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## Appendix E

### *Calculation of Marginal Tax Rates on Corporate Income*

The basic method of calculating marginal tax rates was to apply the tax schedules to mean values of income and other variables for each class in each year. While this approach is an improvement over simply using average tax rates or top-bracket rates, there are several limitations that remain. As noted in the text, it was impossible to account in detail for the numerous provisions of the tax law applying to insurance companies and other special classes of returns or to account for minor differences in the definitions of various tax bases within any given year. A second limitation to the use of average data for asset classes is that nonlinear functions of means will not in general be equal to means of those functions applied to disaggregated data. While the mean of taxable income falls in a certain bracket, for instance, it is possible that some individual companies fall outside that bracket. Where tax brackets have large discontinuities, calculation on the basis of mean values will be less reliable. In the present application, calculation on the basis of means gave much more accurate estimates of tax liability for the normal income tax than the excess-profits taxes. Thus when absolute amounts of the latter taxes were used in calculation of subsequent tax bases, means of actual taxes paid were used rather than calculated amounts.

Since some components of the corporate tax were often deductible in computing other parts, the marginal tax rate on income is not always the simple sum of each component's tax rate. The rules for deductibility are reflected in the equations below, where the component marginal tax rates are *RNT* (normal tax), *RST* (surtax), *RDEPT* (declared-value excess-profits tax), *RWEPT* (wartime excess-profits tax), and *RUNIT* (undistributed net-profits tax).

1936-37

$$R = RDEPT + RNT + RUNIT (1 - RDEPT - RNT).$$

1938-39

$$R = RDEPT + RNT (1 - RDEPT).$$

1940

$$R = RDEPT + RWEPT (1 - RNT \\ (1 - RDEPT)) + RNT (1 - RDEPT).$$

1941

$$R = RDEPT + RWEPT + RNT \\ (1 - RDEPT - RWEPT) + RST (1 - RDEPT - RWEPT).$$

1942-45

(a) If subject to wartime excess-profits tax:

$$R = RDEPT (1 - RNT - RST) + RWEPT.$$

(b) If not subject to wartime excess profits tax:

$$R = RDEPT (1 - RNT - RST) + RNT + RST.$$

(c) If total tax is greater than 80 percent of net income,

$$R = .72 (= (.8) (.9)).$$

1946-49

$$R = RNT + RST.$$

1950-53

$$R = RNT + RST + RWEPT.$$

1954-78

$$R = RNT + RST.$$

1979-80

$$R = RNT.$$

The wartime excess-profits tax during World War II is worthy of special mention. Companies could choose between two basic methods of calculating the excess-profits tax base. One method used a percentage of "invested capital" while the other was based on an average of previous years' income as well as the change in capital stock. Since most firms used the former method, it was applied in calculations for the present study.<sup>1</sup>

The credit allowed under this method is equal to "equity-invested capital" plus half of "debt-invested capital." For the purpose of tax calculation, equity-invested capital was approximated by capital stock and debt-invested capital was approximated by the liabilities other than capital stock. The credit was then calculated by applying tables for various years to the total invested-capital figure. Data published for 1940 on the amount of this credit by asset class showed that the average calculated credit was close to the average credit for firms paying the excess-profits tax. For example, the companies with assets between \$500,000 and \$1 million paying excess-profits taxes had an average excess-profits credit of about \$35,900 (U.S. Internal Revenue Service, *Statistics of Income—1940, Corporation Income Tax Returns* (Part II), p. 251). The tax calculation algorithm estimated the average for that class to be \$37,200. The average for the \$10-50 million class was \$1.16 million, compared to a calculated value of \$1.08 million.

As noted above, the sum of the excess-profits tax, normal tax, and surtax was limited to 80 percent of net income; however, none of the class means in the present sample reached that constraint. Finally, a postwar refund of 10 percent of the excess-profits tax is reflected in the calculated

1. In 1945, for example, over two-thirds of companies paying excess-profits tax used the invested-capital method (U.S. Internal Revenue Service, *Statistics of Income—Corporation Income Tax Returns 1950* (Part II), p. 358).

rates for 1942–45. For 1942 and 1943, this refund was immediately available to retire debt, and in 1944 and 1945 was an immediate tax credit. (U.S. Internal Revenue Service, *Statistics of Income—1945, Corporation Income Tax Returns 1950* (Part II), p. 459).

To illustrate the calculations of marginal tax rates, table A.4 shows the calculation of marginal tax rates for two asset classes (\$100,000–250,000 and \$1,000,000–5,000,000) for the years 1939 and 1953. In each case,

**Table A.4** Calculation of Marginal Tax Rates for 1939 and 1953, Two Asset Classes

	\$100,000 –250,000	\$1,000,000 –5,000,000
<i>1939</i>		
Average net income + contributions ( <i>NI</i> )	\$10,346	\$114,661
Average capital stock ( <i>CS</i> )	65,200	671,235
Declared-value excess-profits tax rate ( <i>RDEPT</i> )	.12	.12
0 if $NI < .10 CS$ , .06 if $.10 CS \leq NI < .15 CS$ , .12 if $NI > .15 CS$ .		
Income tax rate ( <i>RNT</i> )	.14	.19
where Base $B = NI -$ declared- value excess-profits tax		
0 if $B < 0$ , .125 if $0 < B \leq \$5,000$ , .140 if $\$5,000 < B \leq \$20,000$ , .160 if $\$20,000 < B \leq \$25,000$ , .190 if $B > \$25,000$ .		
Marginal tax rate ( $RDEPT + RNT(1 - RDEPT)$ )	.243	.287
<i>1953</i>		
Average net income + contributions ( <i>NI</i> )	\$13,085	154,937
Income tax rate ( <i>RNT</i> )	.30	.30
Surtax rate ( <i>RST</i> )	0	.22
0 if $NI < \$25,000$ , .22 if $NI \geq \$25,000$ .		
Excess-profits tax rate ( <i>REPT</i> )	0	0
where $B = NI -$ (83 percent of previous 4-year average of net income + 12 percent of increase in capital stock over previous 3-year average),		
0 if $B < \$25,000$ , .30 if $B \geq \$25,000$ .		
Marginal tax rate	.30	.52

average net income is adjusted by adding average contribution back in. For the 1939 calculation, average capital stock was also necessary. In 1939 corporations in the \$100,000–250,000 asset class had average net income of \$10,346. Given their average capital stock, they were subject to a 12 percent marginal tax rate on net income from the declared-value excess-profits tax and a 14 percent rate on net income in the normal income tax. Using equation (11') above, the overall rate was 0.243. Corporations in the \$1–5 million asset class had average net income of \$114,661, for an overall rate of 0.287.

The calculation of marginal tax rates is also illustrated for 1953, a year in which corporations faced a normal tax, a surtax, and an excess-profits tax based on increases in profits from a base period. The calculated marginal rates for the average firm in the two classes are 0.30 and 0.52. Although some firms in each class paid excess-profits tax, no excess-profits tax was due for the average net income of either of these classes, thus illustrating the disadvantage of calculating marginal rates using class averages when the rates are discontinuous and there is variation among firms.