INCOME TAX AVOIDANCE: EVIDENCE FROM INDIVIDUAL TAX RETURNS†

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ABSTRACT

Even if factor supplies and pre-tax incomes are unaffected by income taxation, tax rate changes can affect taxable income and tax revenue through their impact on tax avoidance in the form of itemized deductions and tax-shelter investments. Empirical tests using a national sample of individual income tax returns reveal that high marginal tax rates generate significant and substantial increases in tax avoidance, especially among upper-income taxpayers. Consequently, research which focuses on factor supply effects alone may seriously underestimate the impact of tax policy on tax revenue and resource allocation.

THE income tax reforms in the United States during the 1980s have intensified academic debate over the impact of tax rate changes on economic activity and the distribution of the tax burden. Much of the previous research in this area has focused on the response of labor and capital supplies to changing tax rates. This research has usually been cast within the framework of a simple two-sector model in which an increase in tax rates induces resources to flow from a taxed market sector into an untaxed household sector. Often, empirical values of the factor supply elasticities are applied to the model to simulate the response of market output and tax revenue to changes in the rate of income taxation (see Stuart, 1981, 1984; and Fullerton, 1982).

While our research also investigates the impact of changing tax rates on the tax base and tax revenue, it differs from the major body of prior research in several important respects. First, our analysis takes the level of factor supplies and market income reported on tax returns as exogenous and focuses instead on income tax avoidance—legal methods to minimize tax liability.[1] We believe that ignoring tax avoidance biases conclusions regarding the relationship between tax rates and tax revenues. Second, our research utilizes detailed individual tax return data to estimate the impact of tax rates on tax avoidance within specific income and tax rate groupings. We find that tax avoidance increases with the marginal tax rate and that this effect is large enough in the upper-income classes to generate an inverse relationship between tax rates and tax revenue. In this regard, our findings are similar to those recently reported by Lindsey (1985). However, our study employs a completely different methodology than Lindsey utilized and it focuses on the long-run relationship between tax rates and tax revenue.

Section I of the paper outlines the theory behind the types of tax avoidance considered in our analysis. Section II describes the data and method we employ to estimate the impact of tax rates on tax avoidance. The empirical results follow in Section III, and their implications for tax revenue are discussed in Section IV. The paper concludes with a brief summary of our findings.

I. Theoretical Considerations

Income tax avoidance as defined in this study involves taxpayer actions designed to (a) move reported income into lower taxed categories and (b) reduce the personal cost of consumption. Tax avoidance is made possible by the fact that federal and state income taxes are not levied on gross income but on a more narrow tax base that results after numerous adjustments in the form of deductions, exclusions, and allowance for income losses. The relationship between tax rates and the tax avoidance we examine can be derived from the standard models of portfolio choice and utility maximization. We consider two types of tax avoidance separately, both for

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convenience of exposition and because they are fundamentally different in the sense that one involves investment decisions and the other consumption choices.

A. *Taxation and Investment Choices*

The first type of tax avoidance that we consider results from certain provisions in the federal and state tax codes that cause returns from various assets to be taxed at unequal rates. Consider an investor choosing among k different real and financial assets (k = 1 . . . m). Define the proportion of the before-tax rate of return which is taxed as a variable α, with $\alpha = 1$ indicating full taxation and $\alpha < 1$ preferential taxation. Following Bailey (1974), assume that the before-tax return r^b decreases as the percentage of the asset's income which is taxed falls. That is, $\alpha_j < \alpha_{j+1}$ implies $r_j^b < r_{j+1}^b$. Assume further that competition equalizes after-tax rates of return r_j^a among investors in a given marginal tax bracket t, where

$$r_j^a = r_j^b(1 - \alpha_j t). \tag{1}$$

In making a marginal investment decision, an individual investor is assumed to choose the asset yielding the highest after-tax rate of return (Galper and Zimmerman, 1977). The tax-preferred status of the asset selected will depend on the marginal tax rate facing the investor. This can be seen by noting that there exists a "break-even" tax rate t* which equates the after-tax returns from any two assets yielding r_1^b and r_2^b before tax, with $r_1^b < r_2^b$ and $\alpha_1 < \alpha_2$:

$$t^* = (r_2^b - r_1^b)/(\alpha_2 r_2^b - \alpha_1 r_1^b). \tag{2}$$

Therefore, an investor facing a tax rate above t* should choose the asset whose before tax-rate return r_1^b is relatively low but which yields the higher net return due to more favorable tax treatment (low α_1). Similarly, taxpayers facing an even higher tax rate t** should prefer even more preferentially taxed assets, other things constant. In other words, theory suggests that assets receiving preferential income tax treatment should be held predominately by higher income and tax bracket investors.

The most important types of preferential tax treatment relevant to our study include the allowance of depreciation (especially accelerated) deductions that exceed economic depreciation, percentage depletion allowances, the immediate expensing of intangible drilling costs and construction period charges, and the partial exclusion of capital gains from tax. The "excess" deductions allowed investors in real estate, equipment leasing, and oil and gas exploration often result in paper losses being reported even though positive economic income is being earned. Consequently, accounting (tax) losses have been used as a proxy for investment in certain tax-preferred assets (Galper and Zimmerman, 1977).

According to the portfolio choice theory, when income tax rates increase individuals will report larger tax return losses from partnerships and small business corporations—frequent vehicles for tax-shelter investments. Rental losses reported on individual returns will expand as investors acquire properties providing depreciation deductions and promising appreciation benefits. Higher tax rates will encourage individuals to invest in assets whose returns are primarily in the form of utility or personal pleasure (e.g., "hobby" farms and antique shops). In this regard, some business losses could be considered as personal consumption rather than investment. In any case, the common element in most tax losses is that they reduce current tax liability and enable income to be shifted into low-tax years such as retirement or partially-taxed forms such as capital gains (prior to the 1986 tax act).

B. *Taxation and Consumption Choices*

Under an income tax that allows for legal deductions in the definition of taxable income, taxpayers can also make certain consumption choices that will reduce tax liability. Consider a family receiving nominal income before taxes, Y, for our purposes considered exogenous.[2] Income taxes are levied on taxable income, $Y^T = Y - D$, where D represents all deductions from gross income. The tax function, $T = T(Y^T)$, is given and assumes a marginal

rate t that rises with taxable income.

Deductions from gross income can be expressed as

$$D = A + C_d. \tag{3}$$

The first component, A, includes adjustments to income such as moving expenses and IRA contributions, a standard deduction, the amount of personal exemptions, excluded capital gains and other tax-exempt income, income losses, and illegally unreported income—all considered exogenous. The second term, C_d, consists of deductions resulting from expenditures accorded preferential tax treatment. For the federal and many state income taxes, C_d includes a variety of consumption expenditures (e.g., mortgage and other interest payments, medical expenses above a certain amount, charitable contributions) along with some "business" deductions that may provide personal consumption benefits (e.g., expenses incurred in attending conventions and seminars, subscriptions to professional journals).[3]

Total income finances either normal consumption, C_n, tax-deductible consumption, C_d, or income taxes, T. For simplicity, we do not consider any saving (investment). Hence, the budget constraint is:

$$Y = C_n + C_d + T. \tag{4}$$

The family maximizes utility, $U = U(C_n, C_d)$, with $U_1, U_2 > 0$, subject to the budget constraint and the definition of taxes. The first-order condition yields the familiar result:

$$\frac{\partial U/\partial C_n}{\partial U/\partial C_d} = \frac{1}{(1-t)}. \tag{5}$$

Equation (5) shows that the relative price of tax-deductible consumption is $(1 - t)$, where t is the marginal tax rate. In general, an increase in the marginal tax rate reduces the *personal* cost of C_d and induces a substitution of tax-deductible consumption for normal consumption.

The demand for C_d will be a function of its tax price, income, and tastes and preferences. The tax rate elasticity of demand for any particular deductible item depends on its substitutability for other goods and services. Empirical studies indicate that charitable contributions are fairly sensitive to tax rate changes (Clotfelter and Steuerle, 1981), but little is known about other deductible expenses. Certainly some deductible expenses (e.g., medical bills and taxes) may be less discretionary than others, but our major focus in this paper is the relationship between the tax rate and aggregate itemized deductions. Some deductions that we categorize as consumption, such as mortgage interest payments and interest paid on loans to purchase automobiles and other consumer durables, could alternatively be considered as investment in tax-preferred assets.

In summary, optimizing behavior by taxpayers suggests that they respond to an increase in tax rates by (a) diverting resources into investments designed to show accounting losses and (b) increasing expenditures on tax-deductible goods and services. Generating additional tax losses or deductions provides a means of reducing or avoiding the increased tax liability that would otherwise result from higher tax rates.

II. Data and Model Specification

Econometric analysis is utilized to empirically examine the relationship between tax rates and tax avoidance. Our empirical tests employ detailed data on incomes, losses, and deductions from the 1979 *Individual Tax Model File* of the Internal Revenue Service, a stratified random sample of unaudited individual income tax returns. In its description of the file, the IRS states, "The records in this file are intended to represent all returns filed for Income Year 1979" (Internal Revenue Services, 1982, p. 23). While more current versions of the *Tax Model File* are available to researchers, we believe that the 1979 file offers two distinct advantages over more recent releases. First, the differential federal taxation of labor and capital incomes in 1979 (discussed below) increases the variation in the marginal tax rate (holding total income constant), which permits estimation of the partial

impact of tax rate changes on tax avoidance. Second, after the 1981 tax legislation was passed, there was a great deal of uncertainty as to revisions or possibly even cancellation of the rate reductions contained therein. Therefore, to the extent that taxpayer decisions were influenced by this uncertainty, post-1981 tax data cannot be expected to yield estimates of the permanent or long-run impact of tax rate changes on income tax avoidance.

According to the previous section, the amount of tax deductions and losses reported by individuals should be determined by the marginal tax rate, taxpayer income, and tastes or preferences relating to the timing of income, homeownership versus renting, and so forth. Besides that stated earlier, there are several reasons for examining these two types of tax avoidance separately. First, the marginal tax rate, taxpayer income, and other factors may have different impacts on tax losses than on deductions. Second, although the relationship between tax rates and deductions (especially contributions) has been investigated by numerous researchers, tax losses have received very little attention in the literature.[4] However, there is some suspicion that tax-shelter investments are the most serious form of avoidance (Barro and Sahasakul, 1983). As a consequence, the 1986 tax act contained various provisions to curb real estate limited partnerships and other shelters. Specifically, the new tax bill will prevent taxpayers from offsetting wage and salary income or portfolio earnings with paper losses from investments in which they do not actively participate. Such "passive losses" can only be used to offset income from similar passive investments, such as real estate limited partnerships. All rental income will be subject to this loss-limitation rule, although under a special exemption taxpayers who actively participate in the rental activity and whose adjusted gross income is under $100,000 can take a maximum of $25,000 of rental losses. In addition, any taxpayer who invests in a business but does not participate in it "on a regular, continuous and substantial basis" will be unable to use its losses to shield other income from taxation.[5]

The dependent variables constructed for empirical analysis are: (1) tax deductions, equal to all itemized deductions except state and local *income* taxes paid, and (2) tax losses, equal to the sum of gross losses from partnerships, small business corporations, and estates or trusts plus net losses from rents, royalties, business, farming, and other sources.[6]

The *Tax Model File* contains a state-of-residence indicator that allows one to estimate the combined federal and state marginal tax rate, MTR. Under a combined federal-state tax system that is progressive, MTR is endogenous. However, it is common practice in empirical public finance research to treat each individual's marginal tax rate as a constant. Therefore, we measure MTR as the tax rate on income *prior* to adjustments for deductions or losses. This procedure minimizes the simultaneity problem that results when the marginal tax rate is based on adjusted gross or taxable income (see Feldstein, 1975).[7] In our context, viewing the *pre-avoidance* or "first-dollar" tax rate as constant amounts to assuming that tax avoidance choices are marginal and that inter-state mobility in response to tax rate differentials does not occur.

In analyzing tax losses we measure each taxpayer's marginal federal tax rate as that which applies to "pre-loss" taxable income, defined as "gross" income minus adjustments to income minus excess itemized deductions minus the personal exemptions amount. In this context, "gross" income equals the sum of all positive components of income. For estimating the effect of tax rates on deductions, the federal rate is the marginal rate on the taxpayer's "pre-deductions" taxable income, which equals adjusted gross income minus personal exemptions. The definitions of pre-avoidance taxable incomes for determining state tax rates are conceptually similar to those used in measuring the federal rate. Allowing for the deductibility of state income taxes at the federal level, MTR equals $f + s - fs$ for taxpayers who itemize deductions and $f + s$ for non-itemizers, where f and s are the applicable federal and state rates.[8]

State marginal tax rates range from zero in states without a personal income tax to

maximum rates in the teens in several other states.[9] Thus, even after making allowance for the deductibility of state income tax payments against federal tax liability, there is substantial variation in the combined marginal tax rate even among taxpayers with the same income. And, as mentioned above, the usual collinearity of income and tax rate is reduced further by the federal maximum tax on earned income that was in effect in 1979. The marginal tax rate on earned income was lower than the rate applying to other income, but because the earned income rate depended on, among other things, the ratio of earned to total income, it was not limited to 50 percent as is widely assumed (see Lindsey, 1981). For individuals affected by the maximum tax provision, we follow Lindsey (1983) and set the federal tax rate equal to a weighted average of the earned and unearned income marginal tax rates.

The nature of the data base greatly restricts the number of economic and personal characteristics of the taxpayer that can be controlled for in the deductions and tax losses equations. Tax-rate effects are isolated from the impact of income on deductions and tax losses by including adjusted gross income (AGI) in the equation explaining deductions and gross income (GI) in the tax losses equation. The amount of excluded capital gains (ECG) is entered in both models as an additional control for income effects. In addition, income may proxy educational attainment, knowledge of investment opportunities, and access to credit. In the tax losses equation, gross income also serves to control for the fact that the data do not distinguish tax (paper) losses from true economic losses. If true business losses rise with income, perhaps because high-income investors may be less risk averse than low-income taxpayers (Galper and Zimmerman, 1977), then regressing tax losses on MTR alone might produce a positive coefficient because of the correlation between income and tax rate. However, with income held constant, a positive coefficient on MTR would suggest that higher tax rates stimulate additional tax loss (rather than economic loss) investments, since true losses are disadvantageous to low and high tax rate individuals alike (Bailey, 1974).

The remaining independent variables are the number of dependents (DEP) and dummy variables for taxpayers age 65 or older (AGE65), for taxpayers using income averaging (INCAVG), and for taxpayers filing a joint return (JR). *A priori* predictions about the impact of these control variables on tax avoidance are not always possible. For example, older taxpayers are expected to have smaller interest expenses than younger consumers, but studies have found that persons over age 65 make relatively larger charitable contributions. However, we anticipate that DEP and JR will be positively related to deductions because (a) additional family members are likely to raise demands for tax-favored housing and medical care and (b) empirical studies find that being married and the presence of dependents raise charitable giving (Clotfelter and Steuerle, 1981).[10] In contrast, we expect a negative coefficient on AGE65 in the tax losses equation because older individuals seem less likely to engage in tax avoidance which involves moving income into the future.

INCAVG is included primarily to adjust for MTR overstating the true marginal tax rate of income averagers. Because income averagers actually have less incentive to engage in tax avoidance than implied by our estimated tax rate, INCAVG is expected to carry negative coefficients.[11] In addition, the dummy for averaging may pick up the impact of any lag between a tax rate change and tax avoidance behavior.

III. Empirical Results

Since the *Tax Model File* is a stratified sample, the raw data overrepresent the actual number of taxpayers in oversampled categories (e.g., taxpayers from small states, high-income taxpayers, taxpayers reporting business or farm receipts). Consequently, the data are weighted to eliminate any bias arising from the stratified sampling procedures.[12] Because not all taxpayers itemize deductions or report tax losses, especially in the lower-income categories, the equations explaining deductions and tax losses are estimated using

Tobit maximum likelihood estimation.[13] Since theory and empirical evidence suggest that the relationship between tax rates and tax avoidance will vary by income and marginal tax rate levels (see Gwartney and Stroup, 1982a; Lindsey, 1985), the tax avoidance models are estimated separately for various preavoidance taxable income classes.[14]

A. *Tax Deductions*

The equations for tax deductions are presented in Table 1. The marginal tax rate variable (MTR) has the predicted positive sign and the coefficient is extremely significant in every equation except that for the lowest taxable income category, $0–$20,000. Low-income taxpayers automatically enjoy the tax avoidance effect of the standard deduction, so the marginal benefits of discretionary deductions are probably not very great in this income range. However, this is not the case for higher income (and marginal tax rate) classes, in which the rate of income taxation positively influences the level of tax deductions reported on individual tax returns.

While the signs of the Tobit coefficients indicate the direction in which the explanatory variables affect deductions, a simple transformation of the coefficients is necessary to determine how much deductions change when the tax rate, income, or other variables change. With Tobit estimation, the partial derivatives of deductions are obtained by multiplying the Tobit coefficients by the predicted probability of observing nonzero deductions, designated F(z) in Table 1. For example, consider the equation for tax deductions claimed by individuals in the $20,000–$40,000 income class. A one-percentage-point rise in the marginal rate (e.g. from 30 to 31 percent) is estimated to raise itemized deductions by $121, or 156 times 0.773. Deductions are expected to rise by $.054 (.070 times 0.773) with each one dollar increase in AGI, by $512 (663 times 0.773) with each additional dependent, and so forth. Moving consecutively through the equations for higher income classes, one can calculate that a one-percentage-point increase in MTR is predicted to raise itemized deductions by $148, $410, $554, $871, and $972, respectively.

The nontax variables in the model generally perform as expected and their coefficients are usually highly significant. The levels of adjusted gross income and capital gains income are positively related to itemized deductions. Each additional dependent of the taxpayer raises deductions by anywhere from $65 to $1,665, with the dollar increment directly related to the taxpayer's income level. Other things constant, itemized deductions are relatively lower for taxpayers who use income averaging and, except in the lowest income category, deductions are substantially lower for elderly taxpayers. Taxpayers filing joint returns report higher deductions than single taxpayers in all but the very lowest and the very highest income groupings.

The stability of the tax rate coefficients was examined by testing several alternative specifications of the deductions model. First, the equations explaining itemized deductions were re-estimated using joint returns only. Joint filers accounted for over 75 percent of federal income taxes in 1979 and they probably constitute a more homogeneous group of taxpayers than the entire *Tax Model File* sample. The estimated marginal effects of taxation on deductions were $9, $122, $149, $454, $515, $888, and $898, respectively, which are very close to the estimates reported above. Second, taxpayers using income averaging were dropped from the sample and the equations were estimated with the variable INCAVG deleted. This change had little effect on the size or significance of the marginal tax rate coefficients. Third, the basic model was reestimated with the dependent variable redefined to exclude *all* state and local tax payments (not just state and local income taxes, which are excluded to eliminate an obvious potential upward bias in the MTR coefficients). This change reduced the coefficient of MTR but the pattern of results by income level was unaffected.[15] This implies that taxpayers exercise some discretion even over payments for sales and property taxes. After

Table 1

Tobit Analysis of Itemized Deductions on Individual Tax Returns, 1979

(Asymptotic t-statistics in Parentheses)

Pre-daduction Taxable Income	Explanatory Variables[a]										
($1,000s)	MTR	AGI	ECG	DEP	AGE65	INCAVG	JR	Constant	LLF	F(z)	n
0-20	-29 (-2.65)	.473 (30.16)	.002 (.12)	350 (7.79)	961 (5.85)	-2,486 (-7.02)	-251 (-1.79)	-8,666 (-47.66)	-78,241*	.187	22,175
20-40	156 (16.17)	.070 (6.64)	.074 (7.59)	663 (23.47)	-1,024 (-6.37)	-1,552 (-17.16)	1,315 (9.90)	-6,038 (-24.01)	-183,098*	.773	18,773
40-60	171 (12.54)	.047 (4.72)	.069 (12.19)	792 (21.52)	-1,293 (-7.66)	-1,726 (-18.28)	1,118 (5.22)	-5,259 (-8.18)	-192,338*	.864	17,082
60-80	490 (12.81)	.161 (8.81)	.072 (9.33)	1,025 (12.34)	-1,323 (-3.87)	-3,693 (-17.22)	2,575 (5.23)	-31,637 (-11.20)	-90,889*	.837	7,736
80-120	677 (24.03)	.049 (4.31)	.061 (10.67)	1,398 (14.96)	-3,519 (-9.29)	-5,611 (-19.32)	1,666 (3.32)	-32,166 (-17.10)	-143,313*	.819	11,865
120-160	1,068 (21.51)	.111 (5.16)	.054 (7.77)	1,595 (8.93)	-2,492 (-3.56)	-12,720 (-18.25)	3,089 (3.28)	-62,626 (-14.30)	-77,082*	.816	6,300
160-200	1,229 (13.95)	.205 (4.47)	.043 (4.57)	2,105 (5.80)	-3,290 (-2.40)	-16,405 (-11.07)	-4,879 (-2.67)	-83,235 (-8.50)	-36,289*	.791	2,888

[a]See text for variable definitions and sources.

*Indicates that the equation is statistically significant at the .01 level according to the log-likelihood function.

all, the level of property taxes depends partially on expenditures for housing and automobiles, and taxpayers can elect to keep detailed records of sales tax payments rather than use the optional tables.

As stated earlier, our primary interest in this paper is the impact of tax rates on aggregate deductions (and tax losses). Nevertheless, some insight about which deductions are more discretionary than others can be gained by examining how the major deductions, as a percentage of income, vary with the level of the pre-deduction marginal tax rate. These data suggest, as one might expect, that the positive impact of the marginal tax rate on deductions is much more pronounced for charitable contributions and "other" interest expenses than for mortgage interest or miscellaneous deductions.[16] In contrast to the prior items, deductions for medical expenses and casualty losses do not appear to be the result of tax avoidance decisions.

B. Tax Losses

The Tobit analysis of tax losses is presented in Table 2. The coefficient of MTR is negative although not or only marginally statistically significant in the first three equations. The negative tax rate coefficients in the under-$60,000 income categories may indicate that low-income taxpayers rely on other means of tax avoidance (such as deductions) or find loss-generating investments less profitable than assets whose returns are fully taxed. However, among taxpayers whose pre-investment income exceeds $60,000, an increase in the marginal tax rate results in additional losses on individual tax returns. A one-percentage-point increase in the marginal tax rate is associated with loss increments of $795, $1,820, $2,756 and $4,399 in the income classes between $60,000 and $200,000. Each of these estimates is significant at the .01 level or higher. The marginal tax rate impact on losses in the over $200,000 category is much larger, $8,130, but may be biased due to sample selectivity resulting from confidentiality requirements.[17] Disaggregating tax losses by source of loss suggests that losses from partnerships are much more responsive to the marginal tax rate than other losses.[18] It is fairly well known that in recent years real estate and oil and gas extraction partnerships have become very popular tax shelters (Nelson, 1985).

Most of the control variables are statistically related to tax losses although their impacts are not always consistent across income groupings. For example, gross income is positively related to tax losses in six of the eight income intervals, whereas increases in excluded capital gains lead to larger tax losses regardless of the pre-loss taxable income level. Entering GI and ECG in the model separately does provide some control for the composition of income according to labor and capital sources (see Minarik, 1983). However, one may argue that capital gains are as much a result of, as a determinant of, tax avoidance in the form of investment in assets designed to generate accounting losses. In any case, nearly identical estimates of the tax rate coefficient are obtained when ECG, itself a measure of a form of tax avoidance, is omitted from the model.[19]

Elderly taxpayers typically report substantially smaller losses on their tax returns than individuals under age 65. The number of dependents claimed by the taxpayer is positively related to tax losses in four of the eight equations and in five income classes taxpayers filing joint returns report larger losses than single taxpayers. Taxpayers using income-averaging consistently report smaller tax losses than individuals with comparably sized but more stable incomes. Since taxpayers whose incomes fluctuate sharply or who are not married may behave differently than the typical taxpayer when it comes to tax avoidance, the tax losses models were also estimated separately for taxpayers filing joint returns and for taxpayers not using income-averaging. The empirical results (available on request) confirm our conclusion that increases in marginal tax rates lead to substantial reporting of tax losses among upper middle- and high-income taxpayers.

Table 2

Tobit Analysis of Tax Losses Reported on Individual Tax Returns, 1979

(Asymptotic t-statistics in Parentheses)

Pre-loss Taxable Income	Explanatory Variables[a]										
($1,000s)	MTR	GI	ECG	DEP	AGE65	INCAVG	JR	Constant	LLF	F(z)	n
0-20	-50 (-2.77)	.089 (3.24)	.800 (13.65)	-122 (-1.25)	1,036 (3.29)	-3,222 (-3.96)	1,223 (4.44)	-10,655 (-38.65)	-61,557*	.119	21,175
20-40	-77 (-.79)	.197 (2.55)	1.042 (10.37)	-1,202 (-3.46)	-340 (-.19)	-7,210 (-6.73)	-5,472 (-3.81)	-27,449 (-8.45)	-96,762*	.245	18,889
40-60	-84 (-.70)	.126 (2.65)	.545 (11.85)	-572 (-1.69)	-6,036 (-4.18)	-8,540 (-9.83)	-5,818 (-3.24)	-13,976 (-2.23)	-115,936*	.349	16,721
60-80	1,751 (11.97)	.023 (.64)	.335 (11.03)	814 (2.45)	-11,338 (-8.12)	-14,201 (-16.00)	10,440 (5.51)	-110,670 (-11.37)	-62,108*	.454	7,454
80-120	4,438 (7.01)	-.198 (-1.29)	.480 (3.70)	4,350 (2.07)	-58,282 (-6.67)	-46,872 (-7.23)	38,835 (3.35)	-330,610 (-8.16)	-122,577*	.410	12,121
120-160	4,844 (29.10)	.208 (4.91)	.157 (5.88)	3,218 (5.27)	-29,438 (-11.57)	-51,362 (-21.92)	18,388 (5.49)	-321,470 (-25.64)	-58,716*	.569	5,720
160-200	7,027 (18,84)	.502 (4.43)	.213 (4.55)	4,038 (2.42)	-37,521 (-5.48)	-90,525 (-14.61)	11,159 (1.30)	-498,140 (-16.24)	-29,196*	.626	2,407
200+	10,175 (8.90)	1.340 (40.40)	.802 (16.56)	-460 (-.08)	-46,198 (-1.74)	-147,870 (-7.58)	-22.467 (-.79)	-866,620 (-10.52)	-59,016*	.799	3,878

[a]See text for variable definitions and sources.

*Indicates that the equation is statistically significant at the .01 level according to the log-likelihood function.

IV. Tax Avoidance and Tax Revenue

The empirical results presented in Tables 1 and 2 suggest that a tax rate increase will reduce the tax base, especially in the higher income categories, because taxpayers will allocate more resources to tax avoidance. *Ceteris paribus*, the change in taxable income due to deductions or tax losses equals minus one times the product of the Tobit coefficient of MTR and F(z). The impact of a tax rate increase on tax revenue depends, of course, on the elasticity of the tax base with respect to the tax rate. The tax base elasticities implied by the MTR coefficients in our deductions and tax losses equations (calculated at the mean marginal tax rate and pre-avoidance taxable income) are reported in Table 3, columns (2) and (4).

In the case of itemized deductions, taxable income elasticities never exceed unity in absolute value. This indicates that an increase in marginal tax rates fails to shrink the tax base *due to deductions alone* by an amount large enough to offset fully the positive revenue impact of the higher rates. Nonetheless, for pre-deduction taxable income classes above $60,000 the tax base elasticities are substantial, ranging from $-.34$ to $-.38$.

However, when the impact of taxation

Table 3

Taxable Income Elasticities

Pre-avoidance[a] Taxable Income Class ($1,000)	Itemized Deductions: Mean Tax Rate (1)	Itemized Deductions: Tax Base Elasticity (2)	Tax Losses: Mean Tax Rate (3)	Tax Losses: Tax Base Elasticity (4)
0-20	16.60	+.012	17.95	+.013
20-40	35.96	-.160	36.84	+.026*
40-60	49.20	-.153	50.08	+.031*
60-80	56.53	-.340	56.87	-.660
80-120	58.13	-.337	58.60	-1.11
120-160	59.53	-.380	60.52	-1.22
160-200	60.99	-.337	62.90	-1.58
200+	--	--	68.89	-1.72

[a]Refers to "pre-deductions" federal taxable income for columns (1) and (2) and "pre-loss" federal taxable income for columns (3) and (4).

*Not statistically different from zero.

on the level of loss-generating investment activities is considered, the tax base is found to be much more responsive to tax rate changes, particularly in the upper income (and marginal tax) groupings. For the $60,000–$80,000 pre-loss taxable income class, the estimated tax base elasticity is −.660, indicating that for this bracket revenue losses due to shrinkage in the tax base would offset two-thirds of the revenue gains due to higher marginal rates. For income groupings above $80,000, the estimated tax base elasticities due to tax losses alone are all in excess of unity, ranging from −1.11 to −1.72. This implies that, at least for high marginal rate classes (in these groupings the mean pre-loss marginal rates are in excess of 55 percent), lower aggregate federal and state rates would generate more revenue.[20] In other words, reducing tax rates in the upper-income brackets would actually increase the share of taxes paid by wealthy individuals, a result that can hardly be considered a "windfall" or "welfare" for the rich.

The impact of deductions *and* tax losses on the tax base cannot be measured by simply summing these separate elasticities since additional deductions reduce pre-loss taxable income (and additional losses reduce pre-deduction taxable income). Thus, not all taxpayers in a pre-loss taxable income class will be in the same pre-deduction taxable income class. However, one would expect considerable overlap, particularly when the sample sizes are large. Bearing this in mind, a few generalizations do seem possible. First, our analysis suggests that tax avoidance stemming from both deductions and losses is small for taxpayers with pre-avoidance incomes of less than $60,000, income groupings characterized by pre-avoidance combined federal-state marginal tax rates averaging under 50 percent. For these categories, higher marginal rates lead to roughly proportional increases in revenue. Second, the revenue-enhancing effects of higher tax rates diminish substantially due to income tax avoidance as combined marginal rates exceed 50 percent. For taxpayers in higher income categories with mean combined marginal rates above 55 percent, the higher marginal rates stimulate tax avoidance activities sufficiently enough to reduce tax revenues in these ranges.

Since our tax base elasticities do not incorporate the effects of higher tax rates on labor supply, tax evasion, fringe benefits, capital gains, or other factors which affect taxable income, they should be viewed as lower bounds. Thus, once these other factors are considered, Laffer curves for some individuals may bend backwards at marginal rates well below 50 percent. The validity of this observation is supported by Lindsey's (1985) analysis of the 1982 federal income tax rate reductions. By considering some of the very same taxpayer adjustments to lower tax rates which our analysis ignores (e.g. increases in wage and salary income due to additional labor supply or lower fringe benefit compensation, rises in capital gains realizations) Lindsey estimated that the revenue-maximizing rate of the federal income tax may be as low as 40 to 43 percent.

Since the majority of taxpayers and income appear in income classes where tax avoidance is relatively unresponsive to changes in tax rates, *in aggregate,* tax avoidance (and taxable income) is not highly responsive to changes in marginal rates. For example, weighting the tax base elasticities reported in Table 3 by the share of taxable income in each category yields an aggregate tax base elasticity of only −.103 for itemized deductions and −.086 for tax losses. It is unlikely that these aggregate (weighted) elasticities would be much higher even if our data base included all high income taxpayers, rather than just those with AGI less than $200,000. However, the aggregate result (especially for tax losses) conceals the responsiveness of tax avoidance and revenue to rate changes in the upper income brackets. As a consequence, using tax avoidance parameters from aggregate samples to simulate the revenue impact of rate changes affecting taxpayers in *specific* income ranges may produce biased estimates.[21]

A final caveat should be added. Since our methodology incorporated tax rate differences due to a pattern of federal and state income taxes that had been in place for some time, our elasticity estimates are best interpreted as long run rather than short run. Thus, the response of tax revenue and the distribution of the tax burden during the first year or two subsequent to a change in tax rates would probably be weaker than our estimates imply. As Buchanan and Lee (1982) have discussed, the predictably smaller tax elasticities in the short run reduce the political attractiveness of rate reductions.

V. Concluding Comments

We have presented substantial evidence suggesting that income tax avoidance, in the form of legal deductions from income and accounting losses that offset taxable income, increases with the rate of taxation. Therefore, reducing income tax rates would shift consumption from deductible to nondeductible items and would divert investment funds from loss-generating assets such as real estate into stocks, bonds, and other taxable assets. The impact of higher tax rates on tax avoidance is large enough in the upper-income classes to produce an inverse relationship between tax rates and tax revenue. The size of our tax base elasticities, which reflect the effect of tax avoidance but not labor supply or other determinants of taxable income, imply that research which ignores tax avoidance may seriously underestimate the impact of tax rate changes on tax revenue and resource allocations.[22]

Some observers believe that income tax revenues could be increased by raising tax rates on high income individuals and closing tax loopholes. For instance, several members of Congress have publicly suggested that the 1986 reductions of the top marginal tax rates be cancelled. Our results suggest that increasing the top marginal rates will reduce rather than expand the amount of revenue collected from high-income taxpayers, at least in the long run. Similarly, if closing loopholes consists of disallowing major deductions, our findings imply that the bulk of tax avoidance—tax-shelter investments—will continue undeterred. Since tax avoidance encompasses such a broad range of activities, many appearing as ordinary business and consumption choices, it is extremely difficult for a legislative body to deter in the face of high marginal tax rates. Attempts to limit the types of interest payments which can be deducted on personal tax returns and to prohibit taxpayers from using losses from "passive" tax shelters to offset other income may succeed in reducing tax avoidance, but such measures are likely to be costly in terms of administration and compliance. However, our findings suggest that lower marginal tax rates alone will prove an effective weapon against tax avoidance in the upper income brackets.

FOOTNOTES

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[1]Several important means of avoiding tax liability besides decreasing factor supply are not considered in this analysis. This include illegal tax avoidance, or tax evasion (see Clotfelter, 1983a), substituting fringe benefits for taxable compensation (see Long and Scott, 1982, and Woodbury, 1983), and deferring realized capital gains (see Feldstein, Slemrod, and Yitzhaki, 1980, and Minarik, 1984).

[2]The following discussion draws liberally from the recent model of Barro and Sahasakul (1983) in which both tax avoidance and labor income are endogenous.

[3]Because our data base does not contain schedules C and F (business and farm income statements), the business deductions from individual income are limited to adjustments to income from Form 2106 and certain itemized deductions. See Clotfelter (1983b) for an analysis of deductions from business income of expenditures yielding consumption benefits (e.g., travel and entertainment). The marginal tax rate relevant to deductions reported on business tax returns includes both income and payroll taxes. In contrast, only personal income taxes are relevant to deductions on individual (1040) returns.

[4]Two articles that do focus on tax losses are Long (1984) and Gwartney and Stroup (1982b).

[5]An important exception to this rule allows individuals with "working interest" investments in oil and gas drilling operations to shelter other income with business losses.

[6]A detailed description of the construction and

sources of all variables is provided in an Appendix available from the authors.

[7]The simultaneity problem exists because with a progressive tax the level of deductions (the dependent variable) determines the marginal tax rate on the last dollar of deductions, which is the theoretically correct tax rate (i.e. the rate which holds at the consumer's optimum). More sophisticated methods of correcting for simultaneity have been reported in recent research (e.g. Feldstein, Slemrod, and Yitzhaki, 1984), but use of the "first-dollar" tax rate remains common practice. For other papers using this method see Feldstein (1975), Clotfelter and Steuerle (1981), and Lindsey (1983). Furthermore, in their 1980 paper Feldstein, Slemrod, and Yitzhaki reported that a first-dollar rate and an instrumental variables estimator yielded quite similar results. In any case, the simultaneity problem is less severe in our analysis because the state of residence, rather than the level of deductions or losses, is the major determinant of individual differences in tax rates *holding income constant*.

[8]When federal income taxes can be deducted on state returns, the effective marginal tax rate equals $(f + s - 2fs)/(1 - fs)$. The states of Georgia, Illinois, Indiana, Massachusetts, Michigan, New Jersey, and Ohio did not allow itemized deductions in 1979. In this case, the marginal tax rate relevant for the analysis of deductions is the federal rate alone. For our empirical analysis, we exclude individual tax returns for which the appropriate state rate structure could not be determined. Excluded were returns filed by individuals (a) residing outside of the 50 states and the District of Columbia, (b) living in Connecticut, New Hampshire, and Tennessee, states which levied only a limited personal income tax, and (c) having adjusted gross incomes of $200,000 or more since confidentiality prohibited the identification of state of residence for these returns.

[9]Florida, Nevada, South Dakota, Texas, Washington, and Wyoming did not levy a personal income tax in 1979. In contrast, California, Delaware, Hawaii, Iowa, Minnesota, Montana, New York, and Wisconsin levied maximum rates of 11 percent or more. The details of state income tax structures necessary to construct the combined federal and state tax rate (e.g. income brackets and the respective marginal tax rates, personal exemptions, standard deductions federal tax deductibility provisions) can be found in Advisory Commission on Intergovernmental Relations (1980).

[10]The state (but not the federal) tax rates which are used to measure MTR are the marginal rates applicable to joint returns. To the extent that some states tax single taxpayers at a relatively higher rate than married couples having the same income, the coefficient of JR may be a biased estimate of the impact of marital status on tax avoidance. However, since most state income tax rates are relatively low (compared to federal rates) any bias is likely to be negligible.

[11]In the case of deductions, this effect may be reversed because income averaging only partially corrects for the additional tax liability imposed on fluctuating incomes under a progressive tax structure. In other words, income averagers may want to take deductions in years when their tax rates are higher than they otherwise would be. To investigate how the tax rate coefficient may be biased by this measurement difficulty, we have also estimated deductions and tax losses equations on samples of taxpayers that do not use income averaging.

[12]The *Tax Model File* provides sampling weights equal to the inverse of the sampling rate for each observation. This weight was applied to each observation in our analysis. When the data base is a stratified sample, failure to utilize weighted data can substantially alter the results. See Minarik (1984) and Feldstein, Slemrod, and Yitzhaki (1984) for additional discussion on this point and an example of sampling bias in the case of the impact of taxation on capital gains realization. Since preliminary analysis of tax deductions and tax losses using unweighted data suggested that failure to control for the sampling procedure used in the *Tax Model File* leads to an overstatement of the effect of taxation on tax avoidance, especially in the case of tax losses, the empirical findings reported below are based on weighted data. Readers interested in the unweighted results should contact the authors.

[13]The linearity assumption underlying ordinary least squares (OLS) regression analysis is violated if zero deductions or tax losses are reported by taxpayers at different income or tax rate levels. Consequently, OLS estimation will yield biased estimates of the determinants of tax deductions and losses (Amemiya, 1985). OLS estimation using only the tax returns which report positive deductions or losses will also yield biased estimates. The preferred technique for estimating models in which the range of the dependent variable is constrained or truncated is Tobit estimation (Tobin, 1958), which estimates the relationship between, say, the tax rate and deductions *conditional* on deductions being itemized. For a related study which employs the Tobit maximum likelihood estimation, see Clotfelter (1983b).

[14]As an alternative to estimating separate equations for each income class, a single equation containing a tax rate-income level interaction term can be estimated for all taxpayers together. While this approach allows the marginal effects of taxation and income to differ between low- and high-income taxpayers, it constrains the impact of other variables on tax avoidance to be equal for all taxpayers and it assumes that the standard error of the equation is the same for all income classes. Consequently, when the sample size is sufficiently large (as in the case of the *Tax Model File*), more information about the determinants of tax avoidance can be obtained by estimating separate equations. The income ranges and number of tax returns in each class are reported in Tables 1 and 2. For the two lowest income classes the samples of tax returns used for estimation are random samples (at a 30 and 50 percent rate respectively) of the *Tax Model File* records in these income categories. This was done to minimize the computation expenses of iterative maximum-likelihood routines.

[15]The tax rate coefficients (asymptotic t-statistics) from this specification, listed in order from low to high income categories, are: −20(−2.06), 114(13.51), 127(10.15), 406(11.25), 611(22.63), 1,003(21.15), and 1,138(13.47).

[16]The relevant data are shown in the table on the following page:

DEDUCTIONS AS A PERCENTAGE OF INCOME, JOINT RETURNS

Marginal Tax Rate (%)	Medical	Home Mortgage	Other Interest	Contributions	Casualty Losses	Miscellaneous
0–19	1.33	2.00	.89	.66	.10	.22
20–29	1.15	3.66	1.57	1.18	.16	.61
30–39	.79	4.38	1.96	1.50	.21	.85
40–49	.69	4.40	2.12	1.82	.21	.95
50–59	.45	3.40	2.32	2.12	.22	.86
60–69	.40	2.03	3.27	2.77	.30	1.01
70+	.41	1.33	3.97	3.00	.06	1.11

[17]This category includes high-income returns reporting losses large enough to reduce AGI below $200,000. However, high-income returns with smaller losses are excluded if AGI exceeds $200,000. This biases the coefficient of MTR in a manner analogous to the wage elasticity bias in labor supply models that exclude individuals out of the labor force. However, the tax rate coefficients for the lower income groupings are not affected by this sample limitation.

[18]The relevant data appear below:

TAX LOSSES AS A PERCENTAGE OF INCOME, JOINT RETURNS

Marginal Tax Rate (%)	Partnership	Small Business Corporations	Rents	Royalty	Business and Profession	Farm
0–19	.57	.24	.72	.00	1.86	2.17
20–29	.16	.09	.40	.00	.59	.52
30–39	.19	.08	.52	.00	.42	.43
40–49	.50	.17	.86	.00	.46	.59
50–59	2.02	.40	1.29	.02	.60	.88
60–69	7.24	1.16	1.57	.13	1.41	1.55
70+	35.48	4.93	3.54	.37	5.41	4.44

[19]The tax rate coefficients (t-statistics when ECG is dropped from the model are listed below in order from low to high income category: −62(−3.46), −85(−.87), −61(−.51), 1,888(12.81), 4,774(7.61), 5,030(30.56), 7,483(20.65), and 12,166(10.30).

[20]This result should be qualified with the understanding that tax revenue losses would be partially offset by the tax revenue generated when capital gains associated with assets generating current tax losses are realized. However, future revenues would be relatively low (especially in present-value terms) if capital gains happen to be taxed at lower rates than those applying to other incomes.

[21]For example, Lindsey (1983) estimated that 0.7 percent more income will avoid tax for each 1 percent increase in the marginal tax rate. His definition of tax-avoidance and model specification differ from ours so no direct comparison with our results is possible. More importantly, however, he estimated only one equation for all income classes. Consequently, our findings suggest that his simulations of reducing tax rates on upper-income individuals probably underestimate the revenue gain due to lower avoidance.

[22]Both Stuart (1984) and Browning and Johnson (1984) consider only factor supply effects in their analyses of the opportunity cost, in terms of reductions in aggregate income, of higher taxes.

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Appendix

Variable Construction

This section explains the construction of certain key variables either appearing in the Tobit equations directly or used to compute variables in the model. The line (L) numbers referenced are those appearing on the 1979 U.S. Individual Income Tax Return, Form 1040. When the line number pertains to a specific schedule, that schedule is denoted in parentheses.

(1) Deductions = L39(A) − L11(A).

(2) Tax Losses = L10c(E) + L14c(E) + L16c(E) − L9(E)* − L13* − L14* − L16* − L19* − L21*, where the items marked by an asterisk are subtracted only if negative amounts.

(3) "Gross income" = L8 + L9 + L10c + L11 + L12 + L15 + L17 + L20b + L10d(E) + L14d(E) + L16d(E) + L9(E)* + L13* + L14* + L16* + L19* + L21*, where the items marked by an asterisk are added only if positive amounts. For taxpayers filing Form 1040A, "gross income" equals L7 + L8 + L9c + L10b.

(4) "Pre-loss" federal taxable income = "Gross" income − L30 − L41(A) − (L7 · 1,000).

(5) "Pre-loss" state taxable income = "Gross" income − applicable standard deduction allowed joint returns − applicable personal exemption amount. "Gross" income is expanded to include capital gains in the states which fully tax capital gains.

(6) "Pre-deductions" federal taxable income = L31 − (L7 · 1,000).

(7) "Pre-deductions" state taxable income = Adjusted gross income − applicable personal exemptions amount.

(8) Federal marginal tax rate (for taxpayers with personal service income) = $\alpha t_e + (1 - \alpha)t_n$, where t_e and t_n are the marginal tax rates on earned and non-labor income respectively, and α is the share of earned income in total income. Lindsey (1983) has shown that the marginal tax rate on earned income (t_e) equals $\Theta(B - A + 50)\% + (1 - \Theta)B\%$, where Θ is the fraction of earned in-

come treated as earned taxable income, A is the normal marginal tax rate if the taxpayer had only earned income, and B is the normal marginal rate on total income. Under 1979 income tax law the fraction Θ can be computed as

$$\frac{TI}{AGI} + \frac{PSI}{AGI} - \frac{TI}{AGI} \cdot \frac{PSI}{AGI}$$

where TI is taxable income, AGI is adjusted gross income, and PSI is personal service income.