

The Sensitivity of the Yield of the U.S. Individual Income Tax and the Tax Reforms of the Past Decade

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I. Synopsis of Methods for Measuring the Sensitivity of the Tax

THE SENSITIVITY (i.e., elasticity and built-in flexibility) of the U. S. individual income tax to changes in national income is of great interest to researchers and policymakers. However, the direct measurement of this sensitivity—that is, the measurement obtained from time-series observations of the relevant variables—has always been difficult, and even at times impossible, because changes in the legal structure of the tax have been too frequent to provide enough observations that relate to the same legal structure to allow statistically significant coefficients to be determined. This was particularly true in the United States before 1954, when the rates were changed frequently; it has also been true since 1963, when important changes occurred in rates, personal exemptions, deductions, and other features. In contrast, during the period between 1954 and 1963, hardly any significant statutory changes occurred in the tax.

The studies that have used historical data to measure sensitivity have basically followed two alternative routes: either they have confined their analysis to those particular periods when there were no changes in the statutory laws (Goode, 1964; Lewis, 1962) or they have attempted to take account of the effects of statutory changes on the relevant historical series—revenue from the tax, taxable income, etc.—through direct adjustments of the series (Brown and Kruiuzenga, 1959; Goode, 1964;

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Prest, 1962) or through the introduction of dummy variables in the regression equations (Waldorf, 1967; also Pechman, 1973). It is obvious that as the frequency and importance of statutory changes increase so do the problems of using historical data. It is for this reason that the alternative of using cross-sectional data is certainly "worthy of . . . consideration" (Goode, 1964, p. 346) and at times may be the only feasible approach.

There are at least three approaches to the measurement of the sensitivity of the income tax by way of cross-sectional data.

The first, which seems to have been developed originally by Mishan and Dicks-Mireaux (1958) and was subsequently applied by Blackburn (1967), calculates, for a given year, the mean tax liability, t , and the mean adjusted gross income (*AGI*), y , for each of the income classes reported by the Internal Revenue Service's *Statistics of Income*.¹ Once these means have been derived, an equation of the type $t = ay^b$ is fitted to the data. This exponential equation can be transformed into a logarithmic one. Regressing the logarithms of mean tax liability against the logarithms of mean adjusted gross income—that is, $\log t = a + b \log y$ —one can find directly the elasticity of the tax with respect to *AGI*. This is simply the b in the equation.²

The basic assumption underlying this approach is that the prevailing relationship between mean tax liability and mean *AGI* for each income class is essentially the same as the relationship prevailing for the country as a whole at that level of *AGI*; any divergence is attributed to error terms with an expected mean value of zero.³ As factors such as particular incomes (e.g., capital gains), particular deductions (e.g., interest payments), and particular family situations (number of children, family status, etc.) are likely to differ substantially and systematically among income classes,⁴ the results obtained from the application of this method are open to legitimate questions.

A second approach, recently followed by Pechman (1973), estimates the sensitivity of the tax by using a somewhat more complex and much more resource-demanding method. This method calculates the relationships between tax and income from a random, stratified sample of actual

¹ In 1972 there were 24 such classes, so that one gets 24 estimates of t and of y .

² This method was also used by Prest (1962) in connection with U. K. data.

³ Adjusted gross income results after gross income, from all sources that are subject to tax, is adjusted to reflect allowances for business expenses. *AGI* less personal deductions (for such outlays as taxes, medical expenses, and charitable contributions) and less personal exemptions gives taxable income, *TI*.

⁴ See U.S. Internal Revenue Service, *Statistics of Income: Individual Income Tax Returns, 1972* (Washington, 1975), Table 1.4, pp. 15–24 (hereinafter referred to as *Statistics of Income*).

federal individual income tax returns filed for a particular year—the Internal Revenue Service tax file. This tax file contains more than 90,000 returns, although Pechman's estimates are based on a subsample of 10,000 returns. This is surely an interesting but also costly method that is available to only a few people.

A third approach, also relying on cross-sectional data, that was proposed a few years ago (Tanzi, 1969) used data easily available to everyone (unlike Pechman's) and also had the not unimportant advantage of being quite simple. Furthermore, for the income tax structure that existed in the United States during the period 1954–63, it was shown to give results that were practically identical to those obtained by other researchers (Blackburn, 1967; Mishan and Dicks-Mireaux, 1958; and Waldorf, 1967) who used alternative and somewhat more complex approaches.⁵ This method is used later to estimate changes in the sensitivity of the U.S. individual income tax over the period 1963–72.

A detailed description of the method, and a discussion of some of the assumptions on which it is based, can be found in Tanzi (1969). Briefly explained, the method is based on the hypothesis that a time series of the U. S. federal income tax yield, T , taxable income, TI , and adjusted gross income, AGI , all on a per capita basis, can be simulated from data for the same variables for the 50 states and the District of Columbia.⁶ The basic rationale is that, while in a particular year per capita AGI for the states covers a really wide range, the incomes of the residents of these states are being subjected to exactly the same federal income tax legislation. Thus, in 1972, the average per capita income tax yield among the states ranged from a low of \$236.80 to a high of \$630.80, the average per capita taxable income ranged from \$1,284.90 to \$2,822.40, and the average per capita adjusted gross income ranged from \$2,370.00 to \$4,429.90. In the absence of substantial inflation, it would take decades for data from time series for the U. S. individual income tax to provide the same range.

Thus, if $i = 1 \dots 51$ refers to the particular state (or the District of Columbia), then the relationships

$$T_i = f_1 (AGI)$$

$$T_i = f_2 (TI)$$

$$TI_i = f_3 (AGI)$$

are assumed to provide unbiased estimates of the same relationships for the Federal Government when per capita income for the United States moves over the same range as that covered by the states, and the tax

⁵ See Tanzi (1969), p. 209.

⁶ These data are available in the annual *Statistics of Income*.

laws remain unchanged. For the estimation of elasticities, we shall follow Mishan and Dicks-Mireaux (1958) and Blackburn (1967) in using constant elasticity functions—of the type $T = AY^b$ —in specifying the form of the relationship.

As mentioned earlier, although the legal structure of the federal income tax remained practically unchanged during the period 1954–63, several relatively important changes occurred in the following decade. Furthermore, whereas the consumer price index (CPI) for all items rose by 13.9 per cent in the former period, it rose by 34.9 per cent in the period 1964–72. Both the legal changes and inflation have affected the elasticity and the built-in flexibility of the tax. The objective of this paper will be to measure their effects over the period 1963–72 and to attempt to relate these changes in the sensitivity of the tax to the events of that period. It is unfortunate that the data needed for this type of analysis are now available only up to 1972. Although inflation persisted from 1963 to 1972, it was only in 1974 that the United States experienced really strong inflationary pressures, with the CPI rising in that year by about 11 per cent.

II. A Summary of Statutory Changes in the Period 1963–72

Important changes in the legal structure of the individual income tax were brought about by the Tax Reform Acts⁷ of 1964, 1968, and 1969, including changes in rates, brackets, and exemptions. The principal changes are described briefly.

The most important rate changes were enacted in 1964 and 1965, when the minimum income tax rate,⁸ was reduced from 20 per cent to 16 per cent and to 14 per cent, respectively. This change, together with the splitting of the first bracket, made the tax much more progressive and elastic at lower-income levels. The maximum marginal rate was reduced from 91 per cent to 77 per cent in 1964 and to 70 per cent in 1965. The brackets to which these rates were applied were also modified. In 1964 the first taxable bracket, which up to that time had covered incomes of up to \$2,000, was split into four smaller ones of \$500 each. These smaller brackets were taxed at rates ranging from 14 per cent upward. The top bracket was also reduced from \$200,000 to \$100,000.

⁷ The 1968 Act was officially called the Revenue and Expenditure Control Act. It did not involve permanent changes in the legal structure of the federal individual income tax but only temporary surcharges, or surtaxes.

⁸ This is the rate at which the first taxable bracket is levied.

Another significant but less general change in rates was introduced by the 1969 Tax Reform Act, which, effective in the taxable year 1971, established a special reduced-rate schedule for single persons not heading households, reduced the maximum marginal rate on "earned income" to 60 per cent for 1971 and to 50 per cent thereafter, and, to taxable income brackets above \$1,000, applied surcharges of 7.5 per cent in 1968, 10 per cent in 1969, and 2.5 per cent in 1970.

Personal exemptions for taxpayers and for each dependent were raised from the \$600 level, which had prevailed between 1948 and 1969, to \$625 in 1970, to \$675 in 1971, and to \$750 in 1972. The 1969 Tax Reform Act also substantially modified the percentage *standard deduction*, which, from 1944 to 1970, had been 10 per cent of *AGI*, with a maximum of \$1,000 for a married person filing a joint return. This deduction was raised to 13 per cent, with a maximum of \$1,500, in 1971, and to 15 per cent, with a maximum of \$2,000, for 1972 and later years. Also, the minimum standard deduction was increased in 1971 and again in 1972.

From the brief account of legal changes given earlier, one would expect a reform-induced fall in the ratio of tax liability, *T*, to taxable income, *TI*, for 1964 and 1965, when the rates were reduced across the board, and then again another drop in 1971 with the reduction in rates on single persons and on earned incomes. On the other hand, one would expect increases in 1968, 1969, and, to a much lesser extent, 1970 because of the surtax. However, owing to the greater than unitary elasticity of tax liability with respect to taxable income, these increases should exceed the rate of the surtax.

These expectations are supported by Table 1. It is there shown that *T/TI* fell from 0.231 in 1963 to 0.205 in 1964 and to 0.194 in 1965, reflecting the cuts in the rates. Then between 1967 and 1968, it rose

TABLE 1. UNITED STATES: STATISTICS ON INDIVIDUAL INCOME TAX, 1963-72¹

Year	<i>T</i>	<i>TI</i>	<i>AGI</i>	<i>GNP</i>	<i>TI/AGI</i>	<i>TI/GNP</i>	<i>AGI/AGI</i>	<i>T/TI</i>	<i>T/AGI</i>	<i>T/GNP</i>
<i>(In billions of dollars)</i>										
1963	48.2	209.1	368.8	590.5	0.567	0.354	0.624	0.231	0.131	0.0816
1964	47.2	229.8	396.7	632.4	0.579	0.363	0.627	0.205	0.119	0.0746
1965	49.5	255.1	429.2	684.9	0.594	0.372	0.627	0.194	0.115	0.0723
1966	56.1	286.3	468.5	749.9	0.611	0.382	0.625	0.196	0.120	0.0748
1967	62.9	315.1	504.8	793.9	0.624	0.397	0.636	0.200	0.125	0.0793
1968	76.6	352.1	554.4	864.2	0.635	0.407	0.642	0.218	0.138	0.0886
1969	86.6	388.1	603.6	930.3	0.643	0.417	0.649	0.223	0.143	0.0930
1970	83.9	399.9	631.7	977.1	0.633	0.409	0.646	0.210	0.133	0.0859
1971	85.4	412.4	673.6	1,054.9	0.612	0.391	0.639	0.207	0.127	0.0810
1972	93.6	445.6	746.0	1,158.0	0.597	0.385	0.644	0.210	0.125	0.0808

Sources: Internal Revenue Service, *Statistics of Income: Individual Income Tax Returns, 1972* (Washington, 1975); Council of Economic Advisers, *Economic Report of the President* (Washington, February 1975).

¹ *T* = income tax; *TI* = taxable income; *AGI* = adjusted gross income; *GNP* = gross national product.

from 0.200 to 0.218 (by 9 per cent), which exceeds the 7.5 per cent surtax, and in 1969 it rose to 0.223, 11.5 per cent above the presurtax level of 1967, thus exceeding again the surtax rate of 10 per cent. In 1970, with the removal of the surtax, T/TI fell below the 1969 level but, at 0.210, it was well above the presurtax 1966 level of 0.196. The elasticity of T with respect to TI would account for this increase. A marginal fall in the ratio is shown for 1971, reflecting the reductions in the rates for single persons and for earned income.

Legal changes would also lead one to expect changes in the TI/AGI ratio for 1970, 1971, and 1972, reflecting both the increases in personal exemptions and, for 1971 and 1972, in standard deductions. These expectations are also borne out by Table 1, which shows that the yearly increase in TI/AGI that occurred regularly between 1963 and 1969 was reversed by the afore-mentioned legal changes. Thus, TI/AGI fell from 0.643 in 1969 to 0.597 in 1972. Since

$$T/AGI = T/TI \cdot TI/AGI$$

the changes in T/AGI reflect those in T/TI and in TI/AGI . To a large extent, over the period these changes neutralized each other, so that the ratio of T to AGI was little affected.

Table 1, while interesting, does not tell us much about the effects of the various statutory changes on the elasticity and built-in flexibility of the tax.⁹ From the outline of the Tax Reform Acts, one might expect the elasticity of the tax with respect to taxable income to have been affected most by the Revenue Act of 1964, while the elasticity of taxable income with respect to AGI might have been affected more by the Revenue Act of 1969 and, particularly, by the sharp increases in personal exemptions and standard deductions that took place in 1972. It is to the measurement of these elasticities that we turn next.

III. Estimates of Elasticities

Table 2 shows for most of the years of the period 1963–72 the estimates of the elasticity of tax revenue, T , with respect to taxable income, TI , derived as described in Section I. The most important change in this “rate structure elasticity” occurs after the 1964 Tax Reform Act,

⁹ Elasticity is a ratio that is defined as the percentage change in tax yield that is brought about by a change of 1 per cent in AGI . Built-in flexibility is defined as the ratio of the absolute change in tax yield to the absolute change in AGI . Both of these concepts can be related to taxable income rather than to AGI . We have also estimated the elasticity and built-in flexibility of taxable income with respect to AGI . (See Tables 3 and 9.)

TABLE 2. UNITED STATES: ELASTICITY OF TAX REVENUE WITH RESPECT TO TAXABLE INCOME, 1963 AND 1966-72

(Elasticity of rate structure)

1963	$LnT = -2.021$ (0.12241)	$+ 1.078$ (0.01782)	$LnTI$	$R^2 = 0.987$
1966	$LnT = -2.801$ (0.18990)	$+ 1.158$ (0.02654)	$LnTI$	$R^2 = 0.975$
1967	$LnT = -2.701$ (0.13915)	$+ 1.146$ (0.01921)	$LnTI$	$R^2 = 0.986$
1968	$LnT = -2.821$ (0.14489)	$+ 1.171$ (0.01972)	$LnTI$	$R^2 = 0.986$
1969	$LnT = -2.729$ (0.1431)	$+ 1.161$ (0.01919)	$LnTI$	$R^2 = 0.987$
1970	$LnT = -2.622$ (0.1330)	$+ 1.139$ (0.01777)	$LnTI$	$R^2 = 0.988$
1971	$LnT = -2.741$ (0.1429)	$+ 1.152$ (0.01902)	$LnTI$	$R^2 = 0.987$
1972	$LnT = -2.947$ (0.1830)	$+ 1.179$ (0.0244)	$LnTI$	$R^2 = 0.979$

which appears to have caused this elasticity to increase from about 1.08 in 1963 to about 1.16 in 1966.

The 1963 estimate, which is not much above unity, confirms to a large extent the "somewhat peculiar" constancy of the effective tax rate on taxable income found by Goode (1964, p. 291). For the period that ended in 1963, he found that "the average effective rate and average marginal rate (both computed with respect to taxable income) appear to have been approximately constant at about 23 percent" (Goode, p. 291). State data for 1963 confirm this finding: out of 50 states, only 3 had T/TIs greater than 0.24 and only 7 had ratios of less than 0.22. In later years, on the other hand, there was much less of an obvious modal ratio; the T/TIs for the states became more responsive to per capita income and ranged in 1972 from 0.18 to 0.23. Thus, the contribution of the rate structure to the overall elasticity of the tax became much more significant after 1964.

Table 3 provides estimates of the elasticity of taxable income with respect to AGI . This elasticity of the tax base was about 1.27 in 1963 and about 1.22-1.23 between 1966 and 1971.¹⁰ In 1972, however, it rose to more than 1.26, thus approaching the 1963 level. This increase was undoubtedly due to the important changes in personal exemptions and deductions introduced in 1972.

¹⁰ It must be realized that in the absence of statutory changes, but in the presence of real growth and inflation, the importance of basic exemptions specified in nominal terms tends to decrease, so that their contribution to the overall elasticity becomes smaller.

TABLE 3. UNITED STATES: ELASTICITY OF TAXABLE INCOME WITH RESPECT TO ADJUSTED GROSS INCOME, 1963 AND 1966-72

(Elasticity of tax base)

1963	$\text{LnTI} = -2.638 + 1.272$ (0.151) (0.020)	LnAGI	$R^2 = 0.988$
1966	$\text{LnTI} = -2.285 + 1.230$ (0.161) (0.021)	LnAGI	$R^2 = 0.986$
1967	$\text{LnTI} = -2.297 + 1.232$ (0.144) (0.019)	LnAGI	$R^2 = 0.989$
1968	$\text{LnTI} = -2.185 + 1.219$ (0.152) (0.019)	LnAGI	$R^2 = 0.988$
1969	$\text{LnTI} = -2.275 + 1.230$ (0.180) (0.023)	LnAGI	$R^2 = 0.984$
1970	$\text{LnTI} = -2.196 + 1.216$ (0.149) (0.019)	LnAGI	$R^2 = 0.989$
1971	$\text{LnTI} = -2.314 + 1.226$ (0.178) (0.022)	LnAGI	$R^2 = 0.984$
1972	$\text{LnTI} = -2.666 + 1.263$ (0.201) (0.026)	LnAGI	$R^2 = 0.981$

In 1963 the *TI/AGI* ratio ranged, for the states, from a minimum of 0.47 to a maximum of 0.62. By 1969, owing to the increase in nominal incomes, which reduced the importance of personal exemptions and of standard deductions, the minimum *TI/AGI* rose to 0.57, while the maximum increased somewhat less, to 0.69. In 1972, on the other hand, as a consequence of the 1969 Tax Reform Act, the *TI/AGI* ratio ranged from 0.52 to 0.64. Thus, the increase in the size of the personal exemption (from \$600 in 1963 to \$750 in 1972—25 per cent), as well as that in the standard deduction, was not enough to neutralize the increase in nominal income (owing to real growth and inflation) that occurred over the period 1963-72. Per capita personal income, for example, rose by 84 per cent during that period. The poorer states are the ones that, over the whole period, experienced the largest increases in taxable income.¹¹

The estimates of the elasticity of tax revenue with respect to *AGI* are shown in Table 4. This total elasticity results from the combined effect of the elasticity of the rate structure and the elasticity of the base. Table 4 shows that the overall elasticity increased from about 1.37 in 1963 to about 1.41-1.42 for the period 1966-71 and then it increased again, to about 1.48 in 1972.¹² While the first of these increases was due mostly to the changes in the rates, the second was also brought about by changes in the relationship between *TI* and *AGI*.

¹¹ But they were also the ones that benefited the most from the increase in the personal exemptions and standard deductions brought about by the 1969 Tax Reform Act.

¹² In 1970, the elasticity was slightly smaller, at 1.38.

TABLE 4. UNITED STATES: ELASTICITY OF TAX REVENUE WITH RESPECT TO ADJUSTED GROSS INCOME, 1963 AND 1966-72

(Overall elasticity)

1963	$LnT = -4.842 + 1.368$ (0.255) (0.034)	$LnAGI$	$R^2 = 0.970$
1966	$LnT = -5.397 + 1.418$ (0.348) (0.045)	$LnAGI$	$R^2 = 0.952$
1967	$LnT = -5.295 + 1.407$ (0.279) (0.036)	$LnAGI$	$R^2 = 0.969$
1968	$LnT = -5.343 + 1.422$ (0.291) (0.037)	$LnAGI$	$R^2 = 0.968$
1969	$LnT = -5.343 + 1.425$ (0.303) (0.038)	$LnAGI$	$R^2 = 0.966$
1970	$LnT = -5.095 + 1.381$ (0.267) (0.034)	$LnAGI$	$R^2 = 0.972$
1971	$LnT = -5.372 + 1.408$ (0.305) (0.038)	$LnAGI$	$R^2 = 0.966$
1972	$LnT = -6.000 + 1.478$ (0.4027) (0.0496)	$LnAGI$	$R^2 = 0.947$

IV. Estimates of Built-In Flexibilities

The data that we have used to estimate the elasticities can also be used to estimate built-in flexibilities. This can be done in two alternative ways: either directly, by simply regressing per capita income tax revenue, by state, on per capita *AGI*, also by state; or, indirectly, by recalling that built-in flexibility, for a particular year, is equal to the elasticity times the ratio of tax yield to *AGI* for that year.¹³ A purist would probably choose the second alternative on the ground that the exponential specification of the relationships used in the derivation of the elasticities would not justify the direct (i.e., nonlogarithmic) regression of tax yield on *AGI*. As it turns out, it makes little practical difference which is chosen, as the two alternatives provide estimates that differ only marginally.

DIRECT ESTIMATES OF FLEXIBILITIES

To get directly the built-in flexibility of *T* with respect to *AGI*, we use the equation

$$T = a + b \text{ AGI}$$

The results obtained in this manner are shown in Table 5. In the Appen-

¹³ Since the elasticity is $\Delta T/T : \Delta \text{AGI}/\text{AGI}$, or $\Delta T/T \cdot \text{AGI}/\Delta \text{AGI}$, multiplying it by T/AGI , we get $\Delta T/T \cdot \text{AGI}/\Delta \text{AGI} \cdot T/\text{AGI} = \Delta T/\Delta \text{AGI}$, which is the flexibility (see Goode, 1964, footnote 2, p. 287).

TABLE 5. UNITED STATES: FLEXIBILITY OF TAX REVENUE WITH RESPECT TO ADJUSTED GROSS INCOME, 1963 AND 1969-72

1963	$T = -88.7 + 0.176$ (10.18) (0.006)	<i>AGI</i>	$R^2 = 0.954$
1969	$T = -166.1 + 0.200$ (16.55) (0.006)	<i>AGI</i>	$R^2 = 0.960$
1970	$T = -144.4 + 0.179$ (14.54) (0.005)	<i>AGI</i>	$R^2 = 0.964$
1971	$T = -155.4 + 0.175$ (15.52) (0.005)	<i>AGI</i>	$R^2 = 0.962$
1972	$T = -193.7 + 0.179$ (20.70) (0.006)	<i>AGI</i>	$R^2 = 0.946$

dix, we derive also the flexibility of T to TI and of TI to AGI . It is there shown that these measures of flexibility can be combined to provide still another estimate of overall flexibility.

INDIRECT ESTIMATES OF FLEXIBILITIES

The results obtained by multiplying elasticities by average tax rates are given in Table 6, which also includes for comparison's sake the measures obtained directly. As already mentioned, the differences in the estimates obtained by the use of these two alternative methods are relatively marginal.

The main conclusion that can be derived from Table 6 is that there was very little change in overall built-in flexibility over the period. This was estimated at about 0.18 in 1963 and 1970-72 with a higher figure (0.20) for 1969 explained by the surtax.

TABLE 6. UNITED STATES: ESTIMATES OF BUILT-IN FLEXIBILITIES, 1963 AND 1969-72¹

	<i>T to AGI</i>		<i>T to TI</i>		<i>TI to AGI</i>	
	D	I	D	I	D	I
1963	0.176	0.179	0.251	0.249	0.707	0.721
1969	0.200	0.204	0.259	0.258	0.775	0.791
1970	0.179	0.184	0.238	0.239	0.755	0.770
1971	0.175	0.179	0.236	0.238	0.743	0.750
1972	0.179	0.185	0.244	0.248	0.740	0.754

¹ D = direct estimates from Tables 5, 8, and 9; I = indirect estimates from Tables 1, 2, 3, and 4.

V. Conclusion

In Sections III and IV, we have shown how the method suggested for estimating the sensitivity of the income tax from state data lends

itself to a simple evaluation of the changes that have taken place over the period 1963–72, which was an active one from the point of view of tax reform. It was mentioned in Section I that for the pre-1964 period the results were consistent with those obtained by other researchers who used different methods for the same period. It would, however, be desirable to check the more recent estimates.

Such a check is possible by comparing our results with those obtained by Pechman (1973). On the basis of a complex revision and updating of Waldorf's time series,¹⁴ Pechman presents estimates of built-in flexibility and elasticity of the federal individual income tax for the period 1954–71 (Pechman, 1973, p. 393). A direct comparison of our results with Pechman's is not possible, as his calculations are related to adjusted personal income (*API*) rather than to *AGI*.¹⁵ To make the desired comparison for 1971, we have calculated *APIs* for each state, using data from the *Survey of Current Business* (1974), and we have re-estimated elasticities and flexibilities relying on our method but using *API* rather than *AGI*. The results obtained are shown in Table 7.

TABLE 7. UNITED STATES: FLEXIBILITY AND ELASTICITY OF TAX REVENUE WITH RESPECT TO ADJUSTED PERSONAL INCOME, 1971

$AGI = -111 + 0.8587 \text{ API}$ (128) (0.34)	$R^2 = 0.928$
$T = -183.2 + 0.1526 \text{ API}$ (24.14) (0.0064)	$R^2 = 0.920$
$TI = -503.8 + 0.643 \text{ API}$ (98.12) (0.026)	$R^2 = 0.925$
$\text{Ln } T = -6.40 + 1.50 \text{ Ln } \text{API}$ (0.58) (0.07)	$R^2 = 0.902$
$\text{Ln } TI = -3.18 + 1.30 \text{ Ln } \text{API}$ (0.47) (0.057)	$R^2 = 0.914$

We can now compare these estimates with Pechman's:

		<i>Our Estimates</i>	<i>Pechman's</i>
Flexibility:	<i>TI to API</i>	0.643	0.664
	<i>T to TI</i>	0.236	0.238
	<i>T to API</i>	0.153	0.158
Elasticity:	<i>TI with respect to API</i>	1.30	1.27
	<i>T with respect to TI</i>	1.15	1.12
	<i>T with respect to API</i>	1.50	1.43

¹⁴ See Appendix by Robert E. Litan to Pechman (1973), pp. 414–21.

¹⁵ Adjusted personal income, or personal income from production, is personal income less transfer payments plus personal contributions for social insurance.

The results are indeed remarkably close, so that either method can be considered as a check on the other. It is only rarely that estimates as close as these are obtained from completely different methods and data. Our bias for the method used in this paper is based essentially on its far greater simplicity.

The main conclusion that can be derived from the statistical results is that between 1963 and 1972 the elasticity of the tax increased somewhat, and that this increase was to a large extent the consequence of changes in the rate structure. The elasticity of tax yield with respect to taxable income rose over the period from about 1.1 to 1.2. This led to an increase in the elasticity of the tax yield with respect to *AGI* from about 1.4 in 1963 to about 1.5 in 1972. The increased elasticity of tax yield to taxable income implies that the erosion in the real value of the basic exemption and of the standard deduction associated with a continuation of the recent inflationary pressures, and the consequent possible decline of the elasticity of taxable income with respect to adjusted gross income, should not have much of an effect on the overall elasticity of the tax. In the absence of further tax reforms, the tax yield should continue to grow at a much faster rate than nominal income.

Finally, the method used in this paper may be applicable in many countries, including developing ones, where the needed data are available. Many countries besides the United States have the data necessary for applying this method; consequently, it may be possible to use this method even when other methods are not applicable.¹⁶

APPENDIX

The flexibility of the tax revenue can also be calculated by multiplying an estimate of the marginal rate of tax on taxable income by an estimate of the flexibility of taxable income with respect to adjusted gross income. This follows from the relationship

$$\Delta T/\Delta AGI = \Delta T/\Delta TI \cdot \Delta TI/\Delta AGI$$

where $\Delta T/\Delta TI$ is estimated from the equation $T = a + b TI$, and $\Delta TI/\Delta AGI$ is estimated from $TI = a + b AGI$.

The results obtained by the use of these two equations are shown in Tables 8 and 9. By multiplying the slopes in Table 8 by those in Table 9, one gets results similar to those shown in Table 5.

¹⁶ This method has recently been used in connection with the Danish income tax. (See Andersen, 1973.)

TABLE 8. UNITED STATES: ESTIMATIONS OF MARGINAL RATE OF TAX ON TAXABLE INCOME, 1963 AND 1969-72

(Flexibility with respect to taxable income)

1963	$T = -22.65 + 0.251$ (5.66) (0.005)	TI	$R^2 = 0.977$
1969	$T = -70.35 + 0.259$ (8.79) (0.005)	TI	$R^2 = 0.983$
1970	$T = -56.44 + 0.238$ (8.00) (0.004)	TI	$R^2 = 0.984$
1971	$T = -61.62 + 0.236$ (7.87) (0.004)	TI	$R^2 = 0.985$
1972	$T = -75.86 + 0.244$ (10.27) (0.005)	TI	$R^2 = 0.979$

TABLE 9. UNITED STATES: ESTIMATIONS OF FLEXIBILITY OF TAXABLE INCOME WITH RESPECT TO ADJUSTED GROSS INCOME, 1963 AND 1969-72

1953	$TI = -271.17 + 0.707$ (20.26) (0.011)	AGI	$R^2 = 0.988$
1969	$TI = -377.00 + 0.775$ (41.27) (0.015)	AGI	$R^2 = 0.983$
1970	$TI = -377.40 + 0.755$ (36.68) (0.012)	AGI	$R^2 = 0.987$
1971	$TI = -403.80 + 0.743$ (44.77) (0.014)	AGI	$R^2 = 0.982$
1972	$TI = -499.70 + 0.740$ (51.70) (0.020)	AGI	$R^2 = 0.980$

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