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TAXATION OF CORPORATE SECTOR ON CAPITAL INCOME UNDER THE ECONOMIC RECOVERY TAX ACT OF 1981

by

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ABSTRACT

The Economic Recovery Tax Act of 1981 included large business and individual tax cuts. The Accelerated Cost Recovery System changes two key provisions for capital cost recovery -- the depreciation allowance and the investment tax credit. The marginal effective corporate tax rates calculated from the cost of capital formula under ACRS are presented in this thesis. The "overall" effective marginal tax rates for differnet inflation rates are calculated under the new tax law. It considers not only the tax paid by the corporations themselves but also the tax paid by the individuals and institutions that provide capital to the corporate sector.

My calculations indicate that ERTA reduces the overall effective marginal tax rate, especially when inflation rate is low. It is found that the overall effective tax rate is sensitive to inflation.

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CHAPTER I

INTRODUCTION

The Economic Recovery Tax Act (ERTA) of 1981 was passed by Congress on August 13, 1981. This Act included the largest business tax cut in U.S. history, embodied in the Accelerated Cost Recovery System (ACRS). Individual statutory tax rates were also reduced. In this thesis, I examine the effect of this Act on the taxation of capital used in the nonfinancial corporate sector of the U.S. economy. There are two parts of this thesis. The first part is the estimation of marginal effective corporate tax rates under ACRS, using the cost of capital formula. The second part is the estimation of "overall" effective tax rates on corporate capital income in 1980 under ERTA of 1981, considering not only the tax paid by the corporations themselves but also the tax paid by the individuals and institutions that provide capital to the corporate sector. This is the approach used by Feldstein and Summers (1979).

Under the Accelerated Cost Recovery System, tax lifetimes of assets have been, in general, substantially reduced. The investment tax credit has been increased and liberalized. These features decrease the taxable profits of corporations and thus reduce the effective tax rate. These reforms have been viewed as methods of counterbalancing the influence of inflation on the corporate income tax, since inflation increases the effective corporate tax rate on capital income due to

the historic cost method of depreciation and the FIFO method of inventory accounting. To estimate the weighted average effective marginal corporate income tax rates, I use the cost of capital formula described in Fullerton and Henderson (1981) and Bradford and Fullerton (1982). The results show that the marginal effective corporate tax rates are sensitive to inflation. With a 5% inflation rate, the marginal effective tax rate is 0.047. But with a 10% inflation rate, the marginal effective tax rate is 0.193.

One measure of the tax burden on corporate source income is the ratio of the total tax paid on such income -- including the taxes paid by shareholders and lenders as well as by corporations -- to the total before-tax real income available to shareholders and creditors. There are five components of the estimated effective tax rate: (1) the corporate income tax; (2) taxes on dividends; (3) taxes on real retained earnings; (4) taxes on nominal capital appreciation; and (5) taxes on interest income of creditors.

The marginal effective corporate tax rate is taken from the first part of my thesis which was mentioned above. In order to estimate the effective marginal tax rates on dividends and capital gains, I use individual data from the Internal Revenue Service, U.S. Treasury Department and the Assets and Liabilities Outstanding data from Flow of Funds Accounts, issued by the Board of Governors of the Federal Reserve System.

For the effective tax rate on the holders of corporate debt, I compute the weighted average of marginal tax rates for each investor class, such as households, commercial banks, life insurance, finance

companies, etc. Assuming that the marginal tax rates are close to the average tax rates, I can estimate the total tax paid for each component.

Adding the five components mentioned previously, I obtain the overall effective tax rate on corporate capital income by applying the provisions of the 1981 tax law to 1980 data. At an inflation rate of 5%, the overall effective tax rate is 32.4%. At an inflation rate of 10%, the overall effective tax rate increases to 65.5%.

Chapter II describes the Accelerated Cost Recovery System in more detail. It contains derivations of formulas for effective marginal tax rates for each asset type under different inflation rates. The numerical results under various assumptions are shown in this chapter.

Chapter III contains the calculations of the effective marginal tax rate on dividends and retained earnings. The effective tax rate on the holders of corporate debt is also estimated in this chapter.

In Chapter IV, the five components estimated in previous chapters are combined to yield the overall effective tax rate on capital income of the nonfinancial corporate sector.

The last chapter offers a conclusion and some comments.

CHAPTER II

THE EFFECTIVE MARGINAL CORPORATE TAX RATE UNDER ACRS

In this chapter, I estimate the effective tax rates on each broad asset type under different inflation rates and obtain average effective marginal corporate tax rates. The results show that inflation has a big influence on effective marginal tax rates.

Generally, autos and equipment have very low effective tax rates under ACRS. In most of the situations they are negative. For public utilities and structures, the effective marginal tax rates are higher and positive usually. Before I derive the formulas for effective marginal tax rates on each asset, let us first examine the ACRS in more detail.

II.1. The Accelerated Cost Recovery System Under ERTA

The ACRS is much simpler than previous tax law. It changes two key provisions for capital cost recovery -- the depreciation allowance and the investment tax credit. Effective January 1, 1981, any depreciable asset falls into one of four classes which are characterized by 3, 5, 10, and 15 year tax lives.

The 3 year class includes autos, light-duty trucks and R & D equipment; the 5 year class includes most other equipment[1]; the 10 year class includes short-lived public utility property; and the 15 year class includes most structures and other public utility property[2]. The new tax

lives are shorter than economic lives for all assets.

The new tax law also specifies the pattern of depreciation allowances to be used for each asset type. Assets with 3 and 5 year tax lives must be depreciated according to the recovery schedule shown in Table 1. For property in the 10 and 15 year recovery classes, allowances are not specified in the law but the use of 175 percent declining balance schedule with an optimal switchover to straight-line is allowed.

The ACRS also provides for an increase in the investment tax credit. Equipment in a 3 year recovery class receives a six percent credit (increased from $3\frac{1}{3}$ percent), and all longer-lived equipment receives a ten percent credit (increased from $6\frac{2}{3}$ percent). For structures, there is no investment tax credit.

In this chapter I will calculate the effective marginal corporate tax rates under the new tax law along the lines suggested by Fullerton and Henderson (1981) and Bradford and Fullerton (1982).

II.2. Derivation of Effective Marginal Corporate Tax Rates on Capital

The cost of capital formula developed by Hall and Jorgenson (1967) implies that a profit-maximizing firm will undertake a marginal investment project if it earns a return net of tax such that the present value of the nominal cash flow at least equals the initial outlay; in competitive equilibrium, the two will be equal.

The equilibrium condition is expressed as

$$(1-k)q = \int_0^\infty (1-u)ce^{(\pi-\delta)t}\, e^{-i(1-u)t}\, dt + uzq \qquad (1)$$

Table 1

Recovery Schedules Under ACRS

Year of Purchase % Allowance in Year	3 Year			5 Year		
	1981-4	1985	1986	1981-4	1985	1986
1	25%	29%	33%	15%	18%	20%
2	38	47	45	22	23	32
3	37	24	22	21	25	24
4				21	16	16
5				21	18	8

Source: Economic Recovery Tax Act of 1981, Public Law 97-34--August 13, 1981.

where q = the acquisition cost of the asset

k = the investment tax credit rate

u = the statutory marginal corporate income tax rate

c = the initial rental rate

π = the rate of inflation

δ = the economic depreciation rate (or the true depreciation rate)

i = the nominal before-tax rate of return

z = the present value of depreciation allowances per dollar of investment

The starting rental rate c grows at the rate of inflation π and declines at the depreciation rate δ . Thus the net of tax rental receipts from the investment at time t equals $(1-u)ce^{(\pi-\delta)t}$. To derive the present value of this stream, this nominal cash flow is discounted at the "nominal after-tax interest rate", i(1-u). The acquisition cost of an asset will be lower to (1-k)q because of the receiving of an investment tax credit. Under tax law, the firm will receive a reduction in taxes due to depreciation allowances. The present value of this deduction per dollar of investment is defined as z, so that the total tax reduction is uzq. Capital cost recovery provisions affect the rental rate thru k and z. Since q and c are endogenous to the system, changes in the tax rules will ultimately be reflected in changes in the values of q and c.

Solving the integral and rearranging terms produces:

$$c/q = \frac{i(1-u)-\pi+\delta}{1-u}\ (1-k-uz) \qquad (2)$$

This is the basic equation for my later calculations. Note that this equilibrium condition is independent of the actual financing method of the corporation; it does not matter whether the source of the investment funds is debt or equity. The option of arbitrage between debt and real capital implies equation (2) because of the assumption of "unconstrained" debt-real capital arbitrage. Condition (2) express the requirement that the corporation should maximize its profits in equilibrium. There can be no potential for the corporation to gain by arbitrage between bonds and real capital. The assumption that no allowances for risk of issue more debt (bankruptcy risk) is made.

The equilibrium real rate of return net of depreciation is denoted by ρ:

$$\rho = c/q - \delta \tag{3}$$

The effective tax rate of capital is usually defined as a measure of the difference between ρ, the real social rate of return, and s, defined as the rate of return received by the person or institution financing its purchase. Then we may define the tax "wedge", t^w, as

$$t^w = \rho - s \tag{4}$$

This wedge may be either positive or negative.

It is also usual to express t^w as a ratio to either the social return or the saver's return. The "gross tax rate" is defined as

$$t^g = \frac{\rho - s}{\rho} \tag{5}$$

and the "net tax rate" is defined as

$$t^n = \frac{\rho - s}{s} \tag{6}$$

Notice that t^g and t^n are nonlinear functions of s and ρ and may behave erratically in some circumstances as, for example, the denominator of these formulas approaches zero, or passes from positive to negative. In this thesis I only calculate the "gross tax rate" t^g from formula (5).

Assume that the interest rate i is a price established on a market in which all can trade. Given this interest rate and a single tax rate u for all traders, the social return ρ would be determined by the equilibrium condition (2) for arbitrage between bonds and real capital. It is also assumed that the market is dominated by corporations with tax rate u. Because the corporation arbitrage between real capital and bonds yielding $(1-u)i-\pi$, it is either a borrower or lender at that "real after-tax interest rate." In this sense, $(1-u)i-\pi$ can be taken as the net return to savings of the corporation, S_c.

Thus, the effective corporate gross tax rate is given by

$$t_c^g = \frac{\rho - S_c}{\rho} = \frac{\rho - \{(1-u)i - \pi\}}{\rho} \tag{7}$$

The calculation of t_c^g assumes debt-finance without bankruptcy costs so that arbitrage is assumed to make costs equal. Since I will not use or

calculate the "net tax rate" t^n in later sections, I shall simply call the effective corporate "gross tax rate" as the "effective corporate tax rate." Remember that the numerator of equation (7) is the corporate tax wedge, t_c^w.

Before I end this section, there is one more problem to solve -- the present value of depreciation allowances, z. To measure z, the new tax law prevides tables with depreciation amounts for 3 year and 5 year assets as mentioned previously. These figures are entered directly into the present value calculations in later sections. In fact, these tables are equivalent to double declining balance (DDB) with an optimal switch to sum-of-the-years'-digits (SYD)[3]. For 10 year and 15 year assets, I use the formula derived by Fullerton and Henderson which allows for 175 percent declining balance with a switch to straight-line:

$$z = b \int_0^{0.5} e^{-i(1-u)t}\,dt + b\left(1 - \frac{b}{2}\right) \sum_{j=0}^{G-1.5} (1-b)^j \int_{j+0.5}^{j+1.5} e^{-i(1-u)t}\,dt$$

$$+ \left(1 - \frac{b}{2}\right) (1-b)^{(G-0.5)} \times \frac{1}{L-G} \times \int_G^L e^{-i(1-u)t}\,dt \qquad (8)$$

where b = B/L

G = {(B-1)/B}×L, the time of the optimal switch

B = the declining balance rate

L = the asset's lifetime for tax purposes

The nominal rate of discount is used in equation (8) because the tax depreciation deductions are denominated in nominal historical dollars rather than real dollars. Inflation-induced increases in the nominal discount rate will lower the present value z, and thus reduce the value

of depreciation allowances. I will apply equation (8) in later sections to estimate the present values for assets with 10 and 15 year tax lives.

II.3. Parameters and Assumptions

The thirty-four assets listed in column 1 of Table 2 include twenty types of equipment and fourteen types of structures[4]. Three parameters, δ, L, and k for each asset type, are provided. Economic depreciation rates δ are taken from Hulten and Wykoff (1982), as shown in the second column of Table 2. These estimates were obtained by studying the market for used plant and equipment, and assuming that the rate of depreciation is constant (an assumption supported by evidence presented in Hulten and Wykoff (1980)). These rates range from 0.018 for railroads to 0.333 for automobiles.

Column 3 displays lifetimes of each asset under the new law, assuming that each asset is homogeneous. The rates of investment tax credit shown in column 4 of Table 2 are those under ACRS.

To determine the nominal after-tax interest rate, I assume one particular relationship between i and π (although the analysis can be done for different combinations of i and π.) I follow Auerbach and Jorgenson (1980) in assuming a constant real after-tax rate of return of four percent, i.e. $(1-u)i_o=0.04$ without inflation. This approach avoids the problem of estimating the general equilibrium changes in the after-tax rate of return, and is justified by Auerbach and Jorgenson on the basis of historical evidence. It is also assume that the nominal corporate income tax rate is 46 percent. Thus, $i_o=0.04/(1-u)=0.074$. Then I use Modified Fisher's Law $i=i_o+\frac{\pi}{(1-u)}$, instead of the Strict Fisher's Law

Table 2: Asset Classes and Assumptions

Asset Type		Economic Depreciation Rate	Tax Life (years)	Investment Credit (percent)
1	Autos	0.333	3.00	0.06
2	Furniture and Fixtures	0.110	5.00	0.10
3	Fabricated Metal Products	0.092	5.00	0.10
4	Engines and Turbines	0.079	5.00	0.10
5	Tractors	0.163	5.00	0.10
6	Agricultural Machinery	0.197	5.00	0.10
7	Construction Machinery	0.172	5.00	0.10
8	Mining and Oil Field Machinery	0.165	5.00	0.10
9	Metalworking Machinery	0.123	5.00	0.10
10	Special Industry Machinery	0.103	5.00	0.10
11	General Industrial Equipment	0.123	5.00	0.10
12	Office and Computing Machinery	0.273	5.00	0.10
13	Service Industry Machinery	0.165	5.00	0.10
14	Electrical Machinery	0.118	5.00	0.10
15	Trucks, Buses, and Trailors	0.254	5.00	0.10
16	Aircraft	0.183	5.00	0.10
17	Ships and Boats	0.075	5.00	0.10
18	Railroad Equipment	0.066	5.00	0.10
19	Instruments	0.150	5.00	0.10
20	Other Equipment	0.150	5.00	0.10
21	Industrial Buildings	0.036	15.00	0.0
22	Commercial Buildings	0.025	15.00	0.0
23	Religious Buildings	0.019	15.00	0.0
24	Educational Buildings	0.019	15.00	0.0
25	Hospital Buildings	0.023	15.00	0.0
26	Other Nonfarm Buildings	0.045	15.00	0.0
27	Railroads	0.018	15.00	0.10
28	Telephone and Telegraph	0.033	15.00	0.10
29	Electric Light and Power	0.030	15.00	0.10
30	Gas	0.030	10.00	0.10
31	Other Public Utilities	0.045	10.00	0.10
32	Farm	0.024	15.00	0.0
33	Mining, Shafts and Wells	0.056	5.00	0.0
34	Other Nonbuilding Facilities	0.029	15.00	0.0

$i=i_o+\pi$, to derive the nominal interest rate i, so that the real after-tax rate of return is not affected by inflation. Jorgenson and Sullivan cite empirical work to support their assumption of a constant real after-tax rate of return on corporate investment. Hall (1981) explicitly assumes Modified Fisher's Law -- that nominal interest rates increase by the inflation rate over one minus the corporate tax rate. This increase is just enough to keep the real after-tax interest rate constant for corporations. On the other hand, Feldstein and Summers (1978) estimate that i has varied slightly less than point for point with π in the U.S. since World War II.

In the following section I will present tax rate estimates for three rates of inflation -- zero, five, and ten percent. Assume the inflation rate to be $\pi=0.10$, then a nominal rate of $i=i_o+\frac{\pi}{(1-u)}=0.259$ maintains the 0.04 real after-tax interest rate. Therefore the nominal after-tax interest rate i(1-u) equals 0.14. This is the discount rate I use in calculating the present value of depreciation allowances. Similarly, at a five percent inflation rate the nominal after-tax interest rate is 0.09; while at a zero percent inflation rate it is simply equal to the real after-tax rate of return of 0.04.

II.4. Marginal Effective Tax Rates for Assets

In this section I present the result of my calculations. First, I use Table 1 and equation (8) to estimate the present value of depreciation allowance z for each asset under 0%, 5% and 10% inflation rates. The results are shown in the third, fourth, and fifth columns of Table 3. Column 2 shows the tax lives of 34 types of asset. With increases in

Table 3

Present Value of Depreciation Allowances and Social Rate of Return for Each Asset Under Different πs

Asset Type	Tax years	Pres. Value of Depre. Allow. 0%	5%	10%	Social Rate of Return 0%	5%	10%
1 Autos	3	0.957	0.910	0.868	.0122	.0272	.0405
2 Furniture and Fixtures	5	0.922	0.840	0.771	.0222	.0327	.0414
3 Fabricated Metal Products	5	0.922	0.840	0.771	.0243	.0335	.0412
4 Engines and Turbines	5	0.922	0.840	0.771	.0259	.0346	.0411
5 Tractors	5	0.922	0.840	0.771	.0159	.0301	.0418
6 Agricultural Machinery	5	0.922	0.840	0.771	.0119	.0284	.0402
7 Construction Machinery	5	0.922	0.840	0.771	.0148	.0296	.0419
8 Mining and Oil Field Machinery	5	0.922	0.840	0.771	.0157	.0300	.0418
9 Metalworking Machinery	5	0.922	0.840	0.771	.0206	.0320	.0415
10 Special Industry Machinery	5	0.922	0.840	0.771	.0230	.0330	.0413
11 General Industrial Equipment	5	0.922	0.840	0.771	.0206	.0320	.0415
12 Office and Computing Machinery	5	0.922	0.840	0.771	.0028	.0247	.0428
13 Service Industry Machinery	5	0.922	0.840	0.771	.0157	.0300	.0418
14 Electrical Machinery	5	0.922	0.840	0.771	.0212	.0323	.0414
15 Trucks, Buses, and Trailors	5	0.922	0.840	0.771	.0051	.0256	.0426
16 Aircraft	5	0.922	0.840	0.771	.0135	.0291	.0420
17 Ships and Boats	5	0.922	0.840	0.771	.0263	.0344	.0410
18 Railroad Equipment	5	0.922	0.840	0.771	.0274	.0348	.0409
19 Instruments	5	0.922	0.840	0.771	.0174	.0307	.0417
20 Other Equipment	5	0.922	0.840	0.771	.0174	.0307	.0417
21 Industrial Buildings	15	0.787	0.608	0.601	.0538	.0654	.0658
22 Commercial Buildings	15	0.787	0.608	0.601	.0517	.0616	.0621
23 Religious Buildings	15	0.787	0.608	0.601	.0507	.0596	.0601
24 Educational Buildings	15	0.787	0.608	0.601	.0507	.0596	.0601
25 Hospital Buildings	15	0.787	0.608	0.601	.0514	.0610	.0614
26 Other Nonfarm Buildings	15	0.787	0.608	0.601	.0554	.0684	.0688
27 Railroads	15	0.787	0.608	0.601	.0398	.0487	.0490
28 Telephone and Telegraph	15	0.787	0.608	0.601	.0397	.0508	.0513
29 Electric Light and Power	15	0.787	0.608	0.601	.0397	.0504	.0508
30 Gas	10	0.851	0.636	0.603	.0359	.0487	.0507
31 Other Public Utilities	10	0.851	0.636	0.603	.0351	.0506	.0531
32 Farm	15	0.787	0.608	0.601	.0516	.0613	.0617
33 Mining, Shafts and Wells	5	0.922	0.840	0.771	.0286	.0531	.0587
34 Other Nonbuilding Facilities	15	0.787	0.608	0.601	.0525	.0630	.0635

the inflation rate, the present value of depreciation allowances decreases. Assets with longer tax lives receive smaller values of z. The assets which are in the same tax life group have the same present value of depreciation allowances. For example, all 5 year assets have the same value of z, 0.922 without inflation.

Second, for each z I obtain c/q for each asset by applying equation (2). Then from equation (3) I get all the social rates of return (ρ) which equals c/q net of depreciation. Column 6, 7 and 8 of Table 3 show the results. Notice that when inflation rate increases, the social rate of return also increases. Assets with longer tax lives have greater values of ρ. Although some assets have same value of z, most of them have different values of ρ because of their different economic depreciation rates or their different investment tax credit rates.

Since I now have the ρ's for each asset, I can apply equation (7) to estimate marginal effective tax rates for each asset. Remember that I assume a constant real after-tax interest rate $(1-u)i-\pi=0.04$. Inflation rates do not change the value of S_c. One can also assume different value for the real after-tax interest rate and obtain different results. For example, Bradford and Fullerton (1982) consider three real after-tax interest rates -- 0.02, 0.04 and 0.06 in their Table 3.

The results of my calculations of marginal effective tax rate on corporate investment for 34 assets with 0%, 5% and 10% inflation rates are shown in Table 4. It is evident that the tax rates on equipment are smaller than on structures. As the rate of inflation increases, the rates turn to positive (i.e. turn from subsidies to taxes) for most of the

Table 4

Marginal Effective Corporate Tax Rates for Each Asset Under Different Inflation Rates

	Asset Type	0%	5%	10%
1	Autos	-2.273	-0.472	0.012
2	Furniture and Fixtures	-0.803	-0.225	0.033
3	Fabricated Metal Products	-0.644	-0.193	0.029
4	Engines and Trubines	-0.546	-0.156	0.026
5	Tractors	-1.516	-0.331	0.044
6	Agricultural Machinery	-2.373	-0.408	0.005
7	Construction Machinery	-1.698	-0.350	0.046
8	Mining and Oil Field Machinery	-1.554	-0.334	0.044
9	Metalworking Machinery	-0.940	-0.249	0.035
10	Special Industry Machinery	-0.738	-0.212	0.031
11	General Industrial Equipment	-0.940	-0.249	0.035
12	Office and Computing Machinery	-13.274	-0.619	0.066
13	Service Industry Machinery	-1.554	-0.334	0.044
14	Electrical Machinery	-0.883	-0.239	0.034
15	Trucks, Buses, and Trailors	-6.845	-0.561	0.062
16	Aircraft	-1.961	-0.376	0.048
17	Ships and Boats	-0.519	-0.163	0.025
18	Railroad Equipment	-0.459	-0.149	0.023
19	Instruments	-1.294	-0.303	0.041
20	Other Equipment	-1.294	-0.303	0.041
21	Industrial Buildings	0.256	0.388	0.392
22	Commercial Buildings	0.227	0.351	0.356
23	Religious Buildings	0.211	0.329	0.334
24	Educational Buildings	0.211	0.329	0.334
25	Hospital Buildings	0.222	0.344	0.349
26	Other Nonfarm Buildings	0.278	0.415	0.419
27	Railroads	-0.005	0.179	0.184
28	Telephone and Telegrahp	-0.007	0.213	0.221
29	Electric Light and Power	-0.007	0.206	0.213
30	Gas	-0.113	0.178	0.212
31	Other Public Utilities	-0.139	0.209	0.246
32	Farm	0.225	0.348	0.352
33	Mining, Shafts and Wells	-0.399	0.247	0.319
34	Other Nonbuilding Facilities	0.238	0.365	0.370

assets. At lower inflation rates, effective tax rates are negative for all types of equipment. This implies that taxpayers can shelter income from other sources (if any). Most of the tax rates on structures are positive at the three different inflation rates. At a ten percent rate of inflation, the effective tax rates on both equipment and structures are positive but near to zero for equipment.

II.5. "Total" Marginal Effective Corporate Tax Rates for Broad Asset Types

To estimate the "total" effective marginal corporate tax rates for all assets, I calculate the effective marginal tax rates by broad asset types and then weight these tax rates by their shares of capital stock in 1980. The capital stock estimates by broad asset type shown in Table 5 are taken from Gravelle (1982)[5]. Note that machinery and general equipment comprise 39.2 percent of total capital stock and non-residental structures and other public utilities equipment & structures account for 41.1 percent of the capital stock.

Table 6 shows the effective marginal corporate tax rates for the 3, 5, 10, and 15 year broad asset types under zero, five, and ten percent inflation rates. Total rates for different inflation rates are shown in the bottom row. Without inflation, the marginal dollar invested will face a negative 78.7 percent effective corporate tax rate, i.e. a subsidy. With a five percent inflation rate, the effective tax rate is 4.7 percent. And at a ten percent inflation rate, the tax rate is 19.3 percent. Again, higher inflation rate brings higher effective marginal tax rate.

Compared to the effective marginal tax rates on aggregate structures

Table 5

Capital Stock Estimates by Broad Asset Type, 1980
(billions of dollars)

Broad Asset Type	Amount	Percentage
1. Autos	52.6	2.0%
2. Machinery and General Equipment	1015.9	39.2%
3. Short-lived Public Utility	458.5	17.7%
4. Non-residental Structures and Other Public Utility	1065.0	41.1%
Total	2592.0	100%

Data Source: Gravelle (1982)

Table 6

Marginal Effective Corporate Tax Rates by Broad Asset Type
(per dollar invested)

Broad Asset Type	Tax Life	Effective Tax Rates		
		0% Inflation	5% Inflation	10% Inflation
1. Autos	3 years	-227.3%	-47.2%	1.2%
2. Machinery and General Equipment	5 years	-201.2%	-27.5%	5.2%
3. Short-lived Public Utility	10 years	-12.6%	19.4%	22.9%
4. Non-residental Structures and Other Public Utility	15 years	16.8%	31.5%	32.0%
Total		-78.7%	4.7%	19.3%

and equipment under Conable-Jones 10-5-3 proposal estimated by Hulten and Wykoff (1981), the estimates under ACRS are lower for machinery and equipment but higher for non-residental structures although the differences are small. The differences may be explained by that under ACRS (15-10-5-3), the investment tax credit rates for equipment are higher than Conable-Jones 10-5-3 proposal and the tax lives of non-residental structures are longer. ACRS is a modified Conable-Jones 10-5-3 proposal.

Notice that all the tax rates I present in this chapter are "corporate" tax rates. t_c is the marginal effective tax rate on debt-financed investment which are paid by corporations, neglecting cost of bankruptcy risk. In the next chapter, I will estimate the "individual" marginal effective tax rates of stockholders and bondholders.

CHAPTER III

TAXES ON INDIVIDUALS AND INSTITUTIONS

Feldstein and Summers' (1979) study of the relation between inflation and corporate tax burdens considers not only the tax paid by the corporations themselves but also the tax paid by the individuals and institutions that supply capital to the corporate sector. This is particularly important for a correct treatment of corporate debt. With inflation, the nominal interest payments that corporations deduct in calculating taxable profits exceed the real cost of borrowed funds; in itself, this tends to understate real profits and to lower the effective tax rate. However, the individuals and institutions that lend to the corporations are taxed on the overstated nominal interest income.

Some economists (Davidson & Weil (1977), Lovell (1978)) have concluded that the corporate tax saving from the exclusion of real gains on corporate debt is sufficient to offset the additional tax caused by the mismeasurement of depreciation and inventory profits. This implies that inflation has no net effect on the taxation of corporate source income. These conclusions are misleading because they are based on consideration of only some of the taxes levied on corporate source income. The total tax on corporate source income includes taxes paid by the owners of corporate securities on dividends, interest payments, and capital gains. It is this total tax rather than the tax levied at the corporate level alone that affects economic incentives to invest.

While corporations are permitted to deduct nominal rather than real interest payments, lenders are obliged to pay taxes on nominal interest receipts. If the tax rate of corporate borrowers exceeds that of lenders, total tax payments fall. Otherwise, tax payments rise.

The effect of taxation of dividends and capital gains must also be considered. The mismeasurement of income from historic cost depreciation and incorrect inventory accounting gives rise to extra corporate tax payments, thus reducing dividends and retained earnings. This causes a reduction in personal income taxes which partly offsets the increase in corporate taxes. Inflation also increases nominal capital gains leading to increases in noncorporate tax payments. A full calculation of the overall effective tax rate of corporate source income requires taking into account all of these effects.

The calculations I present in this chapter show that the relevant weighted average of the marginal tax rates paid by the individuals and institutions that lend to nonfinancial corporations is greater than the marginal rate of tax that is saved by corporations and their shareholders because of the overstatement of true interest payments. Specifically, the marginal tax rate for those who lend to corporations is 0.397 while the combined rate of corporations and their shareholders as borrowers is 0.395. Thus, the difference between the effective marginal rates of the borrowers and the lenders is quite small. This is the same conclusion reached by Feldstein and Summers. However, since the tax rates of individuals are lower under the Economic Recovery Tax Act of 1981 than under the previous law, the effective marginal rates of the

borrowers and the lenders have been reduced.

III.1. Noncorporate Taxation of Equity Income

Owners of corporate equity pay taxes on corporate income either as dividend income if it is distributed or as capital gains if it is retained. The rates at which these taxes are levied depend on the holder.

In order to find the effective average marginal tax rate paid on equity income, we need to determine the distribution of ownership of corporate equity. Table 7 displays the pattern of ownership of corporate equity at the end of 1980 as reported in Flow of Funds Accounts prepared by the Board of Governors of the Federal Reserve System. Most of the equity is held by households. Pension funds and life insurance companies hold significant amounts. Other financial institutions hold a small portion of corporate equity. The second and third columns of the table are the estimated marginal tax rates on dividends and capital gains for each type of investor. It is assumed that retained earnings are taxed at the capital gains tax rate.

The calculations of individual investor tax rates are as follows:

A. Households:

I estimate the average marginal tax rate on individual dividend receipts under the 1981 ERTA. The computations are shown in Appendix and the data is taken from Internal Revenue Service, U.S. Treasury Department. The average marginal tax rate on individual dividends was 33 percent. This is lower than the 39 percent tax rate estimated by Feldstein and Frish (1977)[6], due to the reduction in personal tax rates dictated by the ERTA (shown in Table 8).

Table 7

Effective Marginal Tax Rates on Dividends and Capital Gains

Class of Investor	Value of Holdings ($ billions)	Tax Rate on Dividends	Tax Rate on Capital Gains
Households	1215.6	0.33	0.045
Pension Funds	220.1	0	0
Life Insurance	52.9	0.069	0.15
Other Insurance	32.3	0.069	0.15
Mutual Banks	4.2	0.069	0.15
Commercial Banks	0.1	0.069	0.15
Other	68.4	0	0
Total	1593.6	0.256	0.043

Source: Flow of Funds Accounts Data for 1980.

Table 8

Individual Income Tax, 1981

Tax Rate Schedule for Married Taxpayers
Filling Joint Returns

Taxable Income (dollars)	Tax on Lower Limit (dollars)	Rate of Tax on Excess (percentage)
0 - 3,400	-	0
3,400 - 5,500	-	12
5,500 - 7,600	252	14
7,600 - 11,900	546	16
11,900 - 16,000	1234	19
16,000 - 20,200	2013	22
20,200 - 24,600	2937	25
24,600 - 29,900	4037	29
29,900 - 35,200	5574	33
35,200 - 45,800	7323	39
45,800 - 60,000	11457	44
60,000 - 85,600	17705	49
over 85,600	30249	50

Source: Economic Recovery Tax Act of 1981.

Individual capital gains are taxed at half the statutory rate on dividends. However, gains are taxed only if realized and the effective rate is reduced by the postponement of realization. Bailey (1968) estimated that postponement and realization reduce the effective tax rate further by one half each. Hence, I assume a 4.5 percent tax rate on individual capital gains[7] (33×0.5=16.5, 16.5×0.5×0.5=4.125).

B. Pension Funds:

I assume that no taxes are levied on the equity income of pension funds. As explained by Feldstein and Summers, pension recipients do pay taxes on pension income upon receipt, but the effective rate is low because the tax liability is postponed and because the receipts generally have low marginal tax rates during retirement. In order to get a conservative estimate of the effective tax rate on capital income, it is assumed that there are no taxes on pension income.

C. Life Insurance Companies and Commercial Banks:

Life insurance companies and commercial banks are taxed at corporate tax rates on dividends and capital gains. However, they are permitted to exclude 85 percent of dividends because of the intercorporate dividend exclusion. Their effective marginal tax rate on dividend income is 6.9 percent. (The corporate tax rate is 46 percent.) These institutions are taxed at a 30 percent statutory rate on capital gains realizations. Again, because of the effect of deferral, I assume an effective rate of 15 percent (half of 30 percnet) on such gains. But unlike the treatment of individuals, it is assumed that all gains are realized.

A weighted average of the effective tax rates provides my estimates of the marginal effective rates on dividends and retained earnings. The results of these calculations are shown in Table 7. The effective marginal tax rate on dividends is 0.256, while the effective marginal tax rate on capital gains is much lower at 0.043. In order to determine the noncorporate tax rate on all equity income, the payout ratio of dividends and retained earnings must be determined. Feldstein and Summers estimated this ratio by using the average payout ratio over the past decade. The share of total profits going to dividends was 46 percent, with the other 54 percent going to retained earnings. This implies a total tax rate on equity income of 0.141. If corporate taxable income is increased by a single dollar with no change in real income, the corporation pays 46 cents more in taxes. Shareholder income is reduced by 46 cents, leading to a decline of 6.5 cents in shareholder tax payments. Hense, the total tax payment is 39.5 cents. Thus, the marginal tax rate on this income is 0.395.

III.2. The Tax on Corporate Debt Holders

Next, I examine the extra taxes that holders of corporate debt pay when interest rates rise in response to a higher rate of inflation. That is, I estimate the amount by which debt holders' taxes would be reduced if the taxation of interest income were indexed. I shall also examine the extra taxes corporations pay on their interest-bearing financial assets.

In Table 9, I show the nonfinancial corporate sector's interest-bearing financial assets and liabilities at the end of 1980. The

breakdown of holders of these securities is shown in the different columns. All these figures are derived from the official flow of fund accounts. In order to calculate the effective tax rate on the holders of corporate debt, I find the weighted average of marginal tax rates for each investor class.

The estimate of the marginal tax rate for each class of creditors is shown in the bottom row of Table 9. These estimates are only approximate since the laws of financial institution are very complex and since all of the desired information is not available. I have selected relatively conservative assumptions, following Feldstein and Summers (1979). My estimate of each rate is as follows:

Households. Following Feldstein and Summers, I have selected a 35 percent tax rate on interest paid. This implies that household bondholders have slightly higher marginal tax rates on average than household dividend recipients.

Commercial Banks. Commercial banks pay a 46 percent corporate income tax at the margine on interest receipts. Those interest receipts net of corporate tax are subject to further taxation as dividends and retained earnings; I assume the same rate of 0.141 for this equity income that I derived in section III.1 for nonfinancial corporations. An overall tax rate on this equity income is 0.525 ($46\times(1+0.141)=0.525$). However, if banks raise the interest payments that they make to their depositors, the banks do not pay extra taxes but their depositors do. The total marginal tax rate on corporations and their depositors is approximately 50 percent[8].

Table 9: The Distribution of the Nominal Assets and Liabilities of Nonfinancial Corporations and the Effective Marginal Tax Rate on Corporate Interest Payments

	CREDITORS AND DEBTORS FOR INTEREST BEARING CORPORATE ASSETS AND LIABILITIES									NON-INTEREST BEARING CORP. ASSETS	
ASSETS	House-hold	Private Pensions	Comm. Banks	Mutual S.B.	Life Ins.	Finance Co.	Other Ins.	Gov't	Misc.	Non-Interest Bearing	Total
Time Deposits	-	-	37.6	-	-	-	-	-	-	-	37.6
Consumer Credit	30.8	-	-	-	-	-	-	-	-	-	30.8
Security R.P.'s	-	-	-	-	-	-	-	-	22.9	-	22.9
Goverment Sec.	-	-	-	-	-	-	-	6.2	-	-	6.2
Comm. Paper (Net)	-	-	9.8	-	-	22.8	-	-	-	-	32.6
Trade Credit (Net)	-	-	-	-	-	-	-	-	-	111.8	111.8
Currency and Demand Deposits	-	-	-	-	-	-	-	-	-	69.9	69.9
TOTAL ASSETS	30.8	-	47.4	-	-	22.8	-	6.2	22.9	181.7	311.8
LIABILITIES											
Bonds	86.9	58.1	7.7	21.2	124.5	-	27.1	68.0	-	-	393.5
Mortgages	15.9	2.1	91.7	34.4	86.7	4.9	1.0	8.8	-	-	245.5
Bank Loans	-	-	296.5	-	-	-	-	-	-	-	296.5
Financial Co. Loans	-	-	-	-	-	78.5	-	-	-	-	78.5
U.S. Govt. Loans	-	-	-	-	-	-	-	8.4	-	-	8.4
Misc. Liabs.	-	-	-	-	-	-	-	-	65.5	-	65.5
TOTAL LIABILITIES	102.8	60.2	395.9	55.6	211.2	83.4	28.1	85.2	65.5		1087.9
NET LIABILITIES	72.0	60.2	348.5	55.6	211.2	60.6	28.1	79.0	42.6	(181.7)	776.1
MARGINAL TAX RATES	35%	0	50%	23%	57%	53%	53%	0	0	0	39.7%

Source: Assets and liabilities of 1980 are derived from the Flow of Funds Accounts.

Mutual Saving Banks. I estimate a 23 percent rate for these institutions based on the assumption that about half of marginal income is sucessfully sheltered, following Feldstein and Summers.

Life Insurance Companies. Following Feldstein and Summers, I use a 57 percent marginal tax rate for these institutions.

Finance Companies and Other Insurance. Combining the 46 percent corporate rate with the additional tax on dividends and retained earnings yields a marginal tax rate of 53 percent on this type of income.

Government. I also assume that government neither pays taxes on interest receipts nor deducts expenses for tax purposes.

Miscellaneous. The interest on these assets is assumed to be untaxed for more conservative estimates of the tax burden.

I have averaged the marginal tax rates shown in the final row of Table 9, weighted by the share of debt owned by each class of investors. These calculations imply a marginal tax rate of 0.397 on interest income. Note that the tax rate which lenders pay exceeds that the rate at which corporations deduct interest payments although the difference is very small. Thus the issue of the real gains and losses on debt can be ignored without distorting the measurement of the additional tax caused by inflation. The implication of this finding is that it makes little difference to total tax paid whether the real change in the value of debt is taxed as income to the corporation and deducted by the creditor, or simply ignored.

Note that several of the estimated marginal tax rates are approximations, but they pertain to relatively small amounts of debt.

Therefore, a more exact estimate of these numbers should not alter the basic results of this thesis.

CHAPTER IV

THE OVERALL EFFECTIVE TAX RATE ON CORPORATE CAPITAL INCOME

This chapter presents the estimate of the overall effective tax rate on the real capital income earned in the corporate sector under the Economic Recovery Tax Act of 1981. Feldstein and Summers (1979) measured the tax burden on corporate source income by the ratio of the total tax paid on such income, including the taxes paid by shareholders and lenders as well as by the corporations, to the total real income available before tax for the shareholders and creditors. This approach to estimating effective tax rates by calculating total taxes paid as a proportion of total pre-tax income implicitly assumes that marginal tax rates are not far from the ratio of taxes to income (average tax rates). I am going to apply the marginal effective corporate tax rate and the marginal effective individual tax rates estimated from the last two chapters to obtain this overall effective tax rate. Data from 1980 is used.

The official national income estimate of 1980 corporate profits was $123.6 billion. Net nominal interest payments by nonfinancial corporations were $56.1 billion[9]. The total pre-tax income available for shareholders and creditors can be obtained by adding these profits and net interest to obtain $179.7 billion. Note that a significant fraction of the corporations' financial assets are not liabilities of investors but of the government or of the corporations' customers.

When inflation lowers the real value of these assets, the loss to the corporations is not a gain to individual or institutional investors. The corporations' loss on these financial assets should be subtracted from corporate profits. In 1980, these assets were $181.7 billion[10], therefore the loss was $9.1 billion for a five percent inflation rate and $18.2 billion for a ten percent inflation rate. The total pre-tax corporate sector income available for shareholders and creditors was therefore $170.6 billion for a five percent inflation rate, and $161.5 billion for a ten percent inflation rate.

At a five percent rate of inflation, the total tax of 55.1 billion on the pre-tax income estimated under the new tax law (ERTA) consists of five components as shown in the columns of Table 10.

(1) corporate income tax:

From the calculations of Chapter II, I have the marginal effective corporate tax rate of 0.047 when inflation rate is 5%. This marginal effective tax rate of 0.047 is measured on a dollar of corporate investment. Thus, the new investment in equipment and structures in 1980 of $299.0 billion implies a tax liability of $14.1 billion and represents a marginal effective tax rate of 8.3 percent on total corporate source income (14.1/170.6=8.3)[11]. With new tax law, this marginal effective tax rate is less than the average tax rate on corporation because it ignores taxes paid on previous investments (ACRS applies only to new investment). Compared to the 42.5 percent average corporate tax rate estimated by Feldstein and Summers (1979), this 8.3 percent marginal tax rate seems to be very low. Notice that the 42.5%

Table 10

The Overall Effective Marginal Tax Rate on Capital Income of the Nonfinancial Corporate Sector Under the Economic Recovery Tax Act of 1981*

Inflation Rate	Total Real Income (billion)	Taxes as a percentage of Total Real Income					
			Taxes on Shareholders and Creditors				
		Corporate Income Tax	Dividends	Retained Earnings	Nominal Cap.Appre.	Interest Income	Total
5%	170.6	8.3	6.1	2.3	2.6	13.1	32.4
10%	161.5	35.7	6.4	4.2	5.4	13.8	65.5

* Data of 1980

tax rate estimated by Feldstein and Summers was calculated at a 6.8% inflation rate of 1977. It was also calculated by dividing the "actual" tax paid in 1977 to total real income of 1977 which captured both old and new investment.

The effective tax rates of 10% inflation rate under ERTA are shown in the second row of Table 10. When inflation increases from 5% to 10%, the corporate marginal effective income tax rate increases from 8.3% to 35.7%. This implies that under ERTA of 1981 the effective corporate tax rate is very sensitive to inflation.

(2) taxes on dividends:

Dividends in 1980 were $40.4 billion; a marginal effective tax rate of 0.256 on dividends estimated in chapter III implies $10.3 billion tax liability and adds 6.1 percent to the overall effective tax rate (10.3/170.6=6.1). When inflation rate is 10%, the marginal tax rate increases to 6.4 percent (10.3/161.5=6.4) assuming that average tax rate is equal to marginal tax rate.

(3) taxes on retained earnings:

Retained earnings in 1980 are estimated at $20.2 billion which ignores the real gain of outstanding debt. With a net debt of $776.1 billion, the additional retained earnings were $72 billion under a 5% inflation rate. (Since $i-i_o=\pi/(1-u)=0.093$ for Modified Fisher's Law, $776.1 billion×0.093=$72 billion.) Total retained earnings are $92.2 billion by adding $20.2 billion and $72 billion. Then a marginal effective tax rate of 0.043 on capital gains implies $4 billion tax liability and adds 2.3 percent to the overall effective tax rate. For 10% inflation rate the effective tax rate on retained earnings is

4.2 percent.

(4) taxes on nominal capital appreciation:

The nominal increase in the value of corporate assets due to a general rise in the price level causes an additional capital gains tax liability. The estimated capital stock of 1980 is $2036.3 billion[12]. Thus, when inflation is five percent the increase in the nominal capital stock is $101.8 billion. With a 0.043 marginal effective tax rate, the tax liability is $4.4 billion on the nominal increase, adding 2.6 percent to the overall effective tax rate. The tax rate will increase to 5.4 percent if inflation rate is 10%.

(5) taxes on interest income:

Nominal interest payments of $56.1 billion were taxable income to creditors. With a marginal effective tax rate of 0.397, this presents a tax liability of $22.3 billion, adding 13.1 percent to the overall effective tax rate (22.3/170.6=13.1). At a 10% inflation rate, this $22.3 billion will add 13.8 percent to the overall effective tax rate (22.3/161.5=13.8).

The total of these five figures of marginal effective tax rate is thus 32.4 percent at a five percent inflation rate. Similarly, for a ten percent inflation rate, the overall effective marginal tax rate is 65.5 percent. This result is shown in the last column of Table 10. The overall effective marginal tax rate decreases as the inflation rate decreases. So, if there is a successful anti-inflation policy total tax payment will be less. This was one of the reason that the Carter administration was opposed to the 10-5-3 Proposal -- it costs too much.

The ERTA shares this characteristics as the 10-5-3 Proposal. On the other hand, lower effective tax rate may stimulate the incentive of corporate investment, especially when inflation is not high.

The overall effective average tax rates estimated by Feldstein and Summers (1979) were calculated under the old tax law. They estimated the effective tax rates on capital income of corporations from 1954 to 1977. In 1968 the inflation rate was 4.7%, and the average effective tax rate was 60.8%. In 1970 the inflation rate was 5.5%, the average effective tax rate was 67.8%. These rates are much higher than the overall marginal tax rate estimated under the new tax law of 32.4% with a 5% inflation rate. The ERTA lower the overall effective tax rate. In 1973 the inflation rate was 8.8%. The average effective tax rate was 70.0% under the old tax law. It is higher than the 65.5% marginal effective tax rate which is estimated under new tax law and 10% inflation rate. But the difference is small.

CHAPTER V

CONCLUSION

Fullerton and Henderson (1981) estimated the marginal effective corporate tax rates for each asset under Modified Fisher's Law, assuming a seven percent rate of inflation. They calculated these tax rates under both old law and new law (ACRS). Comparing with the old law, ACRS reduces the effective marginal tax rate for each asset. Under ACRS, the marginal effective tax rate of equipment range from -63.2% to -15.1% and from 9% to 43.7% for strucutres. Under the old law, all the tax rates are positive and above 40% for structures with a 7% inflation rate. From the estimations in this thesis, the marginal effective corporate tax rates at a 5% inflation rate are very close to the results of Fullerton and Henderson. Although the marginal effective tax rates of a 10% inflation rate are higher than the rates estimated by Fullerton and Henderson, they are still lower than the rates estimated under the old law with a 7% inflation rate. Therefore, I reach the same conclusion as Fullerton and Henderson -- the marginal effective corporate tax rates of each asset are reduced under the new tax law of 1981.

After calculating the marginal effective corporate tax rate, I add the estimated individual tax rate to obtain the overall effective marginal tax rate in the corporate sector. To determine the long-run effects of the ERTA, changes in individual tax burdens should also be

accounted for to find the overall marginal tax rate on capital income.

Although this thesis follows Feldstein and Summers (1979) to a large extent, there are some differences between the two methodologies. First, Feldstein and Summers estimated the effective corporate tax rate by using the data of National Income and Product Accout (NIPA) which is estimated using an economic depreciation method. They divided the total tax payment by total corporate source income to obtain the average effective corporate tax rate. Instead, in this thesis I estimate the effective corporate tax rate under the ACRS new tax law with different depreciation methods. I calculate the weighted "marginal" effective corporate tax rate from assets, then multiply this rate by total new investment in 1980 to get the total tax payment.

Second, because of the ERTA the effective individual marginal tax rates have been decreased. Third, Feldstein and Summers estimated the effective corporate tax rate on capital income over time (1954-1977) in order to see the impact of inflation to the economy. I estimate this effective tax rate only on one year, 1980, but under different inflation rates. Fourth, in this thesis I did not calculate the effective tax rates for any industry. Feldstein and Summers in their paper computed the relationship between inflation, depreciation and corporate tax liabilities in manufacturing industries. Other authors, such as Hulten and Wykoff (1981), Fullerton and Henderson (1981), and Jorgenson and Sullivan (1982) have also estimated the effective corporate tax rates for many industries.

Jane Gravelle (1981) in her comment on Feldstein and Summers (1979)

suggests that Feldstein and Summers substantially overstate the tax burden on the corporate sector. Her criticisms focus on three major areas:

1. Basic Methodology

Gravelle criticizes Feldstien and Summers' procedure of examining the effect of inflation in the context of existing statutory tax rates and rules rather than assuming that the statutory tax rules have been changed by inflation. Feldstein and Summers in their reply (1981) argue that corporate tax changes have historically been motivated almost entirely by countercyclical considerations and not by any desire to offset inflation. Under ACRS, we expect that the shorter-lives of assets and the accelerated depreciation methods will counterbalance the influence of inflation. However, the calculations of this thesis indicate that the overall effective tax rate does not decrease much when inflation rate is very high.

Gravelle next questions the way in which Feldstein and Summers estimate the impact of historic cost depreciation. Feldstein and Summers calculate the difference between historic and replacement cost depreciation based on economic depreciation (as estimated by the Department of Commerce) rather than the accelerated depreciation assumptions embodied in tax code. Gravelle then suggests that the effective tax rates they calculate may not be relevant to marginal investment decisions. Although Feldstein and Summers admit that there might in priciple be differences between effective and marginal tax rates, they believe that the effective tax rates that they calculate are good

approximations to the corresponding marginal tax rates.

2. The Tax Rate on Corporate Creditors

Gravelle then criticizes Feldstein and Summers' estimates of the marginal tax rates paid by corporate creditors. She raises a question: what is the appropriate treatment of the interest income received by banks? Feldstein and Summers think that their treatment of bank interest as real income is correct. As long as the rate that banks must pay on deposits fails to adjust fully for inflation, increases in inflation raise the real profits of banks. This real income is taxed at the corporate level (i.e., at the bank level) and then the residual is passed through to shareholders who are subject to further tax.

Gravelle suggests that the above discussion is irrelevant since banks, in her view, transmit interest rate changes, thus making the tax rate of depositors relevant rather than that of the bank and its shareholders. Her recalculations of the tax rate of commercial bank is 39 percent. This estimate is much lower than Feldstein and Summers' of 54 percent. Because of the special rules for banks, Feldstein and Summers argue that banks engage in a variety of activities which involve lower pre-tax returns but escape taxation. Thus the level of "actual" tax payments has little to do with the relevant marginal tax rate. For the tax rate on corporate creditors in this thesis, I follow the assumptions of Feldstein and Summers.

3. State and Local Taxes

Gravelle's final point is to note that Feldstein and Summers

induced state and local profits tax liability in their calculation. While state and local taxes should be omitted in calculating effective federal tax rates, they are relevant to the calculation of the total tax rate on corporate capital income. I follow this example in this thesis.

FOOTNOTES

1. Autos, light-duty trucks, and other personal property with a midpoint life of four years or less under the old ADR system qualify for a three-year write-off.

2. The property with an ADR midpoint life of between eighteen and twenty-five years may depreciated over ten years, while a fifteen-year write-off is permitted for public utility assets with an ADR midpoint life greater than twenty-five years.

3. For more detail, see Fullerton & Henderson (1981), pp. 7-10.

4. Most of the asset types are taken from Fullerton & Henderson (1981).

5. She estimated the distributional ratio of each asset, not only of four broad asset types.

6. The TAXSIM Model was first presented in their paper.

7. For more detail, see Feldstein and Summers (1979) and Bailey (1968).

8. See Feldstein and Summers (1979).

9. Survey of Current Business, Dec. 1981.

10. This number derived from Table 8. Trade Credit (net) and Currency and Demand Deposits are equal to $181.7 billion.

11. Survey of Current Business, July 1981.

12. Survey of Current Business, Feb. 1981, June 1981; and U.S. Landownership Survey, Landownership in the U.S., 1978. See the definition in von Furstenberg, G. (1977).

Appendix: Distribution of Corporate Income and Taxes, 1977

Income Class AGI (000) (1)	Number of Returns (000) (2)	Total Dividends Amount (000) (3)	Average Amounts per return					Tax on Corp. as Perc. of Corp. Income (9)
			Dividends (4)	Corporate Income (5)	Net Tax Liability (6)	Personal Tax on Corp. Income (7)	Total Tax on Corp. Income (8)	
0 - 4	18931.9	$ 616717	$ 32.6	$ 185.2	$ 49.5	$ 3.9	$ 53.4	28.83%
4 - 6	8573.8	645623	75.3	427.7	114.4	9.0	123.4	28.85
6 - 8	8063.6	722163	89.6	508.9	136.2	12.5	148.7	29.22
8 - 12	13130.1	1480555	112.8	640.7	171.5	18.0	189.5	29.58
12 - 16	10756.7	1622106	150.8	856.5	229.2	28.7	257.9	30.11
16 - 20	8853.5	1520047	171.7	974.1	260.9	37.8	298.7	30.66
20 - 25	7766.7	1636933	210.8	1197.3	320.4	52.7	373.1	31.16
25 - 30	4354.1	1478588	339.6	1928.9	516.2	98.5	614.7	31.87
30 - 35	1196.2	1095502	915.8	5201.7	1392.0	302.2	1694.2	32.57
35 - 45	2392.5	2191004	915.8	5201.7	1392.0	357.2	1794.2	33.63
45 - 60	1424.4	2094395	1470.4	8351.9	2235.0	647.0	2882.0	34.51
60 - 80	570.4	2497232	4378.0	24867.0	6654.6	2145.2	8799.8	35.39
80 - 100	342.2	1498339	4378.5	24869.9	6655.3	2189.3	8844.6	35.56
100 - 200	225.2	3352468	14886.7	84556.5	22627.8	7443.4	30071.2	35.56
200 - 500	46.4	2414263	54186.7	307780.5	82363.8	27093.4	109403.2	35.55
500 - 1000	5.2	968661	186280.9	1058075.5	282147.0	93140.5	376287.5	35.56
1000+	1.8	1085870	603261.1	3426523.0	916956.9	301630.5	1218587.4	35.56
All	86634.6	$ 27020483	$ 311.9	$ 1771.6	$ 474.1	$ 115.9	$ 589.9	33.30%

Source: Internal Revenue Service. Individual Returns/1977, Returns Filed and Sources of Income.

BIBLIOGRAPHY

Books and Articles

Aaron, H.J., "Inflation and the Income Tax: An Introduction," in Henry J. Aaron ed., Inflation and the Income Tax, The Brookings Institution, 1976, pp. 1-31.

Auerbach, A.J., "The New Economics of Accelerated Depreciation," NBER Working Paper, #848, January 1982.

Auerbach, A.J. and Jorgenson, D.W., "Inflation-proof Depreciation of Assets," Harvard Business Review, Sept.-Oct. 1980, pp. 113-118.

Bailey, M.J., "Inflationary Distortions and Taxes," in Henry J. Aaron ed., Inflation and the Income Tax, The Brookings Institution, 1976, pp. 291-329.

Bradford, D.F., "Tax Neutrality and the Investment Tax Credit," in Auron and Boskin, eds., The Economics of Taxation, The Brookings Institute, 1980, pp. 281-298.

Bradford, D.F., "Issues in the Design of Saving and Investment Incentives," in Charles R. Hulten, ed., Depreciation, Inflation, and the Taxation of Income From Capital, The Urban Institute, Washington, D.C., 1982, pp. 13-47.

Bradford, D.F. and Fullerton, D., "Pitfalls in the Construction and Use of Effective Tax Rates," in Charles R. Hulten, ed., Depreciation, Inflation, and the Taxation of Income From Capital, The Urban Institute, Washington, D.C., 1982, pp. 251-278.

Cordes, J.J. and Sheffrin, S.M., "Taxation and the Sectoral Allocation of Capital in the U.S.," National Tax Journal, XXXIV(4), 1982, pp. 419-432.

Feldstein, M., "Tax Incentives, Corporate Saving, and Capital Accumulation in the United States," Journal of Public Economics 2, 1973, pp. 159-171.

Feldstein, M., "Taxes, Inflation and Capital Formation," National Tax Journal, XXXII(3), 1979, pp. 347-349.

Feldstein, M., "Adjusting Depreciation in an Inflationary Economy: Indexing versus Acceleration," National Tax Journal, XXXII(4), 1979, pp. 29-43.

Feldstein, M. and Frisch, D., "Corporate Tax Integration: the Estimated Effects on Capital Accumulation and Tax Distribution of Two Integration Proposals," National Tax Journal, XXX(1), 1977, pp. 37-52.

Feldstein, M. and Slemrod, J., "Inflation and the Excess Taxation of Capital Gains on Corporate Stock," National Tax Journal, XXXI(2), 1978, pp. 107-118.

Feldstein, M. and Summers, L., "Inflation and the Taxation of Capital Income in the Corporate Sector," National Tax Journal, XXXII(4), 1979, pp. 445-470.

Feldstein, M. and Summers, L., "Inflation and the Taxation of Capital Income in the Corporate Sector: Reply," National Tax Journal, XXXIII(4), 1980, pp. 485-488.

Fullerton, D. and Henderson, Y.K., "Long Run Effects of the Accelerated Cost Recovery System," NBER Working Paper, #828, December 1981.

Gravelle, J.G., "Inflation and the Taxation of Capital Income in the Corporate Sector: A Comment," National Tax Journal, XXXIII(4), 1980, pp. 473-483.

Hall, R.E., "Tax Treatment of Depreciation, Capital Gains, and Interest in an Inflationary Economy," in Charles R. Hulten, ed., Depreciation, Inflation, and the Taxation of Income From Capital, The Urban Institute, Washington, D.C., 1982, pp. 149-166.

Hulten, C.R. and Wykoff, F.C., "Economic Depreciation and Accelerated Depreciation: An Evaluation of the Conable-Jones 10-5-3 Proposal," National Tax Journal, XXXIV(1), 1981, pp. 45-60.

Hulten, C.R. and Wykoff, F.C., "The Measurement of Economic Depreciation," in Charles R. Hulten, ed., Depreciation, Inflation, and the Taxation of Income From Capital, The Urban Institute, Washington, D.C., 1982, pp. 81-125.

Jorgenson, D.W. and Sullivan, M.A., "Inflation and Corporate Capital Recovery," in Charles R. Hulten, ed., Depreciation, Inflation, and the Taxation of Income From Capital, The Urban Institute, Washington, D.C., 1982, pp. 171-237.

Musgrave, R.A. and Musgrave, P.B., Public Finance in the Theory and Practice, McGraw-Hill Book Company, Third Edition, 1980.

Steuerle, E., "Is Income From Capital Subject to Individual Income Taxation?" Office of Tax Analysis Paper, #42, October 1980.

Stiglitz, J.E., "The Corporation Tax," Journal of Public Economics 5, 1976, pp. 303-311.

Sunley, E.M., "Indexing the Income Tax for Inflation," National Tax Journal, XXXII(3), 1979, pp. 328-333.

Sunley, E.M., "Acceleration of Tax Depreciation: Basic Issues and Major

Alternatives," in Charles R. Hulten, ed., Depreciation, Inflation, and the Taxation of Income From Capital, The Urban Institute, Washington, D.C., 1982, pp. 137-147.

von Furstenberg, G., "The Q Theory of Investment," Brookings Papers on Economic Activity, 1977:2.

Public Documents

Board of Governors of the Federal Reserve System, Flow of Funds Accounts, Assets and Liabilities Outstanding, 1969-1980; September 1981.

Economic Recovery Tax Act of 1981, Public Law 97-34--Aug. 13, 1981.

Economic Reports of the President, January 1981, p. 255.
___, January 1982, p. 189.

U.S. Department of Agriculture, U.S. Landownership Survey, Landownership in the U.S., 1978.

U.S. Department of Commerce, Survey of Current Business, July 1979, p. 17.
___, Feb. 1981, p. 58.
___, June 1981, p. 14.
___, July 1981, pp. 25-26.
___, Dec. 1981, p. 12.

U.S. Treasury Department, Internal Revenue Service, Corporation Returns/1977, Individual Returns/1977.