	\$37,268,000	\$74,536,000	4.16%	\$58,428,775	\$0	\$0
Actual Public Utility License Fee	\$6,236,000	\$12,472,000	5.87%	\$0	\$0	\$0
Actual Occupation and Business License Fee	\$96,821,000	\$193,642,000	7.96%	\$193,640,000	\$25,381,973	\$0
Actual Documentary and Stock Transfer Tax	\$117,780,000	\$235,560,000	13.03%	\$0	\$0	\$177,336,435
Actual Severance Tax	\$1,131,000	\$2,262,000	-0.63%	\$2,262,000	\$2,262,000	\$0
Minimized Variance				1.67355E+17	2.31987E+17	5.03206E+17
Total Revenue				\$9,336,300,000	\$9,336,300,000	\$9,336,300,000

the current system's growth, the statewide property tax rate would have to be twice what was recommended. Like the Commission's first proposed system, this one must meet the higher revenue standard as it proposed to eliminate some local taxes and replace their revenue. The taxes that do not appear in any of the solutions for this system are: the corporation franchise tax, the alcoholic beverage tax, the motor fuels tax, and the hunting and fishing license fee and the inheritance and gift tax. The solution set for this tax system appears in Table 9.

The lower-growth solutions rely heavily on the sales tax and the motor vehicle tax. Revenues from these taxes diminish as the growth rates increase, but, as mentioned earlier, these reductions come at the expense of a state real property tax at the maximum allowed, which is twice the recommended level. Other taxes at or near their maximums in the lower growth solutions include the gross receipts tax, the motor vehicle licensing fee, the insurance premium tax, the public utilities and tobacco taxes, and the alcoholic beverage, motor vehicle and public utilities license fees.

The higher growth solutions make use of fewer taxes, with the 10% solution including only the grocery tax (near its maximum), the general sales tax (well below its 2001 level), the corporation net income tax (at its maximum), the real property tax (at its maximum), the insurance premium tax (at its maximum), and the documentary and stock transfer tax (at above its 2001 level). The motor vehicle tax shows very slow growth, just an annual average rate of 1.21%, so it is strong through the 6% growth solution, is just above its recommended level at 8% growth, is a small contributor at 9%, and falls out of the solution set at 10% growth.

The variance of this system's 9% solution, the one closest to while higher than the current system's growth rate, is lower than the 9% growth solutions associated with both the

progressive and flat income taxes in the Commission's first proposal and the current system with the flat income tax. The variance of this system's 9% solution, though, is higher than the current system's minimized at the 9% growth rate.

All Major Taxes

This tax system was analyzed more as an exercise than as an actual possibility. It includes all of the major taxes used in previous optimizations, but it excludes all of the smaller taxes and fees. The taxes that are included are often somewhat repetitive, as all of the different iterations of similar major taxes are included in one optimization. Required revenue was reduced to reflect the removal of the smaller taxes by subtracting the actual 2001 revenue from those taxes from the total required. The results of the analysis are shown in Table 10. The progressive income tax did not appear in any of the solutions. Otherwise, all of the taxes other than the estimated corporate franchise tax (which was the tax levied only on net worth) and the motor vehicle licensing fee appear in at least some solutions.

The lowest growth solution is at 6%, and it relies almost exclusively on the flat income tax. The Commission's motor vehicle tax also appears, but at only 29% of its projected 2001 level. Other lower-growth solutions rely heavily on the sales tax, motor vehicle tax, and the flat income tax. At the 8% growth rate level, the flat income tax is greatly reduced in favor of more reliance on the sales tax. The 9% growth solution shifts some weight from these taxes to the statewide real property tax. The 10% solution continues this trend toward the property tax, as well as introducing the Hall income tax at its maximum. The 11% solution moves the corporate franchise and net income taxes to near their maximums, keeps the Hall income tax at its

TABLE 10: All Major Taxes Optimization Results

Tax Type	2001 Revenue	Maximum Revenue	Growth	6.00%	7.00%	8.00%
Actual Sales/Gross Receipts	\$4,704,130,000	\$9,408,260,000	8.21%	\$0	\$890,055,852	\$2,446,812,675
Estimated Grocery Food	\$397,498,985	\$794,997,970	8.21%	\$0	\$0	\$795,000,000
Estimated Non-Grocery Food and Non-Food	\$4,306,631,015	\$8,613,262,030	8.21%	\$0	\$356,011,870	\$2,395,247,251
Actual Corporation Franchise	\$480,242,000	\$960,484,000	12.01%	\$0	\$0	\$0
Actual Corporation Net Income	\$673,465,000	\$1,346,930,000	14.23%	\$0	\$0	\$0
Actual Hall Income	\$198,071,000	\$396,142,000	12.46%	\$0	\$0	\$0
Estimated Motor Vehicle Tax	\$525,607,500	\$1,051,215,000	1.21%	\$150,759,035	\$70,138,357	\$70,524,261
Estimated Flat Income Tax	\$8,906,365,551	\$17,812,731,101	6.78%	\$6,131,040,965	\$4,965,593,921	\$574,215,813
Estimated Real Property Tax	\$2,389,616,794	\$4,779,233,588	9.59%	\$0	\$0	\$0
Minimized Variance				1.89118E+16	2.31344E+16	3.93388E+16
Total Revenue				\$6,281,800,000	\$6,281,800,000	\$6,281,800,000

TABLE 10, Continued

Tax Type	2001 Revenue	Maximum Revenue	Growth	9.00%	10.00%	11.00%
Actual Sales/Gross Receipts	\$4,704,130,000	\$9,408,260,000	8.21%	\$747,294,703	\$1,311,711,656	\$0
Estimated Grocery Food	\$397,498,985	\$794,997,970	8.21%	\$0	\$0	\$0
Estimated Non-Grocery Food and Non-Food	\$4,306,631,015	\$8,613,262,030	8.21%	\$1,947,368,367	\$0	\$558,016,723
Actual Corporation Franchise	\$480,242,000	\$960,484,000	12.01%	\$0	\$426,665,704	\$959,787,004
Actual Corporation Net Income	\$673,465,000	\$1,346,930,000	14.23%	\$0	\$474,254,751	\$1,325,832,309
Actual Hall Income	\$198,071,000	\$396,142,000	12.46%	\$0	\$396,140,000	\$396,140,000
Estimated Motor Vehicle Tax	\$525,607,500	\$1,051,215,000	1.21%	\$0	\$0	\$0
Estimated Flat Income Tax	\$8,906,365,551	\$17,812,731,101	6.78%	\$0	\$0	\$0
Estimated Real Property Tax	\$2,389,616,794	\$4,779,233,588	9.59%	\$3,587,136,930	\$3,673,027,889	\$3,042,023,964
Minimized Variance				9.38442E+16	2.05744E+17	3.77856E+17
Total Revenue				\$6,281,800,000	\$6,281,800,000	\$6,281,800,000

maximum, reduces the importance of the sales tax, and the real property tax.

The real surprise in this set of solutions is that the progressive rate income tax never comes into play. When the Commission's proposal that included that tax was run, the Hall income tax was eliminated, and only the corporate franchise tax with the property basis removed was included. The statewide property tax was not available, and the revenue requirement was much larger so it could replace the local option sales tax that the Commission recommended repealing. While the progressive income tax produced large revenues and had a high growth rate, its rate was points lower than the corporate net income tax, while its coefficient of variation was only slightly lower. The Hall income tax also had a significantly higher growth rate and only a slightly higher coefficient of variation. Meanwhile, the statewide real property tax had just over a 1% slower growth rate, but it also had a lower coefficient of variation. The reduced revenue requirement compared to the Commission's first tax proposal allowed these three taxes to combine to replace the progressive income tax at every high growth level.

When all of the major taxes are included, the progression through different growth rate solutions are otherwise pretty much as expected. The lower growth solutions pull from the sales tax and the flat income tax. The mid-range solutions pull in the Hall income tax, the statewide property tax and the corporate taxes. The highest growth solutions rely almost exclusively on the corporate taxes and the Hall income tax, with a significant revenue addition from the statewide real property tax.

Policy Recommendations

Policy recommendations for the Tennessee tax system are going to call for a change. Though revenue has been adequate over the last few years, this has been in large part due to a

general economic recovery and to the cuts in TennCare. Such cuts have reached about as far as they can go, and continued increases in the cost of basic Medicaid, along with all of the other pressures discussed earlier in the paper, will put Tennessee in a budget crunch again.

Tennessee's slower growth system will lag just when economic growth is increasing, other states are enjoying surpluses, and demand for services is high.

There is nothing wrong with a tax system that leans toward stability; such a system offers protection in bad economic times, when demands for government aid are often high. But Tennessee's tax system fails to grow adequately when the economy is booming. At such times, new residents move into the state, putting pressure on existing government services. While safety net services are often in less demand in a strong economy, demand for new infrastructure and for increases in basic government services like education, trash collection, codes inspections, judicial services, etc. are often on the rise.

Many of these kinds of services that have increasing demand in good economic times are provided at the local level. Nonetheless, when Tennessee's state government suffers during these times, it offers less support to local governments just when they most need it. And those services that see increasing demand in a strong economy that are provided by the state, such as state park and recreation services and state highway building and maintenance, often suffer as well.

The state really has three options it could follow to help solve these problems. The first two involve tax reform and are not very politically feasible at the moment. The third involves increased local government autonomy in taxation. Local governments rely primarily on the property tax, which was shown in this analysis to be a relatively stable but slower-growing revenue source, much like the primary revenue sources on which the state relies. Part of the

reason for the slower growth in property tax revenues is the so-called “truth in taxation” requirement that makes counties lower their tax rates after every new assessment to make the change in property values revenue neutral. This policy forces counties to take legislative action to raise property tax rates if revenues are to simply keep up with inflation. If local governments were allowed to develop some faster-growing revenue sources that were more responsive to growth, this could also balance the state system.

In looking at tax reform options, two possibilities seem most strongly suggested by the data. The first is business tax reform, coupled with a shift toward taxes on investment, financial services and financial transactions. The 10% growth solution using current taxes shows a decrease in the reliance on the sales tax (albeit a small decrease) accompanied by a big increase in corporate franchise and net income tax revenue. In addition, the Hall income tax and the insurance premium tax are at or near the maximum amounts allowed.

Business taxes currently rely heavily on gross receipts and asset-based taxes. Though partnerships, limited liability companies, and other such business structures have been included in the corporate net income tax in recent years, they still avoid much or all of the franchise taxes and gross receipts taxes. The system is not very fair, and it is constructed to tax businesses in an economy that is asset and property heavy, such as one that relies on agriculture and manufacturing. As our economy becomes more and more service-oriented, some of the state’s bigger business taxes are hitting fewer and fewer businesses.

A restructuring of the business tax, not unlike the proposal made by Governor Sundquist in 1999, would even out the tax burden and raise more revenue, without necessarily raising taxes on those businesses that are already paying the most. Such a restructuring could also address the competitiveness concern of the Tennessee Tax Structure Study Commission (“Commission”),

which worried that the property portion of the franchise tax was a disincentive for businesses to come to or stay in Tennessee.

Unlike the Commission, I would not recommend eliminating the Hall income tax unless it were to be replaced by a general personal income tax. When the Hall income tax was available in the tax mix, all of the high growth solutions made use of it. As the growth percentage increased, so did the Hall income tax. The highest growth solutions all included the tax at the maximum allowed by the model.

This tax is one of the few that Tennessee has that grows with income and keeps pace with a booming economy. Its revenue growth, which was volatile in the decade studied, was most rapid in the late 1990's, when the state's other taxes were lagging. The Commission's main concern with this tax was that it has a very low exemption of just \$1,250 per taxpayer, and, thus, it raises revenue from many retirees on fixed incomes. This could be solved by raising the exemption and indexing it to automatically change annually with some inflation indicator, such as the Consumer Price Index. This would protect those on fixed incomes without giving up a rare rapid growth tax.

This reform recommendation package would also include increases in taxes on financial transactions. These also increase, in both amount and frequency, in good economic times. Insurance premiums, real estate transfers and stock transfers are more valuable and more frequent among wealthier people. This would be a progressive increase that only rarely targets the majority of people, and the model shows increasing reliance on such taxes as growth requirements increase.

None of these taxes are new, so there would be no need to create a complex revenue-gathering system. Implementing these changes would not violate the simplicity requirement. To

the extent that different types of businesses are paying vastly different amounts in taxes, a shift away from taxing assets and property and toward net income would be a move toward efficiency. In addition, reliance on the gross receipts tax could be reduced, and this is widely regarded as an inefficient and inequitable tax.

Politically, however, this tax reform package is not really feasible. When Governor Sundquist proposed reforming business taxes in 1999, the idea was a complete non-starter in the legislature. It garnered very little support and was never taken seriously. Many businesses which currently pay only the net income tax are opposed to it, and they hold sway with the legislators. It is possible that a governor who is perceived to be a good businessman and a friend of business, such as Governor Bredesen, could move such a reform package through the legislature. But it would be a challenge and a big political risk and would be unlikely to happen unless we hit the next state revenue crunch within the next year or two.

The second possible tax reform package would be a progressive income tax along the lines of the one proposed by the Commission. When the proposal was adjusted to make use of a flat income tax, it was unable to produce the kind of revenue growth required, only reaching 9% by dropping the flat income tax almost completely and moving to a much increased sales tax. Furthermore, the Commission's proposal that includes the motor vehicle tax and the property tax is even less politically imaginable than the progressive income tax.

This proposal includes getting rid of the Hall income tax, part of the proceeds of which go to local governments; getting rid of the local option sales tax; encroaching on the main revenue source for local governments by adding a state property tax; and encroaching on another local revenue source by taxing motor vehicles. The Commission did propose to replace the local option sales tax and Hall income tax revenue for local governments, just as it did when

proposing a progressive income tax, but doing so by making use of the only tax bases local governments have is simply not feasible. Local government officials are likely to raise the objection that the state cannot be counted on to keep its revenue-sharing promises in tough times. It is certainly true that the revenue that the state shares with local governments was cut during two of the more difficult recent fiscal years, when balancing the state budget was a challenge.

While local governments would probably also be nervous about losing the local option sales tax and accepting a promise from the state to replace it from a state progressive income tax, the fact that the new revenue stream does not come from local governments' only remaining tax bases makes it more feasible, though still unlikely, considering the political climate when it comes to a state income tax.

Again, the flat income tax proposal failed to show enough growth to be given real consideration in these policy recommendations. It grew more slowly than the sales tax, and thus would hardly help solve the problems created by the state's reliance on the sales tax. In addition, a flat income tax would not do nearly as much to address tax equity as would the progressive income tax, the equity value of which was well-documented by the Commission.

As far as the details of the progressive income tax, my recommendation would be to adopt something a little bit different than what was proposed. As proposed by the Commission, this tax raised roughly twice the revenue it needed to raise, and it never figured in any of the solutions at anywhere near the estimated 2001 revenue level. Its top rate of 6% made even some of the steadfast supporters of progressive tax reform squeamish, and its exemption and tax bracket formulae were overly complex.

Instead, I would recommend a system that made use of federal adjusted gross income and had brackets with the same endpoints for each type of household. It might be that a married

household paid 1% in the \$20,000 to \$30,000 bracket, for instance, while a single person paid 2% in that bracket, but the bracket would cover the same amounts of income. I would also recommend making 4% the top rate. As long as investment income is included in state taxable income, getting rid of the Hall income tax as part of the package should do no harm.

Counting on federal adjusted gross income as a basis for a state income tax can create problems, because the state becomes subject to the whims of Congress in the definition of adjusted gross income. Nonetheless, federal income taxes are progressive, exemptions and deductions are adjusted over time to reflect inflation, and the simplicity achieved by not forcing people to start from scratch when figuring their state income tax burden make this an attractive option.

When it comes to competitive balance, this recommendation definitely improves the state position. Tennessee's over-reliance on the sales tax puts the state at a competitive disadvantage with its neighbors, as well as with most states across the country. And while the eroding tax base could be solved if streamlined sales tax plans were ever adopted nationally, there is little guarantee that this will happen. The addition of an income tax would not hurt Tennessee in comparison with most states, including its neighbors.

The efficiency of an income tax versus a higher sales tax is hard to measure, but there is an argument to be made for balance. Why should the labor market have so much less taxation than the goods market? Is the market for goods so much more inelastic? There is no evidence that it is. By taking some of the burden off of the goods market and placing it on the labor market, Tennessee would likely achieve greater efficiency by distorting markets in a more balanced fashion.

It must be noted again, however, that the feasibility of such a reform package is very much in question. People have grown tired of the income tax fights. Tennesseans accepted their sales tax increase and expected that to be the end of it. While it is true that the cuts to TennCare have taken away one of the favorite targets of the anti-tax groups, they will find others. And while Tennesseans might be persuaded to back a tax reform package that left many in the same or better financial shape as the current system, that message is not an easy one to get to those people amidst the nasty rhetoric of a tax fight. There is a certain amount of income tax fatigue after the 2002 tax wars, and it likely needs a bit more time to subside before any legislators would even think of taking up the income tax again.

The last policy option to be presented here is one that does not often get discussed when looking at state taxes. It is to leave the state tax system as it is, but to allow local governments to make use of some of the higher growth taxes in their own jurisdictions. In this way, local governments would have more revenue in stronger economic times and would be able to provide the many local services that have increased demand in those times. Revenue-sharing arrangements with the state could be made more flexible so that, during such times, local governments received less revenue from the state, allowing the state to recover from lack of growth in state taxes. In addition, during recessions, the state, which fares fairly well in economic slowdowns, could share more revenue with local governments, helping to keep them afloat.

Such an option would allow a better revenue balance to be achieved without having to pass legislation for it at the state level. It is true that legislation enabling local governments to make use of different types of taxes would be required, and that such legislation would likely be called a tax increase in a political fight. But it can also be called local control of local

government, which is far more palatable to the voter. Furthermore, local governments have already been agitating for this kind of flexibility, so there is already a built in support base for it.

The kinds of taxes local governments have pursued have mostly involved growth: impact fees; adequate facilities taxes; and real estate transfer taxes. By their very nature, these provide more revenue in higher growth times. In addition, Memphis has pursued a payroll tax. There are constitutional questions about such a tax, but no more so than there are concerning an income tax. And when Memphis put the tax to referendum, it fared poorly, but that is not particularly surprising. The recent proposed sales tax increase in Davidson County also fared poorly. People do not often vote for a tax increase. But there is no need to subject local taxing authority to referendum, and many local governing bodies are prepared to pass new types of taxes.

Such a change would also allow cities that wish to provide a higher level of services than the state as a whole to do so without having to convince the rest of the state to share their philosophy. The down side of such a system is that some local jurisdictions simply have very little base to tax, and new types of taxes will not help them. Still, this could be considered in new, more flexible state revenue sharing plans, which would be necessary to make this option one that would actually address the state's problem. Equity, efficiency, competitiveness, and simplicity questions would have to be answered for the particular taxes proposed by local governments.

Tennessee will face a revenue crisis again, likely the next time that the rest of the country starts to enjoy an economic boom. While state tax reform is not a politically feasible option at the time, it is useful to continue to analyze what direction it should take, as the political winds are sure to change sometime in the future. In the meantime, local fiscal flexibility is a more

politically palatable option that could help to address some of the shortfalls of Tennessee's current revenue system.

APPENDIX

SAS PROGRAM LANGUAGE USED TO RUN OPTIMIZATION

```
options nonotes nomprint nomlogic nosymbolgen;
/*
    DO NOT MODIFY THIS CODE; SCROLL DOWN
*/
%macro loadParametersFromExcel(file,sheet,range1,range2);
/* Import non-sigma parameters */
proc import
    datafile = &file.
    out      = parms replace
    dbms     = excel;
    getnames = no;
    range    = &range1.;
    sheet    = &sheet.;
run;
proc sql noprint;
    select max(F6)   into :R from parms;
    select count(F1) into :n from parms;
quit;
%let n = %sysfunc(compbl(&n.));
proc sql noprint;
    select F1 into :name1 - :name&n. from parms;
    select F3 into :rmin1 - :rmin&n. from parms;
    select F4 into :rmax1 - :rmax&n. from parms;
    select F5 into :g1    - :g&n.    from parms;
quit;
data parms;
    set parms;
    label f1 = "Tax"
          f2 = "2001 Revenue"
          f3 = "Revenue Floor"
          f4 = "Revenue Ceiling"
          f5 = "Growth Rate";
    rename f1 = TAX;
    rename f2 = REVENUE_2001;
    rename f3 = RMIN;
    rename f4 = RMAX;
    rename f5 = G;
    drop f6;
run;
/* Import sigma parameters */
proc import
    datafile = &file.
    out      = sigmas replace
    dbms     = excel;
    getnames = no;
    range    = &range2.;
    sheet    = &sheet.;
run;
```

```

data sigmas;
  set sigmas;
  id = _n_;
  run;
proc transpose
  data = sigmas
  out = sigmas_vec;
  by id;
  run;
data sigmas;
  set sigmas;
  drop id;
  run;
data sigmas_zero;
  set sigmas_vec;
  if coll = . then coll = 0;
  run;
proc sql noprint;
  select coll into :S separated by ' ' from sigmas_zero;
quit;

```

```

/* Single-shot optimization; inputs are provided as (global) macro variables,
   outputs (optimal individual revenue shares) are saved in (temporary) data-
   set GLOBAL_OPTIMUM
*/

```

```

%macro initializeOutputDatasets;
  %let f1 = local_optimum;
  %let f2 = local_optima;
  %let f3 = global_optimum;
  %do i = 1 %to 3;
    data &&f&i.;
    %do j = 1 %to &n.;
      w&j. = .;
    %end;
  run;
%end;
%mend;
%macro initializeWeights;
  %let ok = 0;
  %do %while (&ok. = 0);
    %let sum = ;
    %do i = 2 %to &n.;
      %let u = %sysfunc(uniform(-1));
      %let wmin = %sysevalf(&&rmin&i/&R);
      %let wmax = %sysevalf(&&rmax&i/&R);
      %let d = %sysevalf(&wmax - &wmin);
      %let w&i = %sysevalf(&wmin + &d*&u);
      %let sum = &sum - &&w&i;
    %end;
    %let w1 = %sysevalf(1 &sum.);
    %let wmin = %sysevalf(&rmin1/&R);
    %let wmax = %sysevalf(&rmax1/&R);
    %if %sysevalf(&w1. <= &wmax., boolean)
    and %sysevalf(&w1. >= &wmin., boolean)
  %then %do; %let ok = 1;
    parms

```

```

                %do i = 2 %to &n.;
                    w&i. = &&w&i,
                    %end;
                    w1 = &w1.;
                %end;
%end;
%mend;
%macro setRevenueBounds;
    bounds
    %do i = 2 %to &n.;
        %sysevalf(&&rmin&i./&R.) <= w&i. <= %sysevalf(&&rmax&i./&R.),
    %end;
    %sysevalf(&&rmin1./&R.) <= w1 <= %sysevalf(&&rmax1./&R.);
%mend;
%macro setConstraints;
    lincon w1
    %do i = 2 %to &n.;
        + w&i
    %end;
    = 1,
    &g1.*w1
    %do i = 2 %to &n.;
        %let sign = ; %if %sysevalf(&&g&i>0, boolean) > 0 %then %let sign = + ;
        &sign. &&g&i.*w&i
    %end;
    >= &lambda.;
    ;
%macro computeObjFunction;
    %let f = f = 0;
    %do i = 1 %to &n.;
        %do j = 1 %to &i.;
            %let weight = ;
            %if %sysevalf(&i = &j, boolean) %then %let weight = 0.5*;
            %let k = %sysevalf(&n.*&i. + &j. - &n.);
            %let sk = %scan(&S.,&k.,' ');
            %let sign = ; %if %sysevalf(&&sk>0, boolean) > 0 %then %let sign
= + ;
            %let f = &f. &sign. &weight.&sk*w&i.*w&j.;
        %end;
    %end;
    &f.
%mend;

%macro runOneOptimization;
    %initializeOutputDatasets;
    %let meth1 = QUANEW;
    %let meth2 = TRUREG;
    %let meth3 = NEWRAP;
    %let meth4 = CONGRA;
    %do init_cond = 1 %to 100;
        %do meth = 1 %to 1;
            /* Compute a local optimum */
            %put "Trying starting-value combination &init_cond. for scenario
&scenario.. &par. = &&&par.";
            /* %put "Optimization method: &&meth&meth"; */
            proc nlp noprint
                /* tech = &&meth&meth. */

```



```

        outest = local_optimum;
min f;
    %initializeWeights;
    %setRevenueBounds;
    %setConstraints;
    %computeObjFunction;
run;
data local_optima;
set local_optima local_optimum;
if _TYPE_ in ('PARMS') then output;
run;

%end;
%end;
proc sql;
create table global_optimum
as select *
from local_optima
where _rhs_ = select max(_rhs_) from local_optima;
quit;
%mend;

%macro runManyOptimizations(par,file);
proc sql noprint;
select count(x) into :m from varying_parameter;
quit;
%let m = %sysfunc(compbl(&m.));
proc sql noprint;
select x into :&par.1 - :&par.&m. from varying_parameter;
quit;
data optimal_w; set _null_; run;
%do l = 1 %to &m.;
    %let &par. = &&par&l;
    %runOneOptimization;
    data optimal_w;
    set optimal_w global_optimum;
    run;
%end;
data optimal_w;
set optimal_w;
if n (of _numeric_) < 2 then delete;
array x _numeric_; do over x; if x < .0000001 then x = 0; end;
run;
data optimal_w;
merge varying_parameter optimal_w;
label x = "Varying parameter: &par.";
rename x = &par.;
run;
data optimal_r1;
set optimal_w;
array x w1 - w&n.;
array y r1 - r&n.;
do i = 1 to &n.;
    y(i) = x(i)*&R.;
end;
%do i = 1 %to &n.;
    label r&i = "&&name&i: optimal revenue";
    r&i = round(r&i);

```

```

    %end;
    run;
data optimal_r1;
  set optimal_r1;
  fmin = &R.*sqrt(_rhs_);
  label fmin = "Minimized std. deviation of TR";
  drop i w: _:;
  run;
proc transpose
  data = optimal_r1
  out = temp;
  /*var r:; */
  by &par.;
  run;
data temp2;
  set temp;
  x = substr(_name_,2,2);
  y = input(x,2.);
  run;
data temp2;
  set temp2;
  drop _name_ _label_ x;
  run;
proc sort
  data = temp2;
  by y;
  run;
proc transpose
  data = temp2
  out = temp3;
  by y;
  var coll;
  run;
data temp4;
  set temp3;
  %do i = 1 %to &n.;
    rename col&i. = r&i.;
    label col&i. = "Optimal revenue (&par. = &&par&i)";
  %end;
  drop y _name_;
  run;
data goal optimal_r2;
  set temp4;
  if _n_ = 1 then output goal; else output optimal_r2;
  run;
data optimal_r2;
  merge parms optimal_r2;
  run;
proc sql noprint;
  %do i = 1 %to &m.;
    select r&i into :F&i. from goal;
    select sum(r&i) into :Q&i. from optimal_r2;
  %end;
  %let RR = &R.;
  %let QQ = &Q1.;
  %let FF = &F1.;
  %do i = 2 %to &m.;

```

```

        %let RR = &RR, &R;
        %let QQ = &QQ, &&Q&i;
        %let FF = &FF, &&F&i;
    %end;
    insert into optimal_r2 values('Required total revenue',,,,,,&RR.);
    insert into optimal_r2 values('Generated total revenue',,,,,,&QQ.);
    insert into optimal_r2 values('Minimized std. deviation of
TR',,,,,,&FF.);
quit;
proc export
    data      = optimal_r2
    outfile   = &file.
    dbms      = EXCEL replace;
    sheet     = "Column per &par.";
run;
proc export
    data      = optimal_r1
    outfile   = &file.
    dbms      = EXCEL replace;
    sheet     = "Row per &par.";
run;

%macro varList(prefix,m);
    %let list = ;
    %do i = 1 %to &m.;
        %let list = &list. &prefix.&i;
    %end;
    &list.
%mend;

%global n R S scenario
    %varList(R,100)          %varList(lambda,100)
    %varList(name,100)      %varList(rmin,100)
    %varList(rmax,100)     %varList(g,100)
    %varList(w,100);

/*
                MODIFY THIS CODE
*/
%let path = C:\Documents and Settings\Dimitri Shvorob\My Documents\Rose\;
%let file = Data_061206_DS.XLS;

input x @@;
cards;
0 0.01 0.02 0.03 0.04 0.05 0.06 0.07 0.08 0.09 0.10 0.11
run;

%let scenario = Curr Taxes;
%loadParametersFromExcel("&path.&file.", "&scenario.", "A3:F20", "B24:S41");
%runManyOptimizations(lambda, "&path.&scenario.");

%let scenario = Comm Prop 1;
%loadParametersFromExcel("&path.&file.", "&scenario.", "A3:F21", "B25:T43");
%runManyOptimizations(lambda, "&path.&scenario.");

%let scenario = Comm Prop 2;

```

```
%loadParametersFromExcel("&path.&file.", "&scenario.", "A3:F22", "B26:U45");
%runManyOptimizations(lambda, "&path.&scenario.");

%let scenario = Curr Plus Flat;
%loadParametersFromExcel("&path.&file.", "&scenario.", "A3:F21", "B25:T43");
%runManyOptimizations(lambda, "&path.&scenario.");

%let scenario = Comm Prop 1 & Flat;
%loadParametersFromExcel("&path.&file.", "&scenario.", "A3:F21", "B25:T43");
%runManyOptimizations(lambda, "&path.&scenario.");

%let scenario = All;
%loadParametersFromExcel("&path.&file.", "&scenario.", "A3:F14", "B18:M29");
%runManyOptimizations(lambda, "&path.&scenario.");
```

BIBLIOGRAPHY

- Advisory Committee on Intergovernmental Relations. *Federal-State Coordination of Personal Income Taxes*, 1965.
- Advisory Committee on Intergovernmental Relations. *Fiscal Balance in the American Federal System*, 1967.
- Arnott, Richard. "Reflections on Optimal Tax Theory," in Smolensky, Eugene & John Quigley, eds. *Modern Public Finance*. Cambridge, MA: Harvard University Press, 1994.
- Associated Press. "Sundquist Proposes New Budget." *The Daily Beacon*, Vol. 89, #22, February 8, 2002.
- Becsi, Zsolt. "Do State and Local Taxes Affect Relative State Growth?" *Federal Reserve Bank of Atlanta Economic Review*, March/April 1996.
- Bergeron, Paul H., Stephen V. Ash & Jeanette Keith. *Tennesseans and Their History*. Knoxville, TN: University of Tennessee Press, 1999.
- Block, Sandra. "Paying Someone To Do Your Taxes? Check Them Out First." *USA Today*, March 10, 2003. Accessed March 12, 2006 at http://www.usatoday.com/money/perfi/columnist/block/2003-03-10-tax-preparers_x.htm
- Borg, Mary O., Paul M. Mason & Stephen L. Shapiro. *The Economic Consequences of State Lotteries*. New York, NY: Praeger, 1991.
- Bredesen, Phil. *The Budget: Fiscal Year 2005-2006*. Nashville, TN: State of Tennessee, Department of Finance and Administration, 2005.
- Brown, C.V. *Taxation and the Incentive to Work*. New York, NY: Oxford University Press, 1983.
- Citro, Constance F. "Databases for Microsimulation: A Comparison of the March CPS and SIPP." In Citro, Constance F., ed. *Improving Informatin for Social Policy*. Washington, DC: Commission on Behavioral and Social Sciences and Education, 1991.
- Clotfelter, Charles J. & Philip J. Cook. *Selling Hope: State Lotteries in America*. Cambridge, MA: Harvard University Press, 1989.
- Combs, William H. & William E. Cole. *Tennessee: A Political Study*. Knoxville, TN: University of Tennessee Press, 1940.
- Corlett, W.J. & D.C. Hague. "Complimentarity and the Excess Burden of Taxation." *Review of Economic Studies*, Vol. 21, 1953, pp. 21 - 30.

- Corlew, Robert Ewing. *Tennessee, A Short History*. Knoxville, TN: University of Tennessee Press, 1990.
- Coughlin, Teresa A., et al. *Medicaid Since 1980*. Washington, DC: The Urban Institute, 1994.
- Council of State Governments. "State Fiscal Crisis." *Trends Alert: Critical Information for State Decisionmakers*, April 2003.
- De la Cruz, Bonna M. & Duren Cheek. "Income Tax Dead For Now, But Governor May Call a Third Session," *The Tennessean*, Vol. 95, #323, November 19, 1999.
- Diamond, P.A. "A Many-Person Ramsey Tax Rule," *Journal of Public Economics*, Vol. 4, 1975, pp. 227 - 244.
- Due, John F. & John L. Mikesell. *Sales Taxation: State and Local Structure and Administration, 2nd ed.* Washington, DC: Urban Institute, 1994.
- Dye, Richard F. & Therese J. McGuire. "Growth and Variability of State Individual Income and General Sales Taxes." *National Tax Journal*, Vol. 44, #1, March 1991, pp. 55 - 66.
- Elder, Harold W. "Exploring the Tax Revolt: An Analysis of the Effects of State Tax and Expenditure Limitation Laws." *Public Finance Quarterly*, 20 (1), January 1992.
- Feldstein, M.S. "On the Optimal Progressivity of the Income Tax," *Journal of Public Economics*, Vol. 2, 1973, pp. 236 - 376.
- Firestone, David. "Tennessee's Fiscal Troubles Grow After Futile Push for Income Tax." *The New York Times*, August 23, 2001, p. A1.
- Forrister, Bradford N. & Bill Buechler. *Tennessee Tax Guide: A Comprehensive Survey of Major Tennessee State and Local Taxes*. Brentwood, TN: M. Lee Smith Publishers, LLC, 2003.
- Fox, Cynthia G. "Income Tax Records of the Civil War years." *Prologue: Journal of the National Archives*, Vol. 18, #4, Winter, 1986.
- Fox, William F. & Patricia A. Price. *An Economic Report to the Governor of the State of Tennessee: On the State's Economic Outlook*. Center for Business and Economic Research, College of Business Administration, The University of Tennessee, Knoxville. January, 1995.
- Galper, Harvey & Stephen H. Pollock. "Models of State Income Tax Reform," in Gold, Steven D., ed. *The Unfinished Agenda for State Tax Reform*. Washington, DC: National Conference of State Legislators, 1988.

- Gentry, William M. & Helen F. Ladd. "State Tax Structure and Multiple Policy Objectives." *National Tax Journal*, Vol. 47, #4, December, 1994. pp. 747 - 772.
- Gold, Steven D. "State Fiscal Problems and Policies," in Gold, Steven D., ed. *The Financial Crisis of the States: Lessons for the Future*. Washington, DC: Georgetown University Press, 1995.
- Green, Harry A. & Cliff Lippard. *Competitive Edge: The Tax and Business Climate in Tennessee* Nashville, TN: Tennessee Advisory Commission on Intergovernmental Relations, 1988.
- Greene, Lee S., David H. Grubbs & Victor C. Hobday. *Government in Tennessee: Third Edition*. Knoxville, TN: University of Tennessee Press, 1975.
- Groves, Harold M. *Financing Government*. New York, NY: Holt, Rinehart & Winston, 1964.
- Groves, Harold M. & C. Harry Kahn. "The Stability of State and Local Tax Yields." *American Economic Review*, Vol. 57, #3, September 2004, pp. 559 - 570.
- Gullo, Theresa A. "History and Evaluation of the Unfunded Mandates Reform Act." *National Tax Journal*, Vol. 58, #5, Sep/Oct 1998, pp. 379 - 387.
- Harmon, Oskar Ragnar & Rajiv Mallick. "The Optimal State Tax Portfolio Model: An Extension." *National Tax Journal*, Vol. 47, #2, June 1994, pp. 395 - 401.
- Haveman, Robert H. "Optimal Taxation and Public Policy," in Smolensky, Eugene & John Quigley, eds. *Modern Public Finance*. Cambridge, MA: Harvard University Press, 1994, pp. 247 - 249.
- Hegarty, Stephen. "Educators Wary of Lottery Windfall." *St. Petersburg Times*, July 3, 1989, p. 1B.
- Hettich, Walter & Stanley L. Winer. "Economic and Political Foundations of tax Structures." *The American Economic Review*, Vol. 78, #4, September, 1988, pp. 701 - 712.
- Holcombe, Randall G. & Russell S. Sobel. *Growth and Variability in State Tax Revenue: An Anatomy of State Fiscal Crises*. Westport, CT: Greenwood Press, 1997.
- Hy, Ronald John & William L. Waugh, Jr. *State and Local Tax Policies: A Comprehensive Handbook*. Westport, CT: Greenwood Press, 1995.
- International Gaming and Wagering Business*, Vol. 22, #4, April, 2001.
- Langsdon, Phillip Royal. *Tennessee: A Political History*. Franklin, TN: Hillsboro Press, 2000.

- Laska, Lewis L. *The Tennessee State Constitution: A Reference Guide*. New York, NY: Greenwood Press, 1990.
- Legler, John P. & Perry Shapiro. "The Responsiveness of State Tax Revenue to Economic Growth." *National Tax Journal*, Vol. 21, #1, March 1968, pp. 46 - 56.
- Jenny, Nicholas W. "State Finances Begin Recovery: Fiscal Year 2004 Revenue Summary". *State Fiscal Brief* #72. Albany, NY: Fiscal Studies Program, The Nelson A. Rockefeller Institute of Government, State University of New York, 2004.
- McNichol, Elizabeth C. *Governor Sundquist's Revised Tax Proposal Would Address Long-Standing Problems with Tennessee's Tax System*. Center on Budget and Policy Priorities, 1999. Accessed March 12, 2006 at www.cbpp.org/4-1-99sfp.htm
- Merriman, David. *Sources of Data About State Government Revenues and Expenditures*. Washington, DC: The Urban Institute, 2000.
- Misiolek, Walter S. & D. Grady Perdue. "The Portfolio Approach to State and Local Tax Structures." *National Tax Journal*, Vol. 40, #1, March 1987, pp. 111 - 114.
- Moore, Stephen & Richard Vedder. *The Case Against a Tennessee Income Tax*. The Cato Institute: Briefing paper #53, November 1, 1999.
- Myles, Gareth D. *Public Economics*. Cambridge, UK: Cambridge University Press, 1995.
- Nashville Business Journal*. 1999. "Questioning Session's Motive" March 19, 1999. Accessed online June 21, 2006 at <http://www.bizjournals.com/nashville/stories/1999/03/22/editorial1.html>
- National Conference of State Legislators Health Policy Tracking Service. "The State Medicaid Crisis: Benefits and Eligibility on the Block." *Healthcare Financial Management*, Vol. 57, #5, May 2003, pp. 14 - 15.
- Noto, Nonna A. and Louis Allen Talley. "Excise Tax Financing of Federal Trust Funds." *Congressional Research Service Report for Congress, No. 93-6 E*, January 5, 1993. Accessed March 12, 2006 at <http://www.cnie.org/nle/crsreports/economics/econ-2.cfm>
- Pomp, Richard D. "State Tax Expenditure Budgets – and Beyond," in Gold, Steven D. *The Unfinished Agenda for State Tax Reform*. Washington, DC: National Conference of State Legislators, 1988.
- Perdue, D. Grady & Norman L. Weed. "Tax Revenues, Economic Development and Portfolio Analysis: A Texas Application." *Public Administration Quarterly*, Vol. 15, #3, Fall 1991, pp. 341 - 377.

- Platt, Suzy, ed. *Respectfully Quoted: A Dictionary of Quotations*. New York, NY: Barnes & Noble Books, 1992.
- Ramsey, F.P. "A Contribution to the Theory of Taxation," *Economic Journal*, Vol. 37, 1927, pp. 47 - 61.
- Rochelle, Robert. "A Stitch in Time..." *Tennessee's Business*, Vol. 9, #2, 1999, p. 10.
- Roin, Julie A. "Reconceptualizing Unfunded Mandates and Other Regulations." *Northwestern University Law Review*, Vol. 93, #2, Winter 1999, pp. 351 - 374.
- Rosen, Harvey S. *Public Finance, 4th Edition*. Boston, MA: Irwin/McGraw-Hill, 1995.
- Shannon, John. "State Revenue Diversification – the Search for Balance," in Stocker, Frederick D., ed., *The Quest for Balance in State-Local Revenue Structures*. Tax Policy Roundtable, May 1987.
- Shiffman, John & Rob Johnson. "Sponsors: Budget Plan a Starting Point," *The Tennessean*, Vol. 98, #55, February 24, 2002, p. 1A.
- Smith, M. Lee. "Tennessee's Postbellum Political History: Voting Patterns and Party Identification," in Vile, John R. & Mark Burns, eds. *Tennessee Government and Politics: Democracy in the Volunteer State*. Nashville, TN: Vanderbilt University Press, 1998.
- Suits, Daniel B. "Measurement of Tax Progressivity." *The American Economic Review*, Vol. 67, #4, September 1977, pp. 747 - 752.
- Sundquist, Don. "An Outdated Tax System Meets the 21st Century." *Tennessee's Business*, Vol. 9, #2, 1999, pp. 17-19.
- Swope, Christopher. "E-economics Problem." *Governing*. Vol. 13, #6, March 2000, pp. 20 - 23.
- Tennessee Advisory Commission on Intergovernmental Relations. *Understanding Tennessee's Tax System: Problems and Issues*. Nashville, TN: TACIR, 1998.
- Tennessee Department of Finance and Administration. *Tennessee State Taxpayers' Budget: Fiscal Year 2002-2003*. January, 2002.
- Tennessee Tax Structure Study Commission. *Final Report of the Tennessee Tax Structure Study Commission*. Nashville, TN: State of Tennessee, December 2004.
- United States Bureau of Labor Statistics. *Consumer Expenditure Survey, 2001-2002*, Table 7050. Accessed March 9, 2006 at <http://www.bls.gov/cex/2002/highincome/hincome.pdf>

- United States Census Bureau. *1998 Income and Apportionment of State-Administered Lottery Funds*. Accessed March 12, 2006 at www.census.gov/govs/state/98lottery.xls
- United States Census Bureau. *Government Finances 1998-1999*. Issued September, 2001.
- United States Census Bureau. *States Ranked by Revenue and Expenditure Total Amount and Per Capita Total Amount: 1999*. Accessed March 9, 2006 at www.census.gov/govs/state.99rank.html
- United States Census Bureau. *Statistical Abstract of the United States*. 1992 to 2001. Accessed March 13, 2006 at <http://www.census.gov/prod/www/abs/statab.html>
- United States Census Bureau. *Tennessee State Government Tax Collections: 2001*. Accessed March 9, 2006 at <http://www.census.gov/govs/statetax/0143tnstax.html>
- United States Census Bureau. *Tennessee State Government Tax Collections: 2000*. Accessed March 9, 2006 at <http://www.census.gov/govs/statetax/0043tnstax.html>
- United States Census Bureau. *Tennessee State Government Tax Collections: 1999*. Accessed March 9, 2006 at <http://www.census.gov/govs/statetax/9943tnstax.html>
- United States Census Bureau. *Tennessee State Government Tax Collections: 1998*. Accessed March 9, 2006 at <http://www.census.gov/govs/statetax/9843tnstax.html>
- United States Census Bureau. *Tennessee State Government Tax Collections: 1997*. Accessed March 9, 2006 at <http://www.census.gov/govs/statetax/9743tnstax.html>
- United States Census Bureau. *Tennessee State Government Tax Collections: 1996*. Accessed March 9, 2006 at <http://www.census.gov/govs/statetax/9643tnstax.html>
- United States Census Bureau. *Tennessee State Government Tax Collections: 1995*. Accessed March 9, 2006 at <http://www.census.gov/govs/statetax/9543tnstax.html>
- United States Census Bureau. *Tennessee State Government Tax Collections: 1994*. Accessed March 9, 2006 at <http://www.census.gov/govs/statetax/9443tnstax.html>
- United States Census Bureau. *Tennessee State Government Tax Collections: 1993*. Accessed March 9, 2006 at <http://www.census.gov/govs/statetax/9343tnstax.html>
- United States Census Bureau. *Tennessee State Government Tax Collections: 1992*. Accessed March 9, 2006 at <http://ftp2.census.gov/govs/statetax/92tax015.txt>
- Vile, John R. & Mark Burns, eds. *Tennessee Government and Politics: Democracy in the Volunteer State*. Nashville, TN: Vanderbilt University Press, 1998.

- Walker, Henry. "The Blame Game: Talk Radio Personalities Played Second Fiddle to a TV Reporter." *The Nashville Scene*, July 19-25, 2001.
- Wallis, John Joseph. "American Government Finance in the Long Run: 1790 to 1990." *Journal of Economic Perspectives*. Vol. 14, Winter 2000, pp. 61 - 82
- White, Fred. "Trade-Off in Growth and Stability in State Taxes," *National Tax Journal*, Vol. 36, March 1983, pp. 103 - 114.
- Wilford, Walton T. "State Tax Stability Criteria and the Revenue-Income Elasticity Coefficient Reconsidered." *National Tax Journal*, Vol. 18, September 1965, pp. 304 - 312.
- Williams, William V., Robert M. Anderson, David O. Froehle & Kay L. Lamb. "The Stability, Growth, and Stabilizing Influence of State Taxes." *National Tax Journal*, Vol. 36, 1973, pp. 267 - 273.
- Wissner, Sheila. "Cutting the Budget: A Simple Answer or Simplistic Folly?" *The Tennessean*, Vol. 97, #301, October 28, 2001, p. 17A.