NBER WORKING PAPER SERIES

THE EFFECT OF FEDERAL TAX DEDUCTIBILITY ON STATE AND LOCAL TAXES AND SPENDING

Martin Feldstein

Gilbert Metcalf

Working Paper No. 1791

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
January 1986

The research reported here is part of the NBER's research program in Taxation and project in Government Budgets. Any opinions expressed are those of the author and not those of the National Bureau of Economic Research.

NBER Working PAper #1791
January 1986

The Effect of Federal Deductibility on State and Local Taxes and Spending

ABSTRACT

This paper examines the effect of federal deductibility of state and local taxes on the fiscal behavior of state and local governments. The primary finding is that deductibility affects the way that state-local governments finance their spending as well as the overall level of spending. More specifically, in states where federal deductibility implies a relatively low cost of using deductible personal taxes (including income, sales and property taxes), there is greater reliance on those taxes and less reliance on business taxes and other revenue sources.

The effect of deductibility on the state-local financial mix implies that deductibility has a much lower cost to the federal government than has previously been assumed. Indeed, if deductibility causes a large enough shift of financing from business taxes to personal taxes, deductibility may actually raise federal tax receipts. The analysis also implies that deductibility is likely to be a more cost-effective way than direct grants for raising the general level of state-local government spending.

The present study uses the individual tax return data in the NBER TAXSIM model to calculate federal tax prices for itemizers and other taxpayers in each state. The econometric analysis recognizes that the federal tax price is endogenous (because it reflects the state-local spending decisions) and therefore uses a consistent instrumental variable procedure. This use of instrumental variable estimation exacerbates the difficulty of making precise estimates from the data. The relatively large standard errors indicate the need for caution in interpreting the point estimates.

Martin Feldstein
NBER
1050 Massachusetts Avenue
Cambridge, MA 02138

Gilbert Metcalf
NBER
1050 Massachusetts Avenue
Cambridge, MA 02138

THE EFFECT OF FEDERAL TAX DEDUCTIBILITY ON STATE AND LOCAL TAXES AND SPENDING

Martin Feldstein*
Gilbert Metcalf*

The deductibility of state and local tax payments in the calculation of federal personal income tax liabilities is one of the key features of the fiscal relation between the federal government and the governments of states and localities. For 1984, deductions for state and local personal taxes directly reduced federal tax revenues by an estimated $30 billion, more than 30 percent of the federal grants to state and local governments.[1] When the Reagan administration proposed to eliminate state and local deductibility as part of its November 1984 tax reform proposal, the state and local governments objected that deductibility is needed to maintain public support for existing spending levels of important state and local activities and that eliminating deductibility would subject taxpayers to unfair double taxation. The Treasury Department agreed that the current deductibility raises state and local spending but argued that this is a tax-induced distortion in the allocation of

---

*Martin Feldstein is the George F. Baker Professor of Economics at Harvard University and President of the National Bureau of Economic Research. Gilbert Metcalf is a graduate student in Economics at Harvard University. We are grateful to Daniel Feenberg for help with the TAXSIM calculation reported in Sections 3 and 4. We have also benefited from comments by participants in the NBER Tax Program and from additional discussions with Robert Inman and Lawrence Summers. This paper is part of the NBER Study of the Government Budget and the Private Economy.

[1]These figures are for the 1984 fiscal year; see Office of Management and Budget (1985).

resources that should be eliminated. The Treasury also asserted that the deductibility provision causes a large loss of federal revenue and is of primary benefit to high income taxpayers.[2]

The sensitivity of state and local taxes and spending to deductibility is therefore a crucial part of the arguments of both the advocates and the critics of deductibility. Unfortunately, very little is known about the quantitative effects of the current tax deductibility rule on the behavior of state and local governments. The purpose of the present paper is to make a first contribution toward remedying that deficiency.

The paper gives particular attention to the possibility that the deductibility of personal tax payments affects the way that state and local governments finance their spending as well as the amount of that spending. Separate equations are estimated for (1) per capita state and local personal income and sales taxes; (2) per capita state and local revenues that are not deductible in the calculation of personal tax liabilities, including corporate taxes, taxes on motor vehicle fuels, license and user fees, etc.; and (3) the level of per capita state and local spending.

The econometric evidence indicates that deductibility has a powerful effect on the extent to which states and localities use deductible personal taxes. The effect of deductibility on the overall level of spending by states and localities is smaller and more uncertain. Thus deductibility causes states and localities to rely more heavily on the deductible personal taxes than on other types of revenue. The estimates suggest that eliminating

---

[2]The Treasury arguments are presented in U.S. Treasury (1984) and Office of the President (1985). For useful summaries of the traditional arguments for and against deductibility, see Bartlett (1985) and Billman and Cunningham (1985).

personal tax deductibility would probably raise federal tax revenue by only a small fraction of the amount predicted by the traditional "static" revenue estimates and might actually reduce it.[3]

The paper begins by discussing the theory of the federal tax price of state and local spending and the implications of itemizer-only deductibility for the sensitivity of taxes and spending to current tax rules. The analysis shows that previous evidence on the price elasticity of demand for state and local services is not relevant to evaluating the likely effects of changes in deductibility. Section 2 then comments briefly on previous research and notes the difficulty of using that research to estimate the likely effect of eliminating or changing the current deductibility rule. The third section discusses our method of using individual tax return data to obtain federal tax prices for each state and presents estimates for 1980. Section 4 considers a problem of statistical endogeneity that occurs if this federal tax price measure is used in ordinary least squares regressions to estimate the response of spending to the federal tax price and suggests a statistical procedure for avoiding this problem.

The fifth section discusses the specification of the tax and spending equations and presents the statistical estimates of the effects of the federal tax price and other variables on state and local taxes and spending. These parameter estimates are then used in section 6 to evaluate the effect of eliminating deductibility on federal tax revenue and in section 7 to discuss the relative efficiency of federal grants and tax deductibility as alternative ways of

---

[3]The analysis in this paper is thus another example of the importance of going beyond the traditional static revenue estimation procedures and incorporating realistic behavioral assumptions in tax policy analysis. For further examples of behavioral simulation methods in tax policy analysis, see Feldstein (1983).

increasing state and local spending. There is then a brief concluding section.

1. The Theory of the Effect of Federal Tax Deductibility on State and Local Taxation and Spending

Before considering the choice process of the state or local community, it is useful to begin by examining how federal tax deductibility affects the preferences of a single individual who itemizes his tax deductions in calculating his federal tax liability. For such an individual, the deductibility of state and local tax payments reduces the cost of an additional dollar of state and local taxes. If individual i is an itemizer with marginal tax rate m_i, the deductibility of state and local taxes means that an additional dollar of state or local tax payment reduces the individual's federal tax liability by m_i dollars. The net cost to the individual of paying one dollar to the state or local government is thus $1 - m_i$.[4] We will call this the federal tax price of state and local taxes for individual i. Since the average marginal tax rate for itemizers is 27 percent, the average federal tax price among itemizers is 0.73, a substantial reduction in the price of state and local tax revenue.[5] Of course, a non-itemizer's federal tax liability is unaffected by his payments of state and local taxes; his federal tax price is therefore 1.

A lower federal tax price for state and local personal taxes increases the individual's preferred level of state and local spending. It also causes the individual to prefer to finance those services with greater reliance on

---

[4]This ignores the fact that local and federal taxes are deductible in calculating taxable income under some state income tax rules.

[5]The 27 percent is a weighted average marginal tax rate, weighted by the amount of state and local taxes deducted. Thus federal revenue is directly reduced by 27 percent of total personal deductions of state and local taxes.

deductible personal taxes rather than personal user charges (which are not deductible) or corporate taxes and fees (which could reduce wages or cause corporations to leave the state or locality). To the extent that the net costs to the individual of the different sources of state and local finance are initially perceived to be approximately equal, a change in the federal tax price for a state or locality could cause a substantial substitution of one type of finance for another without any significant change in the perceived cost of funds and therefore without any significant change in the desired level of spending. This combination of a sensitive composition of finance and an insensitive level of spending is characteristic of the evidence presented below.

The measurement and interpretation of the federal tax price of personal tax revenue becomes more complicated when we shift attention from the preferences of a representative itemizer to the decision of the community as a whole. If a proportion p of individuals itemize, the average federal tax price is $1 - p + p(1-m) = 1 - pm$. Since only about 30 percent of taxpayers itemize their tax deductions, the average federal tax price is about $1 - .3(0.27) = .92$. The average price reduction is clearly much smaller than the price reduction for itemizers.

Which of these two prices -- the average tax price or the tax price of itemizers -- is relevant for local government decisions? There is, unfortunately, no agreement among specialists in state and local public finance about the relation between local government fiscal decisions and the preferences of the individual voters in the constituency.[6]

---

[6]For surveys of the empirical evidence on this issue, see Inman (1979) and Rubinfeld (1986).

The simplest model of this relation is the median voter model, first proposed by Hotelling (1929) and developed by Bowen (1943), according to which voters are ordered by their desired level of spending and the preference of the median voter is decisive. This model has very important implications in the current context. As a general rule, subject to one exception discussed below, the median voter model implies that federal tax deductibility affects local government taxes and spending only if the median voter is an itemizer. How likely is that?

Consider this question first in the context of choosing the level of spending with the sources of finance fixed. Will the median voter in this context be an itemizer? The position of itemizers in the spectrum of demands depends on the nature of individual preferences and on the relation between income and the individuals' price of local public services (i.e., the individual's state-local tax cost, net of federal deductibility, per dollar of spending). In the standard empirical median-voter model,[7] individuals' demands for local public services increase with income and decrease with price, and the price is itself negatively related to income because federal deductibility outweighs the limited progressivity of state-local tax systems. In this situation, the individuals who itemize will generally have the highest demand for local public services. Since only about 30 percent of all taxpayers itemize, the itemizers' demands will all be greater than the demand of the median voter in every state and in large local jurisdictions. If

---

[7]See Borcherding and Deacon (1962) and Bergstrom and Goodman (1973) for analyses based on this type of specification.

eliminating deductibility would still leave the demands of the former itemizers above that of the former non-itemizers, a change in federal tax deductibility would have no effect on state and local spending.

This very simplified median voter model is likely to underestimate the influence of the taxpayers who itemize. One reason is that an itemizer may be the median voter even if itemizers prefer higher spending than non-itemizers and are only about one-third of all taxpayers. This could happen simply because high income individuals are more likely to vote than lower income individuals. The number of voters per tax return is also likely to be greater for itemizers than for non-itemizers. Probably the best direct evidence on this issue is reported by Ladd (1984) who notes that survey information for Massachusetts indicates that more than half of those who actually vote in most jurisdictions are itemizers. Among 58 cities and towns in the Massachusetts analysis, itemizers were the majority of voters in all but 16.

But even if itemizers are a minority of voters, changes in the assumptions about state-local tax progressivity or about individual preferences could also make an itemizer the median voter. A more progressive state-local tax system could make the price of local services increase with income, causing high income itemizers to be in the middle of the demand spectrum. Alternatively, if individual demand for local public services does not increase monotonically with income, perhaps because high income individuals are more likely to prefer private education or private recreation facilities, the median demand for local spending might be that of a high income itemizer. In either case, eliminating federal tax deductibility would raise the tax price of the median voter and reduce his demand for local

spending.

These comments suggest three different cases in which community demand for state-local services might adjust to the elimination of deductibility within the framework of the median voter model. First if the original median voter is an itemizer and that individual remains the median voter, his preferences are decisive. The elimination of deductibility would reduce the level of state-local spending by an amount that reflects the increase in his federal tax price (from 1-m to 1) and his personal price elasticity of demand for state-local services. In the second case, the rise in the price might cause the demand level of the original median voter and of other itemizers to drop below the level of previous non-itemizers, causing a non-itemizer to become the median voter. In that case, the decisive level of demand would also decline but by less than the fall in demand of the original median voter. And, third, if the demand of itemizers is initially above the median level, eliminating deductibility could cause a previous itemizer to become the median voter or could cause the demand of some or all itemizers to drop below the median level. In this case also the aggregate level of demand would decline but by proportionately less than the demand of the typical itemizer.[8]

It is interesting to examine the quantitative implications for the responsiveness of government spending to the federal tax price in the first case in which an itemizer is initially the median voter and remains the median voter when deductibility is eliminated. We shall assume that all spending is financed by personal taxes. Consider a state in which 40 percent of voters

---

[8]Note that in this case eliminating deductibility may decrease spending even though the median voter is not an itemizer either initially or after the change in deductibility.

itemize and in which the average marginal tax rate of itemizers is 30 percent. The average tax price of itemizers is therefore 0.7. Since the tax price is 1.0 for the 60 percent of individuals who do not itemize, the average tax price in the state is 0.4(0.7) + 0.6(1.0) = 0.88. Eliminating tax deductibility would raise the price for itemizers from 0.7 to 1.0, an increase of 43 percent. If the individuals' demand elasticity for public spending is E, the elimination of federal deductibility would reduce the demand for local public spending to only $(0.7)^E$ times what it is with deductibility. For example, even with a quite modest individual demand elasticity (E = 0.5), the individual demand falls to a fraction $(0.7)^{.5}$ = 0.84 of its current value.[9] With a unit elasticity of demand, eliminating deductibility would reduce the demand of itemizers by 30 percent.

Of course, the median voter cannot be observed. If deductibility were eliminated, we would see only that the mean value of the federal tax price increased from 0.88 to 1.00, an increase of 14 percent. If an itemizer is and remains the median voter with a demand elasticity of 0.5 and a tax price of 0.7, demand would fall by $100(1-.7^{.5})$ = 16 percent. The observation of a 16 percent fall in demand when the price increases by 14 percent implies an aggregate price elasticity of approximately 1.4.[10] Similarly, if the individual price elasticity of the median voter is 1.0, the demand would fall by 30 percent, implying an aggregate price elasticity of nearly 3.

---

[9]See, Inman (1979) and Rubinfeld (1986) for surveys of the estimated price elasticities of demand for local public services. Inman (1979) reports that most estimated demand elasticities for local government services are between 0.1 and 0.7. The problems of interpreting these estimates are discussed in Section 2.

[10]More generally if the if the proportion of itemizers is p and the median voter is an itemizer with marginal tax rate t and demand elasticity E, the implied elasticity of aggregate demand with respect to the average tax price is $E^* = E \ln (1-t)/\ln [1 - p + p (1-t)]$.

In short, if an itemizer is the median voter and remains the median voter, a quite modest individual price elasticity would cause a relatively large aggregate price elasticity. More generally, however, if eliminating deductibility would change the identity of the median voter (i.e., the second and third cases described above), the aggregate price elasticity might be smaller or larger than the price elasticity of the typical individual. It is clear from these comments that, even in the context of the median voter model with all spending financed by deductible personal taxes, it is wrong to use the previously estimated price elasticities of demand to evaluate the likely impact of changing the federal tax deductibility of state and local taxes.[11]

It is important to emphasize that this analysis of the impact of deductibility on spending has assumed that all state and local spending is financed exclusively be personal tax payments. In fact, no state relies exclusively on personal taxes to finance state and local spending. On average, the personal income, sales and property taxes account for about two-thirds of total state and local revenue exclusive of grants from the federal government. The remainder includes corporate income taxes, user fees, license fees, gift and estate taxes, selective excise taxes and other sources of revenue that are not eligible for the personal income tax deduction.

The median voter model has important implications about the reliance on personal taxes to finance state and local spending. Even if itemizers are a minority of taxpayers, their higher propensity to vote may make them a majority of voters. In addition, the structure of state and local taxes

---

[11]Several studies have done just that. These include Ladd (1984), Noto and Zimmerman (1984) and the Congressinal Research Service study prepared for the Senate Committee on Government Operations by Noto and Zimmerman (1983).

(e.g., the progressivity of the personal tax or the range of goods taxed by the sales tax) will determine whether itemizers at different income levels would prefer the state and local governments to substitute other types of finance for personal taxes. In short, there is a wide range of situations in which the decisive voter on the share of total revenue to be raised from personal taxes will be an itemizer.

In general, deductibility will increase the extent to which state and local governments choose to rely on personal taxes. More generally, a lower federal tax price of such state-local personal taxes will increase their relative importance in the financing of state and local outlays. The evidence presented below indicates that the mix of personal and other taxes is quite sensitive to the federal tax price of state-local personal taxes.

This effect of the federal tax price on the mix of state and local financing is not only important in itself but also has implications for the effect of deductibility on the level of state and local spending. As we already noted above in discussing the financing preferences of an individual itemizer, the ability to substitute alternative sources of state-local revenue for the personal tax reduces the impact of deductibility on the net individual cost of state-local spending. This implies that the effect on state-local spending of changes in deductibility will be less than would be implied by the corresponding change in the federal tax price of personal tax revenue.

But even within the median voter model, it is impossible to know from a priori considerations alone how changes in deductibility that affect the chosen mix of financing will alter the resulting level of state-local spending. What matters in the median voter model is how the change in

financing affects the price perceived by the individual who is the median voter with respect to the spending decision.[12] It is even possible that eliminating deductibility could reduce the cost of local government spending for this median voter. For example, if the median voter is and remains a nonitemizer and elimination of deductibility causes a shift from the personal tax to the corporate tax, the cost of state-local spending for the median voter might fall. In this case, eliminating deductibility would actually cause state-local government spending to increase.

We have focused on the implications of the median voter model because of its analytic attractiveness and its place in the theory of local public finance. But although the model is analytically attractive, it is clearly not rich enough to deal with a variety of aspects of actual state and local spending and tax issues. In general, the local government must make a variety of interrelated but separate tax and spending decisions. An important feature of such decision-making may be log-rolling, coalition formation and the development of stable political parties in which different voter subgroups support each others' preferred projects and compromise on a package of tax sources. In addition, a number of studies have pointed to the bureaucracy and to the politically elected officials as independent sources of influence on budgetary choices. And, finally, the process of majority choice may induce migration among jurisdictions that changes the composition of each area's voting group and therefore the outcome of the voting process.[13] The

---

[12]This analysis simplifies by separating the decisions on financing and spending. If the two are taken together, it is even more difficult to know how to identify the decisive voter and the conclusions are more ambiguous.

[13]For a discussion of these issues, see Inman (1979, 1986).

implications of the median voter model must therefore be regarded as only suggestive of the potential effects of federal tax deductibility and of variations in the tax price of state-local spending.

These brief comments have three clear implications. First, it is important to recognize that deductibility is likely to affect the mix of revenue sources for state and local governments as well as the level of spending. Second, changes in the mix of revenue sources can greatly attenuate (or even reverse) the effect of deductibility on the net cost to the local taxpayer of providing state and local services and therefore on the demand for state and local services. Third, the median voter model (and presumably other formal models as well) implies that the aggregate elasticity of demand for local services may be very different from the underlying individual demand elasticities. In some cases, where the median voter is decisive and is not an itemizer, the aggregate demand elasticity may be zero regardless of the demand elasticities of the individual voters. But the analysis also shows that the aggregate demand elasticity may be substantially larger than the demand elasticity of the individual voter. From these three considerations, it is clear that it is not possible on the basis of either theory or previous research on state-local demand elasticities to evaluate the likely effects of changes in deductibility on the mix of financing and the level of spending. But before turning to our own research, we review briefly the previous research on the demand elasticity of state and local government spending as well as some more recent research on the effects of federal tax deductibility.

2. Previous Research on the Price Elasticity of Demand for Public Services and on the Effects of Federal Tax Deductibility

Most previous research on the price elasticity of demand for state and local public services has been based on interjurisdictional differences in the costs of buying public services that arise because of intergovernmental matching programs or interjurisdictional differences in the costs of producing public services.[14] It is important to emphasize that these sources of differences in the costs of public services affect all taxpayers equally. As a result, they provide little information about the likely impact of a change in the federal tax price that would affect only those taxpayers who itemize in calculating their federal income tax liability or that would alter the mix of financing.

More specifically, the existing estimates of the price elasticities of local government spending based on intergovernmental matching grants are, at best, an approximation of the underlying price elasticities of demand of individual voters. Even this interpretation is subject to several difficulties. Many matching grants combine elements of block grant and pure open-ended matching grant, making it difficult to separate income and price effects. Moreover, most statistical studies of the effect of pure block grants indicate a more powerful impact than would be implied by the corresponding income effect; this is the so-called "flypaper effect"[15] that

---

[14]Inman (1986) summarizes a large selection of research on this type of analysis. Inman (1979) reports that most estimated demand elasticities are between 0.1 and 0.7.

[15]The term comes from Gramlich and Galper (1973).

causes block grants to local governments or particular agencies to raise their spending by much more than an equal increase in the income of the jurisdiction's residents. Estimates of the impact of the price changes induced by matching grants are therefore likely to be a combination of a true price effect and a flypaper effect. Since the change in the federal tax price affects the cost to individual taxpayers but not the revenue to the local government, there would be no corresponding flypaper effect.

Price elasticities estimated on the basis of interjurisdiction differences in the costs of producing public services are subject to a quite different bias that makes them unreliable as a basis for estimating the likely effect of changes in deductibility. Differences in wages and salaries are the most important reason for interjurisdiction differences in the cost of providing services. If these wage differences were a truly exogenous measure of the supply price of labor input of a fixed quality, they would provide a useful basis for estimating the price sensitivity of local government spending to changes in the cost of services to all voters. In practice, however, the observed wage differences are likely to be endogenous and, in large part, to reflect local choices of the quality of personnel. The result of this is to bias the price elasticity toward zero or even to produce estimated price elasticities that have the wrong sign. For example, a town that has a strong preference for education (i.e, a positive stochastic disturbance in the equation describing educational spending) is likely to choose not only a larger quantity of teachers but also a higher level of teachers' salaries in order to attract higher quality teachers. In this situation, if the level of teachers' salaries is used as a price variable in a demand equation, the

estimated coefficient may well have the wrong sign.

Robert Inman (1985) has provided the only explicit econometric study of the effect of the federal deductibility of local taxes. His study examined the experience of 41 large cities during the years 1960 to 1980 and estimated the price elasticities of local spending and tax revenue with respect to an estimate of the local average federal tax price. The resulting parameter estimates are puzzling, with signs on the key tax price variables that are the opposite of what would be expected. For example, Inman finds that a higher tax price for property taxes reduces the use of income and sales taxes and that a higher tax price for income and sales taxes reduces the use of the property tax. It seems likely that these surprising results reflect two serious problems in Inman's procedure.

First, the basic data needed to estimate the federal tax prices (i.e., the actual federal marginal tax rates and itemizer status for individuals in these cities) is not available. Inman's solution to this serious problem is to combine the Census Bureau estimates of the income level at the 25th, 50th and 75th percentile points of each city's income distribution with the tax rate at that income level and the national proportion of itemizers to create an estimated tax price. Although this method is probably the best that could be done to estimate tax prices at the city level, the result is clearly a very imperfect measure. There is no information on high income individuals who make up the bulk of the itemizers and therefore no information on the average tax rate of itemizers. Imputing a probability of itemization on the basis of national totals ignores the likelihood that middle and upper-middle income individuals are probably less likely to itemize if they are urban renters than

if they are homeowners and that home-ownership and other factors affecting itemization may vary significantly among cities.

The second problem with Inman's procedure is that it focuses on city budgets when the division of spending responsibilities and of tax bases between city and state levels of government vary enormously among the 50 states. In some states, the cities have a great deal of autonomy in setting taxes and are responsible for spending on a wide range of programs. In other states, the state government restricts the taxing authority of the cities, assumes financial responsibility for most types of government services, and influences local activity by regulations and matching grants. In Massachusetts, for example, cities are precluded from using income or sales taxes and are subject to a maximum rate on their local property tax; the state shares its tax revenue with the cities through block grants and educational matching grants and assumes full responsibility for general welfare. Arrangements such as these, which obviously influence taxes and spending at the city level, must be taken into account in specifying the city tax and spending equations in order to obtain unbiased estimates of the price elasticities of demand. Although Inman has great expertise about these provisions and uses the available data skillfully, the interstate differences in state-local institutional arrangements are just too complex to be modelled adequately in Inman's econometric equations. The inability to incorporate these institutional arrangements into the estimating structure makes it very difficult to interpret the estimated price elasticity of demand and the implied estimates of the effect of eliminating federal tax deductibility.

A second recent study by Hettich and Winer (1984) attempts to assess how

federal deductibility and other variables affect the share of state taxes derived from the personal income tax. Although the authors provide an interesting analysis of local tax decisions as the outcome of choices by public decision makers subject to political constraints, their empirical work has three severe limitations. First, the role of deductibility is measured very crudely by the percentage of taxpayers in the state with incomes greater than $20,000. There is no information on itemization and no assessment of the marginal tax rates. The estimated coefficient of this variable is statistically insignificant and has the wrong sign. Second, the analysis refers to the share of personal income taxes in the state's tax revenue rather than to the share of income, property and sales taxes, all of which are deductible. A larger number of high income individuals may encourage concentration on the income tax rather than the property or sales tax but this says nothing about the effect of deductibility on the use of the eligible set of taxes. Third, the focus is on the state rather than the combined state-local fiscal decision. Since states differ in the division of the tax base between the state level and the localities, an analysis of the state's relative use of one type of tax base may be misleading. Finally, the authors include state expenditure per capita among the regressors. This is a potential source of very substantial simultaneous equations bias affecting all of the coefficients. More generally, it is not clear why the spending level should be taken as logically prior to the composition of taxes. A better specification with the cross-section sample would be simultaneous choice, with neither taxes nor spending among the regressors. With all of these problems, it is not surprising that the estimated effect of deductibility on the

composition of the tax revenue is estimated to be insignificant and of the wrong sign.

The only other study that we know that deals empirically with the effect of deductibility on the state-local tax structure is the work of Zimmerman (1983). He elaborates a median voter model and then concludes, on the basis of his statistical evidence, that federal deductibility has no statistically significant effect on the ratio of the state-local taxes paid by the median income family to the average over all families of the state-local taxes paid in the state. There are a number of problems with the specification that make it difficult to interpret this finding. Zimmerman includes the average public sector wage and the level of state-local spending among the regressors although both would probably be very endogenous. In addition, the federal tax price variable is calculated only for the median voter, who Zimmerman arbitrarily assumes is the same as the median income family. If the actual decision process gives weight to others as well, the tax price of the median voter may be too restrictive a specification. In particular, the empirical analysis makes no allowance for the effect of differences in the relative frequency of itemizers among states. The absence of this source of variation in the average tax price may explain why his federal deductibility variable "apparently does not possess sufficient variation ... to make it a significant determinant."

We have concluded that because of the shortcomings of previous estimates of the price elasticity and because of the special problems of analyzing a policy change that affects only itemizers, there are currently no useful estimates upon which to base an analysis of the likely effects of changes in

the federal deductibility of state and local taxes.

3. Using Federal Tax Prices Based on Individual Tax Return Data to Estimate Tax and Spending Behavior of State-Local Governments

In the present paper, we use observations for a cross-section of states to estimate the effect of the federal tax price on the combined total of state and local personal taxation in each state as well as on aggregate state and local spending in the state. By combining state and local levels in this way, we avoid the problem of institutional differences in the assignment of spending and tax responsibilities. In effect, our specification treats the assignment of such responsibilities as an endogenous behavior that is influenced by such variables as the federal tax price and the distribution of income. Our estimates are therefore in the nature of reduced form equations relating spending and taxes within each state, (including both the state and local levels of government within the state) to the price, income, demographic and environmental variables that characterize the state.

The statistical analysis presented below relates to three state-local fiscal variables: (1) the combined state and local revenue from personal deductible taxes including income taxes, sales taxes and property taxes; (2) all other state and local revenue, including corporate income taxes, severance taxes, license fees, special excise taxes that are not deductible on personal tax returns, and gift and estate taxes; and (3) the spending financed from state-local resources. The third variable is thus the sum of the first two. Specifically excluded is all forms of federal aid.

The state and local revenue from personal taxes averaged $813 per capita

with a standard deviation of $198. This represented an average of 8.9 percent of personal income with a standard deviation of 1.4 percent. The remaining state and local revenue averaged $441 per capita with a standard deviation of $488. This corresponds to an average of 4.6 percent of personal income with a standard deviation of 3.8 percent. Finally, total spending financed by own revenue is the sum of these two revenue sources, $1254 per capita or 13.4 percent of income. The standard deviation of total spending is $595 or 4.1 percent when calculated as a percent of income. The per capita levels and income shares for the three fiscal variables are presented in Tables A-4 and A-5 of the appendix.

The key federal tax price variable for each state is calculated using individual federal income tax returns. More specifically, the federal tax price data are generated by the National Bureau of Economic Research TAXSIM model with data for 1980. The TAXSIM model incorporates 21,787 individual tax returns provided by the Internal Revenue Service and a computer program that can calculate each taxpayers liability under existing and alternative tax laws. The 21,784 tax returns are a one-in-eight random sample of the stratified random sample of all returns for 1979 provided by the Internal Revenue Service adjusted to 1980 income levels. Since sample weights and state identifiers are provided, this sample can be used to estimate average characteristics of the taxpayers of each state. This use of individual tax returns is a unique advantage of the current data over previous studies that had to use various measures of aggregated data or representative individuals to estimate tax rates for each state (e.g., Inman (1985) and Phares (1980)).

For each individual, the federal tax price is defined as 1 if the

individual is a non-itemizer and as one minus the decrease in federal tax liability per dollar increase in itemized deductions for an individual who itemizes. In general, the tax price for an itemizer is one minus the individual's marginal tax rate but the calculation is more complex for individuals who are income averagers, subject to the alternative minimum tax, or in other special situations. The TAXSIM program calculates the correct federal tax price by increasing the individual's itemized deductions by $100, recomputing the individual's tax liability, and dividing the difference in tax liability by $100.

Table A-1 of the appendix shows the federal tax price for each state, the proportion of taxpayers who itemize and the federal tax price for those itemizers. The average value of the federal tax price is 0.92, implying that federal tax deductibility reduces the cost of state and local spending by an average of 8 percent. The federal tax price ranges from a low of 0.87 in Alaska to a high of .96 in South Dakota with a standard deviation of 0.02. Much of the variation in the federal tax price reflects interstate differences in the proportion of itemizers. Column 2 shows that this varies from a low of 14 percent in South Dakota to a high of 44 percent in Michigan with a standard deviation of 6.6. The average federal tax price among itemizers varies from a low of 0.65 in Alaska to a high of 0.78 in Montana with a standard deviation of 0.02.

The econometric estimates relate each of the three fiscal measures to the federal tax price, to per capita income and to several other economic and demographic characteristics of the state. Two alternative specifications are examined. In the income share equations, the dependent variable is the ratio

of each fiscal variable to average personal income in the state and the price variable is the average federal tax price in the state. In the constant price elasticity equations, the dependent variable is the logarithm of the per capita value of the fiscal variable (e.g., the logarithm of per capita state-local personal taxes) and the price variable is the logarithm of the federal tax price.

The income variable used in these analyses is the Census definition of average per capita personal money income. It is worth noting that there is no problem of potential collinearity and underidentification of the type that arises when a marginal tax rate variable and an income variable for each individual derived from tax return data are included in a microeconometric demand equation because in the current specification the income variable is a broader measure of money income and, more importantly, because the federal tax price variable includes the marginal tax rate only for itemizers. The correlation between the income variable and the federal tax variable is only -0.53.

Most of the other variables included in the estimation equations are the familiar explanatory variables of previous studies of state and local spending. These include the number of pupils per capita, the road mileage per capita, and the proportions of the population who are aged, in poverty, homeowners, living in urban areas, married and nonwhite.[16] In addition to these variables, we have also used the NBER TAXSIM model to derive several measures of the distribution of income in each state: the variance and skewedness of the income

---

[16]Sources of these variables are listed in Appendix A-3.

distribution; the average ratio of dividends to adjusted gross income; the average ratio of capital gains to adjusted gross income; and the percentages of taxpayers with adjusted gross incomes in the ranges $7500 to $15,000; $15,000 to $25,000; $25,000 to $35,000; $35,000 to $50,000; and over $50,000.

In addition to the average federal tax price for the state, we have also estimated equations with the tax price for itemizers, with the proportion of taxpayers who itemize, and with various combinations of these variables. This allows us to compare a pure median voter model (in which the median voter is an average itemizer) with the more general specification in which the relative number of itemizers is also important.

4. A Problem of Statistical Endogeneity

There is however a serious problem in using any of these federal tax price variables to estimate the effect of federal tax deductibility on the level of state and local personal taxes. To understand the nature of this problem, consider a simplified specification of the basic equation that we have estimated. If T_i is the per capita level of state and local personal taxes in state i, P_i is the federal tax price in state i, and Y_i is the level of per capita income, a constant elasticity specification is given by:

$$(1) \qquad \ln T_i = a_0 + a_1 \ln P_i + a_2 \ln Y_i + u_i,$$

where u_i is a stochastic disturbance that reflects tastes and other unobserved factors influencing the level of state and local taxation in state i.

Ordinary least squares estimation gives unbiased parameter estimates only

if the stochastic disturbances are statistically independent of the price and income variables. Consider what happens if the individuals in state i have a greater than normal preference for relying on personal taxes to finance state and local services. A higher level of state and local personal tax revenue per capita raises the typical individual's potential itemized deductions and makes it more likely that individuals in that state will find it optimal to itemize their federal tax return. This has the effect of lowering the federal tax price for that state. Thus, to the extent that a positive taste for financing state and local services by personal taxes reduces the federal tax price, it induces a negative correlation between the price variable and the unobservable stochastic disturbance. In short, the price variable is endogenous and standard econometric theory tells us that the estimated price elasticity (a_1 in equation (1)) will be biased in a negative direction; i.e., the negative price elasticity will be overstated in magnitude.

The reason for this statistical bias is easy to see. Consider what would be observed if state and local governments were not at all sensitive to the federal tax prices of their residents when deciding how much to spend and how to finance that spending. Since an above average taste for state and local services financed by personal taxes would lead to increased itemization and therefore a lower federal tax price, there would still be a negative relationship between personal taxes and the federal tax price. The statistical estimation procedure would interpret this negative relation incorrectly as a measure of the sensitivity of state and local personal taxes to the federal tax price even though, in this case, there is no behavioral

relation between the federal tax price and the level of state and local personal taxes. More generally, when a lower federal tax price does increase the chosen level of state and local personal taxation, the simultaneous effect of state and local taxation on the federal tax price will lead to an exaggerated estimate of the effect of the federal tax price on the tax and spending decisions of state and local governments.

Even when we look only at itemizers, there is a relationship between the unobservable disturbance and the federal tax price. A positive disturbance raises per capita state and local personal taxes, thereby increasing the itemized deduction of those who itemize and tending to move them into lower federal marginal tax rate brackets. For an itemizer, a lower marginal tax rate means a higher federal tax price. Thus, for itemizers, an above average taste for state and local services raises the federal tax price and tends to diminish the absolute magnitude of the estimated price elasticity.

Since the statistical bias that operates through the increased probability of itemizing is in the opposite direction of the effect through the marginal tax rate of itemizers, the sign of the bias cannot be determined a priori. However, since the variability and importance of itemization is substantially greater than the variability of the marginal tax rate of itemizers, it seems likely that the itemization bias will dominate. The evidence presented below indicates that this is so, causing the estimated coefficient to be biased toward a more negative (absolutely larger) value.

Although ordinary least squares estimation results in a statistically biased estimate of the effect of the federal tax price variable, a consistent and asymptotically unbiased estimate can be obtained by using an instrumental

variable procedure with an appropriate instrument for the federal tax price variable. An appropriate instrumental variable is any variable that is uncorrelated with the stochastic disturbance term (u_i) but correlated with the exogenous component of the federal tax price variable.

We have used the TAXSIM sample of individual tax returns to construct a set of instrumental variables that are correlated with the exogenous component of the federal tax price and, as far as possible, uncorrelated with the unobserved stochastic "taste" disturbance term. To compute the first such instrumental variable, we begin by excluding the deduction for state and local taxes from all itemized tax returns. We then calculate the marginal tax rate for each tax return, including both itemizers and non-itemizers. Next we assign to each tax return a probability of being an itemizer based only on the adjusted gross income (AGI) class of the return and the national proportion of taxpayers in that AGI class who itemize.[17] An average marginal tax rate is then calculated for each state with each tax return for that state weighted by that return's probability of itemizing as well as by a weight that correctly adjusts for the stratified random sample. This itemization-weighted marginal tax rate is subtracted from 1 to form a type of tax price variable. For an individual who itemizes his deductions, this procedure corresponds to calculating the tax price associated with the first dollar of state and local tax deduction; we will therefore refer to this as a first dollar tax price instrument. Note that this variable reflects the marginal tax rates of all taxpayers and not just of those who itemize. Because the synthetic

---

[17]For this purpose, we use 8 AGI classes.

probability of itemization is used, the variable is not sensitive to the actual rate of itemization in the state.

It might of course be objected that there is still some possible endogeneity in this instrumental variable, i.e., some correlation between the instrument and the taste disturbance in the behavioral equation. The first dollar marginal tax rate reflects the level and distribution of income and of such demographic variables as the proportion of aged persons in the population, the number of children , the relative number of homeowners, etc. Since these variables also potentially affect the demand for local services and, arguably at least, the reliance on personal taxes, the instrumental variable would be correlated with the disturbance in the equation. To reduce or eliminate this problem, these variables are explicitly included among the regressors in the specification of the equation.

The second instrumental variable is similar to the first in all respects except that, instead of replacing each itemizer's state and local tax deduction with zero, we replace it with the national average state and local deduction for individuals in that adjusted gross income class. We refer to this as the average dollar tax-price instrumental variable.

Our third instrumental variable is the proportion of taxpayers in the state who would be expected to itemize if each taxpayer's probability of itemizing was equal to the national average for his adjusted gross income class. This is clearly uncorrelated with the taste factors peculiar to each state and depends only on a particular nonlinear configuration of the state's distribution of adjusted gross income. Since several variables representing the size distribution of money income are explicitly included among the

regressors in the equations presented in the next section, the disturbance term can reasonably be presumed to be free of the effects of income distribution that are the basis of this instrumental variable. More generally, this instrumental variable gets its identifying power from the difference between AGI and money income and from the particular nonlinear relation between AGI and itemization. Two further instrumental variables have been constructed. The first of these is the average first-dollar tax-price among itemizers only and the second is the average-dollar tax-price among itemizers.

In summary, the instrumental variables, unlike the tax price variable itself, do not directly reflect the proportion of individuals in each state who itemize or the deductions for state and local taxes within that state. They are correlated with the federal tax price variable for each state to the extent that that variable reflects the distribution of taxable income and other characteristics of the taxpayers in the population.

Columns 1 through 3 of Table A-2 show the three instrumental variables: the average-dollar tax price, the synthetic proportion of itemizers, and the average dollar tax price for itemizers.

5. The Statistical Estimates

The estimated coefficients of the tax-price variable corresponding to different dependent variables and different specifications are presented in Table 1. The first three columns refer to the ratio specifications in which the dependent variable is expressed as a fraction of personal income, e.g., personal taxes per dollar of taxable income. The last two columns refer to the

logarithmic constant elasticity specification. The coefficients of the other variables in each equations are presented in Appendix Table A-6 and A-7. These estimates are based on data for the 48 contiguous states.

Consider first the coefficients of the tax price variable in the equation in which the dependent variable is personal taxes per dollar of personal income. When all of the potential explanatory variables described in section 3 are included in the specification and the equation is estimated by ordinary least squares, the estimated coefficient of the tax-price variable is -0.43 with a standard error of 0.14. This is shown in the first column and first row of table 1.

Before looking at any of the other estimated coefficients, it is interesting to calculate the elasticity of personal taxes with respect to the federal tax price that corresponds to this coefficient. Since the mean value of the tax price variable for the 48 contiguous states is 0.92 and the mean value of personal taxes per dollar of personal income is 0.087, the elasticity at these mean values is -4.55; this figure is shown in square brackets beneath the standard error of the coefficient. Although -4.55 seems like a very high elasticity, it is important to stress that it is not an elasticity of demand for state and local services but for tax-deductible personal taxes used to finance state and local spending. It is also helpful to recall that in a median voter model (with realistic values of the tax parameters) the aggregate price elasticity is approximately three times the elasticity of the individual median voter.[18]

---

[18]See pages 8 and 9 above, especially footnote 2 of page 9.

Table 1

The Effects of Federal Deductibility on State and Local Taxes and Spending

Dependent Variable	Ratio Specification: All Variables OLS (1)	Ratio Specification: All Variables IV (2)	Ratio Specification: Restricted Variables IV (3)	Logarithmic Specification: All Variables IV (4)	Logarithmic Specification: Restricted Variables IV (5)
Personal Taxes	-0.43 (0.14) [-4.55]	-0.33 (0.21) [-3.49]	-0.15 (0.13) [-1.59]	-2.36 (2.47)	-1.71 (1.43)
Other State-Local Revenue	0.10 (0.19) [2.19]	0.18 (0.28) [3.94]	0.17 (0.15) [3.72]	3.24 (7.32)	2.15 (3.70)
Net State-Local Spending	-0.34 (0.23) [-2.44]	-0.15 (0.34) [-1.08]	0.02 (0.18) [0.14]	-0.15 (-2.74)	-0.08 (1.35)

All coefficients are of the tax price variable; see text for description of other variables and Appendix Tables A-6 and A-7 for their coefficients; standard errors are shown in parentheses. For the ratio specification, the elasticities at the mean values are shown in square brackets.

When the same specification is estimated by an instrumental variable procedure using the instrumental variables described in the previous section, the coefficient increases from -0.43 to -0.33 with a standard error of 0.21. This IV estimate is shown in the second column of Table 1. The rise in the value of the coefficient reflects the OLS bias discussed in the previous section. It implies that the positive correlation between a taste for personal tax financed spending by state and local governments and the resulting higher level of itemization outweighs the negative correlation between the taste for personal tax financed spending by state and local governments and the resulting lower level of the marginal tax rate of itemizers.

The implied size of the OLS bias, about one-third of the consistently estimated coefficient, is large enough to warrant the use of the instrumental variable estimates even though they produce large standard errors. Despite the decrease in absolute value, the IV estimate of the coefficient of the tax price variable implies that the elasticity of personal taxes with respect to the tax price is a very substantial -3.49.

The specification in columns 1 and 2 includes all 19 variables described in section 3, including 9 variables that describe the distribution and composition of income. Since there are only 48 observations, the coefficients of most of these 19 regressors are smaller than their standard errors. In general, the variables for which the coefficient is at least 1.5 times its standard error are the number of pupils per capita, the percentage of the population in the state living in urban areas, the percentage of the population that are aged, and the percentage of the population that own their own homes. Restricting the regressors to these four variables in addition to per capita income and

the federal tax price, yields the tax price coefficients presented in columns 3 and 5.

In the ratio specification, the tax price coefficient declines to -0.15 with a standard error of 0.13. The implied elasticity of -1.59 is very similar to the constant elasticity of -1.71 estimated with the logarithmic specification and presented in column 5. Restriciting the number of regressors generally has the advantage of reducing the standard errors of the remaining coefficients, something which is particularly useful in the context of instrumental variable estimation, but also adds to the risk that the coefficient estimates are biased. Although we believe that the complete specification is preferable, we present both types of estimates.[19]

Return now to column 2 and the instrumental variable estimates for the specification with all variables included. To assess the importance of the tax price coefficient, recall that the average value of the tax price variable is 0.92 and that, on average, the ratio of personal taxes to personal income is 0.087. The coefficient of the tax price variable in the equation for personal taxes implies that increasing the federal tax price to 1.0 (i.e. eliminating deductibility) would reduce the ratio of personal taxes to personal income by 0.08 x 0.33 = 0.026, or about 30 percent of the existing state and local personal taxes.

The coefficient of the tax price variable in the equation for all other state and local revenue (excluding grants from the federal government) is a positive 0.18. This implies that eliminating deductibility would cause state

---

[19]On the question of whether or not to exclude variables in order to reduce the mean square error of the coefficient of interest, see Madalla (1977, Chapter 10) and Feldstein (1973).

and local governments to change other tax rules in a way that increased revenue from these sources as a proportion of personal income by 0.18 x 0.08 = 0.014. This is enough to offset slightly more than half of the revenue that is foregone because of the induced changes in personal taxes implied by the coefficient -0.33.

Unfortunately, the large standard error makes it difficult to have confidence in the precise estimate of this tax substitution. It is somewhat reassuring therefore that the specification with the restricted set of explanatory variables results in an estimated taxprice coefficient of 0.17 with a standard error of 0.15, a coefficient that is almost identical to the 0.18 obtained for the full set of regressors. Some support can be also taken from the fact that the implied elasticity at the means (3.94) is very similar in magnitude to the constant elasticity estimated in the logarithmic specification (3.24), although the standard error of that estimate is also very large.

Since the net public spending financed by state and local resources is equal to the sum of personal taxes and of other state and local revenue, the coefficients of the tax price variable in the ratio specification in columns 1 through 3 is the sum of the coefficients in the two tax equations. Thus, in the specification with all variables included (column 2), the tax price coefficient is -0.15. This implies that eliminating deductibility would reduce state-local spending by 0.15 x 0.08 = 0.012 or slightly less than one-tenth of the current share of income accounted for by state and local governments. The implied price elasticity of aggregate state and local spending with respect to the tax price variable is -1.08.

Once again, however, the standard error is very large and one cannot reject the hypothesis that variations in the federal tax price of state and local taxes have no effect on the level of spending. The specification with the restricted set of variables provides further evidence that the effect of the tax price on spending is very small. In that specification, the estimated coefficient is only 0.02 with a standard error of 0.18. The general impression of a small impact of the federal tax price on state and local spending is also supported by the evidence from the logarithmic specification.

The relatively large standard errors of virtually all of the coefficients in Table 1 imply that the estimated price elasticity parameters must be interpreted with great caution. It is nevertheless useful to summarize the general pattern of behavior that is implied by these estimated elasticities of tax and spending behavior with respect to the federal tax price variable.

The key finding is that the effect of deductibility is substantially greater on the amount of personal deductible taxes paid to state and local governments than on the total amount of revenue collected by the state and local governments. In those states where the tax situation of residents leads to less reliance on deductible personal taxes, the state and local governments substitute other revenue sources. The parameter estimates indicate that between half and all of the reduction in personal tax revenues induced by variations in the federal tax price are offset by increases in other sources of state and local revenue.

These statistical conclusions are based on a model in which the effect of deductibility is represented by the weighted average tax price of both

itemizers and nonitemizers. At the risk of trying to squeeze too much information from the data, we have examined three alternative specifications in which the state and local tax decisions depend in a less restricted way on the proportion of itemizers in the state (p) and on the average tax price of itemizers in the state (tpi). The results of these more general specifications, presented in Table 2, support the basic conclusion that federal tax deductibility induces state and local governments to rely more heavily on deductible personal taxes but has a much smaller influence on the total amount of state and local revenue.

The coefficients in Table 2 are all estimated by an instrumental variable procedure and are based on the ratio specification (tax dollars per dollar of personal income). The previously reported estimates for the effect of the federal tax price on personal taxes are shown in the first line. When all the variables are included in the equation, the coefficient is -0.330 with a standard error of 0.214 (shown in column 1). When the specification is restricted to the tax price and the four statistically significant economic variables identified above, the coefficient is -0.147 with a standard error of 0.130 (shown in column 4).

Line 2 shows the effect of adding the proportion of taxpayers who itemize their deductions as a separate explanatory variable. This variable is completely insignificant. It is less than one-third of its standard error in both specifications. Line 3 shows that the same is true when the tax price of itemizers is included as a separate variable; the coefficient is very small and less than one-third of its standard error. Finally, in line 4, we exclude the tax price variable and include the proportion of itemizers and

the average tax price of itemizers as separate variables. It follows from the definition of the tax price variable (tax price = 1 - p + p(tpi) or tax price = 1 + p (tpi-1)) that if the restriction of line 1 is appropriate, the coefficient of p in line 4 would be tpi - 1 times the coefficient of tax price in line 1 and the coefficient of tpi in line 4 should be p times the coefficient of tax price in line 1. Since the average value of tpi -1 is -0.28 and the average value of p is 0.27, the corresponding estimated coefficients are reasonably close to their predicted values.[20] In short, all three alternative specifications confirm that the weighted average tax price variable used in Table 1 and repeated in line 1 of Table 2 is an appropriate specification for the explanation of the personal tax raised by state and local governments.

The effect of deductibility on other types of state and local tax revenue is analyzed in the specifications of lines 5 through 8. Including a separate term for the proportion of itemizers in the state (line 6) or the average tax price of itemizers (line 7) indicates that the variations in the tax price of itemizers has a more powerful effect than the proportion of itemizers in the state on the amount of state and local revenue other than the deductible personal tax revenue. This is confirmed by the specification (line 8) that substitutes the two separate tax variables for the taxprice variable; only the average tax price of itemizers is significant. These results are generally confirmed when the set of explanatory variables is restricted (columns 5 through 8).

---

[20]Compare the estimated coefficient of 0.100 for p with the predicted value at the mean of -0.28 x - 0.33 = 0.09. The estimated coefficient of -0.142 for tpi compares with the predicted value at the mean of 0.27 x -0.33 = -0.09; at the weighted average value of p of 0.50, the predicted coefficient is -0.17.

Table 2

Alternative Specifications of the Federal Tax Price Variable

Dependent Variable		All Variables			Restricted Variables		
		Tax Price (1)	p (2)	tpi (3)	Tax Price (4)	p (5)	tpi (6)
Personal Taxes	(1)	-0.330			-0.147		
		(0.214)			(0.130)		
	(2)	-0.522	-0.049		-0.198	-0.017	
		(0.608)	(0.145)		(0.373)	(0.113)	
	(3)	-0.350		-0.041	-0.149	0.006	
		(0.228)		(0.151)	(0.137)	(0.114)	
	(4)		0.100	-0.142		-0.040	-0.037
			(0.066)	(0.184)		(0.040)	(0.110)
Other State-Local Revenue	(5)	0.183			0.168		
		(0.284)			(0.153)		
	(6)	1.690	0.387		0.610	0.143	
		(0.849)	(0.203)		(0.429)	(0.130)	
	(7)	0.381		0.419	0.122		0.131
		(0.320)		(0.212)	(0.159)		(0.132)
	(8)		-0.114	0.539		-0.033	0.166
			(0.094)	(0.259)		(0.046)	(0.127)
Net State-Local Spending	(9)	-0.148			0.021		
		(0.341)			(0.185)		
	(10)	1.170	0.338		0.412	0.126	
		(1.017)	(0.241)		(0.517)	0.156	
	(11)	0.031		0.379	-0.027		-0.137
		(0.384)		(0.254)	(0.191)		(0.160)
	(12)		-0.014	0.396		0.007	0.129
			(0.113)	(0.311)		(0.056)	(0.153)

All coefficients are of the tax price variables; see text for full description of the other variables in the complete ("all variables") and restricted specifications. Estimation is by instrumental variable procedure. Standard errors are shown in parentheses.

The results are quite similar for the effect of deductibility on the net spending of state and local governments. The average tax price of itemizers has a more powerful and statistically more significant effect than the proportion of taxpayers who itemize.

The standard errors of the separate coefficients are however very large and the point estimates of the coefficients imply implausible changes in "other state-local revenue" and in net spending. When all of the variables are included in the specification (columns 1 through 4), the unrestricted specifications imply that eliminating deductibility would increase "other state-local revenue" by enough to raise total net state-local spending substantially. The specifications with the limited number of explanatory variables (columns 4 through 6) imply more modest and therefore more plausible effects of deductibility on "other state-local revenue" and net state-local spending. Although these specifications also imply that a higher federal tax price for state-local spending raises the net spending by state and local governments, the coefficients are smaller than their standard errors.

In short, the decomposition of the federal tax price variable into its two components (the proportion of itemizers and the average tax price for itemizers) does not alter the two key conclusions reached with the composite tax price variable: (1) deductibility substantially increases the use of deductible state and local personal taxes but (2) the net effect on total net spending is offset in whole or in part by the decreased use of other sources of state and local revenue. Although the standard errors are in general too large to make any confident statements about the relative importance of the number of itemizers and the average tax price of itemizers, variations in the average tax price of

itemizers may be more important.

6. Effects of Deductibility on Federal Tax Revenue

The present analysis has important implications about the effect of deductibility on federal tax revenue and therefore about the efficiency of deductibility as a way of increasing state-local spending. This section discusses the effect of deductibility on federal revenue and section 7 considers the efficiency of deductibility as a means of increasing state-local spending.

As we noted above, the Treasury has recently proposed eliminating the deductibility of state and local personal taxes. The Treasury predicts that this change in tax rules would raise amounts that increase from $33 billion in fiscal year 1987 to $40 billion by fiscal year 1990. As such, the elimination of deductibility is the largest single source of increased revenue in the Administration's plan. Indeed, by 1990 it accounts for more than 85 percent of all of the additional revenue raised from individuals by broadening the tax base. Stated differently, it finances 55 percent of the personal rate reductions, with most of the remainder financed by the increased taxes on corporations.

The research presented here implies that eliminating deductibility may not produce anything like the amount of additional revenue that the Treasury predicts and may actually cause a fall in total tax revenue. The reason is that eliminating deductibility is likely to cause state and local governments to switch some of their revenue from individuals -- where each dollar of state

and local tax payment has a relatively small impact on federal tax receipts -- to corporations where those same state and local tax payments have a much larger impact on federal tax revenue. If eliminating deductibility causes a large enough shift from personal taxes to taxes and fees paid by business, the Treasury could actually lose revenue by eliminating deductibility.

Consider more specifically the situation in 1984 and the implications of the estimates presented in section 5. The Treasury estimates that the deduction of state and local personal taxes (including income, sales and property taxes) reduced federal revenue by $29.9 billion in fiscal year 1984 and $32.4 billion in fiscal year 1985; we will take the revenue loss for calendar year 1984 to be $30.5 billion. If deductibility had been eliminated for 1984 and if state and local governments did not alter their business taxes or fees, federal revenue would have increased by $30.5 billion.

In contrast, the estimates presented in Table 1 imply that eliminating deductibility would increase the "other state-local revenue" as a proportion of personal income by 0.18 times the resulting change in the federal tax price of currently deductible personal taxes. The average federal tax price in the 1980 sample used to estimate those behavioral equations was 0.92; eliminating deductibility would raise the federal tax price by 0.08 and would therefore increase "other state-local revenue" by 1.44 percent of personal income. Since personal income in 1984 was $3,012 billion, this represents a $43 billion increase in "other state-local revenue". Note that since the decrease in personal taxes implied by the estimated coefficient of -0.33 is equivalent to $80 billion in 1984, the increase in "other state-local revenue" would

offset 54 percent of the personal tax revenue lost by state and local governments.

Before considering the implications of this increase in "other state-local revenue" for federal revenue, it is worth considering an alternative estimate of the effect on "other state-local revenue" of eliminating deductibility. In 1984, state and local governments collected $282 billion in the form of income taxes, sales taxes and property taxes. Since approximately 50 percent of the $98 billion of property taxes included in this total were paid by businesses,[21] the potentially deductible personal taxes totalled $233 billion. A comparison of the $30.5 billion of revenue loss in 1984 with the $233 billion of state-local personal taxes implies a federal tax price of 0.87; with this value, the parameter estimate of Table 1 implies that eliminating deductibility would increase "other state-local revenue" by 2.34 percent of personal income.[22] This 2.34 percent of personal income implies that "other state and local revenue" would have increased by $70 billion.

The impact on federal tax receipts of the increase in "other state-local revenue" depends on the nature of the increase. If these additional revenues are paid by businesses in the form of higher taxes or increased fees, the

---

[21]The 1982 Census of Governments (1982) reports that single family homes represent 52 percent of taxable property values. Unfortunately, these data refer to assessed values rather than market values or actual tax revenues.

[22]The difference between the 0.92 average federal tax price in the cross-state data and the 0.87 federal tax price implied by the 1984 experience reflects two effects. First, the federal tax price of 0.92 is based on an unweighted average of the marginal tax rates of itemizers and of the probability of itemizing while the actual revenue loss reflects the positive correlation of individual state and local tax liabilities with itemization and marginal tax rates. Second, the 0.87 value reflects the fact that businesses pay about 50 percent of property taxes.

federal government would lose approximately 46 percent of the rise in "other state-local revenue" through lower corporate tax receipts or between $20 billion and $32 billion of reduced corporate tax receipts. In addition, the reduction in net corporate income would mean reduced dividends and other personal capital income and therefore a further reduction in personal tax payments to the federal government. The combination of the decreased corporate and personal federal taxes that results from the induced increase in other state-local revenue would thus offset between 65 percent and more than 100 percent of the direct increase in federal revenue that results from eliminating the personal deduction.

In practice, the offset to the direct increase in federal revenue might be smaller than this because at least some of the increased "other state-local revenue" would be in the form of greater charges to households for services provided by state and local governments. The analysis is also complicated by the fact that the businesses might in part respond to increased state-local taxes and fees by reducing real wages. To that extent, the relevant tax rate is not the corporate 46 percent rate but the personal rate on wage and salary income.

There is, however, an important reason why the calculations presented above may understate the adverse effect on federal revenue of a shift in the composition of state and local revenue. The parameter estimates from section 5 used to derive the shift in the composition of state-local revenue are based on interstate differences in the federal tax price at a point in time. A change in federal tax deductibility that affects all states equally is more likely to induce an increase in taxes on business than the

same size difference in tax rates between two states. If one state raises its tax on business because it has a higher federal tax price for personal state-local taxes than the neighboring states, it is likely to drive some business away, thereby reducing its tax base and decreasing the demand for local labor. But if all states are faced with an increased federal tax price for personal state-local taxes because of a change in deductibility, they can all simultaneously raise their taxes on business without concern about driving business away.

All of these considerations make it impossible to provide a precise estimate of the likely effect on federal revenue of eliminating deductibility. But they do make it clear that an induced shift in the composition of state-local taxation in response to the elimination of deductibility could reduce substantially, and might even more than fully eliminate, the prospective increase in federal personal income tax revenue. As a minimum, the analysis in this paper shows that it would be unwise for the federal government to assume that eliminating the deductibility of state-local taxes would increase federal tax receipts.

7. The Cost-Effectiveness of Grants and Tax Deductibility

The low (or possibly negative) cost to the federal government of the deductibility of state and local taxes implies that deductibility may be a very cost-effective way for the federal government to stimulate additional spending by state and local governments. This conclusion runs counter to the conventional assertion that deductibility is a high cost way of stimulating

state-local spending.[23] This section compares the cost-effectiveness of deductibility and federal grants in raising state-local spending.

The basic coefficient estimates of section 5 (for the full specification in ratio form estimated by an instrumental variable procedure) imply that deductibility increases the ratio of state and local spending to personal income by -0.15(-0.08) = 0.012, on the assumption that the relevant federal tax price is 0.92.[24] What is the cost to the federal government of achieving this increase and how does it compare to the cost of other policies that may achieve an equal increase in state and local spending?

The same data imply that the ratio of personal deductible taxes to personal income is 0.087. Since the effective tax rate (reflecting the extent of itemization and the marginal tax rate of itemizers) at which this is deducted is 0.08, the resulting federal revenue loss is 0.70 percent of personal income. Against this must be offset the extra revenue that the federal government collects from businesses because deductibility induces state and local governments to tax businesses more lightly and from individual shareholders and creditors because of the increased net-of-tax income of businesses. The relevant parameter estimate implies that deductibility reduces "other state-local revenue" as a fraction of personal income by 0.18(0.08) = 0.0144. If a fraction b of this reduction in "other state-local

---

[23]See the Congressional Research Service study for the Senate Committee on Government Operations by Noto and Zimmerman (1984) for a recent example of this conventional conclusion.

[24]Parallel calculations based on the federal tax price of 0.87 are presented in footnote 27.

revenue" would otherwise have been paid by business and deducted against a federal tax rate of 0.46 percent, deductibility increases federal revenue from businesses as a fraction of personal income by 0.46(0.0144)b = 0.0066 b.

The net cost of deductibility to the federal government, expressed as a fraction of personal income, is therefore 0.0070 - 0.0066 b.[25] If all of the "other state-local revenue" is raised by taxes on business (b = 1), deductibility has essentially zero cost to the federal government; this is the result noted in the previous section. But even if only half of the "other state-local revenue" is raised from businesses, the net cost of deductibility is 0.37 percent of personal income or $11.1 billion at 1984 levels. Since deductibility raises spending by 1.2 percent of personal income, the cost-effectiveness of deductibility can be expressed as 1.2/0.37 = 3.24 dollars[26] of increased state and local spending per dollar of net federal cost.[27]

---

[25]This ignores the additional personal taxes collected because of higher dividends and interest income. Omitting this relatively small effect tends to overstate the cost of deductibility.

[26]Taking the increased federal tax revenue on dividends and interest would raise the cost-effectiveness of deductibility.

[27]With a federal tax price of 0.87, reflecting the weighted average effective marginal tax rate for state and local tax deductions, the preceding calculations imply that deductibility increases the ratio of state and local spending to personal income by 0.15(0.13) = 0.020. With an effective marginal tax rate of 0.13, deductiblity causes a direct loss in federal revenue as a fraction of personal income equal to 0.0113. Business taxes rise as a fraction of personal income by 0.18(0.13)b = 0.0234 b and federal corporate tax receipts therefore fall by 0.46(0.0234 b) = 0.0107 b. The net effect of deductibility is therefore to reduce federal tax receipts as a fraction of personal income by 0.0113 - 0.0107 b. If all of the other revenue is paid by business, deductiblity has essentially no cost to the federal government. Even when b = 0.5, the cost-effectiveness of deductibility is 0.020/0.006 = 3.33 dollars of increased state-local spending per dollar of federal net cost.

What is the net cost to the federal government of increasing state-local spending by block grants to state and local governments? Several studies have shown that federal block grants to state and local governments increase spending by less than a dollar but more than the amount that would be expected by a pure income effect.[28] If the increased state-local spending per dollar of federal block grant is s, the state-local governments reduce their tax receipts by 1-s per dollar of federal block grant. If a fraction p of this reduction is in personal taxes that would be deducted at effective marginal tax rate m and, of the remainder, the fraction paid by business is b, a dollar of federal block grant raises the federal government's tax revenue by $(1-s)(pm + (1-p)(.46b))$. The increase in state-local spending per dollar of cost to the federal government is thus $s/(1 - (1-s)(pm + (1-p)(.46\ b))$. For example, using the average observed values of $p = 0.65$ and $m = 0.08$ and assuming $s = 0.3$ and $b = 0.3$ implies that this cost-effectiveness ratio is only 0.32 dollars of increased state and local spending per dollar of net federal cost. Even if each dollar of federal block grant raised state and local spending by a full dollar, the cost-effectiveness ratio would only rise to one dollar of increased local spending per dollar of federal cost.

Federal grants can be more cost-effective than tax deductibility only if the federal grants are matching grants that increase state-local spending by substantially more than one dollar for every dollar of federal grant. For example, if each dollar of federal matching grant raised state local spending by two dollars, the cost ratio becomes 1.82 dollars of increased state-local

---

[28]See Inman (1979) and Rubinfeld (1986) for summaries of these studies.

spending per net dollar of federal cost. But even with this very powerful matching effect, the federal matching grant is far more costly than deductibility per dollar of increased state and local spending.

These calculations imply that substituting direct block grants or matching grants for deductibility would be very likely to increase the cost to the federal government of achieving the current level of state-local spending. It is likely that federal grants to state and local governments can be rationalized only as a way to increase spending beyond the level that is achieved by deductibility or to alter the distribution of spending among states and program areas, or to redistribute income geographically.

8. Conclusion

This paper has examined the effect of the federal deductibility of state and local taxes on the fiscal behavior of state and local governments. The primary finding is that deductibility affects the way that state-local governments finance their spending as well as the overall level of spending. More specifically, in states where federal deductibility implies a relatively low cost of using deductible personal taxes (including income, sales and property taxes), there is greater reliance on those taxes and less reliance on business taxes and other revenue sources.

The effect of deductibility on the state-local financial mix implies that deductibility has a much lower cost to the federal government than has previously been assumed. Indeed, if deductibility causes a large enough shift of financing from business taxes to personal taxes, deductibility may actually

raise federal tax receipts. The analysis also implies that deductibility is likely to be a more cost-effective way than direct grants for raising the general level of state-local government spending.

The present study uses the individual tax return data in the NBER TAXSIM model to calculate federal tax prices for itemizers and other taxpayers in each state. The econometric analysis recognizes that the federal tax price is endogenous (because it reflects the state-local spending decisions) and therefore uses a consistent instrumental variable procedure. This use of instrumental variable estimation exacerbates the difficulty of making precise estimates from the data. The relatively large standard errors indicate the need for caution in interpreting the point estimates.

There are several directions in which the current work could usefully be pursued. Combining cross-sections for two or more years could improve the precision of the parameter estimates. A more disaggregated analysis of the responsiveness of different types of revenue sources would make it possible to calculate the federal cost of deductibility more accurately. This could usefully be paralleled by a disaggregated analysis of spending.

But as of now, the analysis and data suggest that it would be wrong to assume that eliminating federal deductibility would substantially increase federal revenue or that substituting block grants for deductibility would permit the current level of state-local spending to be maintained at lower cost to the federal government.

Cambridge, MA
November 1985

Bibliography

Bartlett, Bruce. "The Case for Eliminating Deductibility of State and Local Taxes," Tax Notes, September 2, 1985.

Bergstrom, T. and Goodman, R. "Private Demand for Public Goods." American Economic Review 63: 286-96, June 1973.

Billman, Brookes D., Jr. and Cunningham, Noel B. "Nonbusiness State and Local Taxes: The Case for Deductibility," Tax Notes, September 2, 1985.

Borcherding, T. E. and Deacon, R. T. "The Demand for the Services of Nonfederal Governments," American Economic Review 52, 891-901, 1962.

Bowen, H.R. "The Interpretation of Voting in the Allocation of Economic Resources," Quarterly Journal of Economics 58, 27-48, 1943.

Bridges, Benjamin, Jr. "Deductibility of State and Local Nonbusiness Taxes Under the Federal Individual Income Tax," National Tax Journal 14:1, March 1966.

Feldstein, Martin. Behavioral Simulation Methods in Tax Policy Analysis, National Bureau of Economic Research. Chicago: University of Chicago Press, 1983.

Feldstein, Martin. "Multicollinearity and the Mean Square Error of Alternative Estimates," Econometrica, 1973.

Gramlich, E. and Galper, H. "State and Local Fiscal Behavior and Federal Grant Policy." Brookings Papers on Economic Activity 1: 15-58, 1973.

Hettich, Walter and Winer, Stanley. "A Positive Model of Tax Structure," Journal of Public Economics 24, 67-87, 1984.

Hotelling, Harold. "Stability in Competition." Economic Journal 39: 41-57, January 1929.

Inman, Robert P., "Four Essays on Fiscal Federalism," unpublished Ph.D. Dissertation, Harvard University, 1972.

Inman, Robert P. "The Fiscal Performance of Local Governments: An Interpretative Review," Current Issues in Urban Economics, pp. 270-321. P. Mieszkowski and M. Streizheim (eds.). Baltimore: Johns Hopkins, 1979.

Inman, Robert P. "Does Deductibility Influence Local Taxation?" NBER Working Paper #1714. October 1985.

Inman, Robert P., "Markets, Government, and the 'New' Political Economy." In Handbook of Public Economics Vol. II. A. Auerbach and M. Feldstein (eds.). North-Holland Press, 1986.

Ladd, Helen F. "Federal Aid to State and Local Governments" Federal Budget Policy in the 1980s. G. B. Mills and J. L. Palmer (eds.). Washington, DC: Urban Institute, 1984.

Madalla, G.S. Econometrics. New York: McGraw Hill, 1977.

Noto, Nonna A. and Zimmerman, Dennis, "Limiting State-Local Tax Deductibility In Exchange for Increased General Revenue Sharing: An Analysis of the Economic Effects," Senate Print 98-77, Washington, DC: U.S. Government Printing Office, 1983.

Noto, Nonna A. and Zimmerman, Dennis. "Limiting State-Local Tax Deductibility: Effects Among the States," National Tax Journal, 1984.

Office of Management and Budget. "Special Analysis H: Federal Aid to State and Local Governments," The Budget for Fiscal Year 1986. Washington, DC: U.S. Government Printing Office, 1985.

Office of the President. The President's Tax Proposals to the Congress for Fairness, Growth, and Simplicity, 62-69, Washington, DC: U.S. Government Printing Office,1985.

Phares, Donald. Who Pays State and Local Taxes? Cambridge, MA: Oelgeschlager, Gunn and Hain, 1980.

Rubinfeld, Daniel L., "The Economics of the Local Public Sector." In Handbook of Public Economics Vol. II. A. Auerbach and M. Feldstein (eds.). North-Holland Press, 1986.

The Tax Foundation, Facts and Figures on Government Finance, Washington, DC, 1981.

U.S. Department of Commerce, State and Metropolitan Area Data Book, Washington, DC: U.S. Government Printing Office, 1982. (NOTE: This is note the County and City Databook.)

U.S. Bureau of the Census, Property Taxation, Census of Governments, Washington, DC: U.S. Government Printing Office, 1982.

U.S. Department of Treasury. Tax Reform for Fairness, Simplicity and Economic Growth, Vol. 1, Washington, DC: U.S. Government Printing Office, 1984.

Zimmerman, Dennis. "Resource Misallocation From Interstate Tax Exportation: Estimates of Excess Spending and Welfare Loss in a Median Voter Framework," National Tax Journal, 1983.

Table A-1
Federal Tax Price and Related Statistics, 1980

State	Federal Tax Price	Proportion of Taxpayers Who Itemize	Federal Tax Price For Itemizers
Alabama	.94	.22	.72
Alaska	.87	.38	.65
Arizona	.92	.31	.76
Arkansas	.94	.25	.74
California	.90	.36	.72
Colorado	.89	.42	.73
Connecticut	.91	.31	.72
Delaware	.95	.18	.70
Florida	.94	.24	.75
Georgia	.92	.29	.72
Hawaii	.92	.27	.71
Idaho	.91	.37	.75
Illinois	.92	.27	.70
Indiana	.93	.24	.71
Iowa	.93	.23	.69
Kansas	.92	.27	.72
Kentucky	.93	.26	.73
Louisiana	.94	.19	.71
Maine	.95	.19	.73
Maryland	.89	.36	.68
Massachusetts	.91	.32	.72
Michigan	.87	.44	.70
Minnesota	.91	.32	.73
Mississippi	.95	.20	.73
Missouri	.94	.21	.73
Montana	.93	.32	.78
Nebraska	.94	.23	.72
Nevada	.93	.26	.73
New Hampshire	.95	.19	.73
New Jersey	.91	.28	.69
New Mexico	.94	.21	.72
New York	.90	.35	.71
North Carolina	.93	.23	.72
North Dakota	.93	.27	.75
Ohio	.93	.23	.70
Oklahoma	.92	.28	.73
Oregon	.91	.34	.73
Pennsylvania	.93	.25	.72
Rhode Island	.92	.28	.71
South Carolina	.92	.30	.74
South Dakota	.96	.14	.75
Tennessee	.94	.21	.72
Texas	.93	.22	.69
Utah	.92	.31	.74
Vermont	.94	.21	.71
Virginia	.90	.31	.69
Washington	.93	.24	.69
West Virginia	.92	.26	.71
Wisconsin	.91	.34	.72
Wyoming	.95	.16	.70

Source: Authors' calculation using NBER TAXSIM Model for 1980.

Table A-2
Federal Tax Price Instruments, 1980

	Average Dollar Tax Price	Synthetic Proportion of Itemizer	Average Dollar Tax Price for Itemizer
Alabama	.93	.25	.72
Alaska	.87	.38	.66
Arizona	.93	.24	.72
Arkansas	.92	.28	.72
California	.91	.30	.70
Colorado	.91	.31	.70
Connecticut	.91	.31	.70
Delaware	.93	.23	.71
Florida	.93	.25	.71
Georgia	.92	.27	.71
Hawaii	.92	.26	.71
Idaho	.92	.29	.72
Illinois	.90	.32	.69
Indiana	.91	.31	.70
Iowa	.92	.28	.70
Kansas	.91	.31	.70
Kentucky	.93	.24	.72
Louisiana	.92	.28	.71
Maine	.94	.23	.73
Maryland	.90	.32	.68
Massachusetts	.92	.27	.70
Michigan	.88	.37	.68
Minnesota	.93	.25	.71
Mississippi	.94	.22	.72
Missouri	.93	.26	.71
Montana	.92	.28	.73
Nebraska	.92	.29	.72
Nevada	.93	.26	.71
New Hampshire	.93	.24	.71
New Jersey	.91	.30	.68
New Mexico	.92	.28	.73
New York	.91	.28	.69
North Carolina	.93	.25	.72
North Dakota	.93	.26	.73
Ohio	.91	.30	.70
Oklahoma	.91	.31	.72
Oregon	.91	.30	.70
Pennsylvania	.91	.31	.72
Rhode Island	.91	.28	.69
South Carolina	.93	.26	.73
South Dakota	.93	.25	.71
Tennessee	.92	.26	.72
Texas	.90	.29	.66
Utah	.93	.25	.72
Vermont	.93	.25	.72
Virginia	.90	.31	.68
Washington	.91	.30	.69
West Virginia	.90	.34	.70
Wisconsin	.91	.30	.70
Wyoming	.91	.29	.71

Source: Authors' calculation using NBER TAXSIM Model for 1980.

Table A-3

Sources of Data

Name	Definition	Source
State-Local Fiscal Variables		
Personal Taxes	General and selective sales, income, and property taxes	(1)
Dther State-Local Revenue	S&L general expenditure less personal taxes, and federal aid to S&L	Genl. exp. - (2) Pers. tax - (1) Aid - (2)
Net State-Local Spending	S&L general expenditure less federal aid to S&L	(1), (2)
Demographic and Economic Characteristics		
Personal Income per capita		(2)
Pupils per capita		(2)
Road Mileage per capita		(2)
Percentage of Nonwhites		(2)
Percentage of Urban Dwellers		(2)
Poverty percentage	Percentages of persons with incomes below poverty level	(2)
Aged percentage	Percentage of population 65 years and over	(2)
Homeowners percentage	Percentage of occupied housing units owner occupied	(2)
Family Income	Family Money Income (1979)	(2)
Variance of AGI	Calculated from individual tax returns	(3)
Skew of AGI	Calculated from individual tax returns	(3)
Dividend and Interest Deductions to AGI Ratio	Calculated from individual tax returns	(3)
Capital Gains to AGI Ratio	Calculated from individual tax returns	(3)

Table A-3 (Continued)

Name	Definition	Source
Percentage Married	Percentage of joint returns as well as individual returns indicating married filer.	(3)
Tax Price Variables and Instruments		
		(3)

Sources:

(1) The Tax Foundation, Facts and Figures on Government Finance, Washington, D.C., 1981.

(2) U.S. Department of Commerce, State and Metropolitan Area Data Book, Washington, D.C.: U.S. Government Printing Office, 1982.

(3) Calculated using NBER TAXSIM Model, Individual Tax Model File, 1979.

Table A-4
State and Local Taxes and Spending per Capita, 1980

	Personal	Other State-Local Revenue	Net State-Local Spending
Alabama	580	338	918
Alaska	1398	3704	5102
Arizona	927	311	1238
Arkansas	560	228	788
California	1019	443	1462
Colorado	897	337	1233
Connecticut	938	273	1210
Delaware	714	635	1348
Florida	637	379	1016
Georgia	708	224	932
Hawaii	1202	264	1465
Idaho	641	308	949
Illinois	962	233	1194
Indiana	680	270	951
Iowa	842	501	1344
Kansas	807	432	1239
Kentucky	616	460	1075
Louisiana	612	574	1186
Maine	757	184	940
Maryland	1025	346	1371
Massachusetts	1118	174	1292
Michigan	930	524	1455
Minnesota	949	537	1486
Mississippi	566	316	882
Missouri	690	243	934
Montana	762	390	1151
Nebraska	880	316	1196
Nevada	890	556	1446
New Hampshire	615	350	964
New Jersey	967	336	1303
New Mexico	633	509	1142
New York	1363	296	1659
North Carolina	649	321	971
North Dakota	656	652	1308
Ohio	724	388	1113
Oklahoma	583	473	1056
Oregon	821	609	1430
Pennsylvania	821	268	1088
Rhode Island	895	356	1250
South Carolina	631	295	926
South Dakota	734	210	944
Tennessee	560	362	922
Texas	641	442	1083
Utah	781	443	1223
Vermont	794	109	902
Virginia	780	328	1108
Washington	923	453	1376
West Virginia	734	300	1034
Wisconsin	947	421	1368
Wyoming	1083	632	1715

Table A-5
State and Local Taxes and Spending per Dollar of Personal Income, 1980

	Personal	Other State-Local Revenue	Net State-Local Spending
Alabama	.08	.05	.12
Alaska	.11	.29	.40
Arizona	.11	.04	.14
Arkansas	.08	.03	.11
California	.09	.04	.13
Colorado	.09	.03	.12
Connecticut	.08	.02	.10
Delaware	.07	.06	.13
Florida	.07	.04	.11
Georgia	.09	.03	.12
Hawaii	.12	.03	.15
Idaho	.08	.04	.12
Illinois	.09	.02	.11
Indiana	.08	.03	.11
Iowa	.09	.05	.14
Kansas	.08	.04	.12
Kentucky	.08	.06	.14
Louisiana	.07	.07	.14
Maine	.10	.02	.12
Maryland	.10	.03	.13
Massachusetts	.11	.02	.13
Michigan	.09	.05	.15
Minnesota	.10	.06	.15
Mississippi	.09	.05	.13
Missouri	.08	.03	.10
Montana	.09	.05	.13
Nebraska	.09	.03	.13
Nevada	.08	.05	.13
New Hampshire	.07	.04	.11
New Jersey	.09	.03	.12
New Mexico	.08	.05	.13
New York	.13	.03	.16
North Carolina	.08	.04	.12
North Dakota	.07	.07	.15
Ohio	.08	.04	.12
Oklahoma	.06	.05	.12
Oregon	.09	.07	.12
Pennsylvania	.09	.03	.12
Rhode Island	.09	.04	.13
South Carolina	.09	.04	.13
South Dakota	.09	.03	.12
Tennessee	.07	.05	.12
Texas	.07	.05	.11
Utah	.10	.06	.16
Vermont	.10	.01	.12
Virginia	.08	.03	.12
Washington	.09	.04	.13
West Virginia	.09	.04	.13
Wisconsin	.10	.05	.15
Wyoming	.10	.06	.16

Table A-6

The Effects of Federal Deductibility on
State and Local Taxes and Spending: Ratio Specification

	Dependent Variable		
Tax Price	Personal Taxes	Other State-Local Revenue	Net State-Local Spending
Tax Price	-.330 (0.214)	.183 (.284)	-.148 (.341)
Pupils per capita	0.573 (0.239)	-.634 (.317)	-.061 (.380)
Road Mileage per capita	-.0279 (0.0467)	.031 (.062)	.003 (.074)
Nonwhite %	-0.010 (0.037)	.085 (.049)	-.095 (.059)
Urban %	-0.30 (.021)	.054 (.028)	.024 (.033)
Poverty %	0.757 (0.367)	.057 (.487)	.814 (.584)
Aged %	0.484 (0.186)	-.754 (.246)	-.270 (.295)
Homeowners %	-.204 (.051)	.151 (.068)	-.053 (.082)
Family Income:			
$ 7500-15000	0.937 (.481)	-.392 (.638)	.545 (.765)
15000-25000	0.739 (.390)	-.244 (.517)	.494 (.620)
25000-35000	1.203 (.534)	-.149 (.709)	1.054 (.850)
35000-50000	0.635 (.529)	-.724 (.701)	-.089 (.841)
50000+	.544 (.531)	.203 (.705)	.747 (.845)

Table A-6 (Continued)

Tax Price	Dependent Variable: Personal Taxes	Dependent Variable: Other State-Local Revenue	Dependent Variable: Net State-Local Spending
Variance of AGI	-.396 (1.635)	.664 (2.170)	.268 (2.601)
Skew of AGI	.212 (1.676)	-.877 (2.224)	-.665 (2.666)
Dividends and Interest per dollar of AGI	-14.048 19.225	-6.318 25.515	-20.417 30.586
Capital Gains to AGI	.887 (1.105)	.334 (1.466)	1.221 (1.757)
Percentage of Married	-.033 (.034)	.039 (.045)	.006 (.054)
Constant	-.429 (.380)	.165 (.504)	-.264 (.604)

The dependent variable in each equation is measured as a ratio to personal income. All equations are estimated by an instrumental variable procedure. Standard errors are shown in parentheses. See Table A-3 for definition of the variable.

Table A-7

The Effects of Federal Deductibility on
State and Local Taxes and Spending: Logarithmic Specification

	Dependent Variable		
	Personal Taxes*	Other State-Local Revenue*	Net State-Local Spending*
Tax Price*	-2.364 (2.477)	3.241 (7.325)	-.509 (2.746)
Personal Income per capita*	-.040 (.613)	2.305 (1.812)	.681 (.679)
Pupils per capita*	.937 (.509)	-3.131 (1.506)	-.304 (.565)
Road Mileage per capita*	-.010 (.030)	.063 (.089)	.009 (.033)
Nonwhite %	-.172 (.422)	-1.679 (1.247)	-.766 (.468)
Urban %	.347 (.234)	1.514 (.692)	.178 (.260)
Poverty %	4.905 (5.269)	2.472 (15.580)	4.573 (5.841)
Aged %	5.142 (2.131)	-21.500 (6.300)	-2.563 (2.362)
Homeowners %	-2.412 (.618)	4.967 (1.829)	-.446 (.686)
Family Income			
$ 7500-15000	8.017 (6.370)	-9.038 (18.835)	2.510 (7.061)
15000-25000	5.126 (5.284)	-4.127 (15.624)	2.323 (5.858)
25000-35000	11.392 (6.869)	-4.074 (20.311)	6.255 (7.614)
35000-50000	6.481 (5.979)	-22.561 (17.679)	-1.303 (2.294)
50000+	5.058 (6.052)	.531 (17.895)	5.002 (6.709)

Table A-7 (Continued)

	Dependent Variable		
	Personal Taxes*	Other State-Local Revenue*	Net State-Local Spending*
Variance of AGI	4.741 (19.388)	44.936 (57.328)	6.598 (21.492)
Skew of AGI	-6.422 (20.694)	-27.476 (61.190)	-10.523 (22.940)
Dividends and Interest to AGI	-153.13 (177.91)	-320.74 (526.07)	-133.53 (197.22)
Capital Gains to AGI	9.881 (10.242)	17.902 (30.286)	8.080 (11.353)
Percentage of Married	-.434 (.383)	.538 (1.134)	.018 (.425)
Constant	6.194 (8.600)	-32.053 (25.423)	-.015 (9.533)

Variables marked with an asterisk are transformed into logarithms.

The dependent variable in each equation is measured as a ratio to personal income. All equations are estimated by an instrumental variable procedure. Standard errors are shown in parentheses. See Table A-3 for definition of the variable.