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INFLATION AND THE TAXATION OF CAPITAL INCOME
IN THE CORPORATE SECTOR

MARTIN FELDSTEIN
LAWRENCE SUMMERS

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SUMMARY

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Martin Feldstein
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This paper presents a detailed examination of the effect of inflation on the taxation of capital used in the nonfinancial sector of the U.S. economy. In contrast to previous studies of the relation between inflation and corporate tax burdens, we consider 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.

According to our calculations, the effect of inflation with the existing tax laws was to raise the 1977 tax burden on corporate sector capital income by more than \$32 billion, an amount equal to 69 percent of the real after tax capital income of the nonfinancial corporate sector (including dividends, retained earnings and real interest). This extra tax raised the total effective tax rate from 43 percent to 66 percent of capital income in the nonfinancial corporate sector.

A separate analysis for each of 20 manufacturing industries shows substantial variation among these industries in the relative importance of this increased taxation. Inflation therefore can distort the allocation of capital among industries as well as the total volume of corporate capital formation.

The paper considers the role of corporate debt in detail. Inflation distorts taxation by allowing corporations to deduct nominal interest payments that exceed real interest but then taxes lenders on their nominal receipts. Our analysis shows that the additional taxes paid by lenders exceed the tax saving by corporate borrowers. Since the difference between the relevant tax rates of borrowers and lenders is quite small, the mismeasurement of interest income and expenses can be ignored without seriously distorting the evaluation of the overall effect of inflation on the taxation of corporate sector capital.

National Bureau of Economic Research, Inc.
1050 Massachusetts Avenue
Cambridge, Massachusetts 02138
(617) 868-3905

Inflation and the Taxation of Capital Income
in the Corporate Sector*

Martin Feldstein
Lawrence Summers

This paper presents a detailed examination of the effect of inflation on the taxation of capital used in the nonfinancial corporate sector of the U.S. economy. Our analysis shows that, with current tax laws, inflation substantially increases the effective tax rate on capital income in the corporate sector. The principal reason for this is that the historic cost method of depreciation causes a major overstatement of taxable profits, i.e., historic cost depreciaton results in a large increase in the level of real taxable profits at any level of real economic profits. Current methods of inventory accounting add further to this overstatement of profits for tax purposes.

According to our most comprehensive calculation, the effect of inflation with existing tax laws was to raise the 1977 tax burden on corporate sector capital income by more than \$32 billion. This extra tax burden was equivalent to 69 percent of the real after-tax capital income of the nonfinancial corporate sector, including retained earnings, dividends, and real interest receipts

* Martin Feldstein is President of the National Bureau of Economic Research and Professor of Economics at Harvard University. Lawrence Summers is a Research Analyst of the National Bureau of Economic Research and a graduate student at Harvard University. This paper is part of the NBER Study of Capital Formation. The authors are grateful for comments on an earlier draft by participants in a meeting of the NBER research group on Taxation and Business Finance. James Poterba, Stephanie Seligman and Daniel Smith provided valuable assistance. The views expressed here are the authors' own and not an official statement of the NBER.

of the corporations' creditors. Since our calculations show that the total tax burden on this corporate capital income was \$92 billion, the extra tax burden raised the tax by more than 54 percent. The total effective tax rate on corporate sector capital income in 1977 was 66 percent; without the extra tax caused by inflation, the effective tax rate would have been only 43 percent.

In contrast to previous studies of the relation between inflation and corporate tax burdens, we consider 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.¹ This is particularly important for a correct treatment of corporate debt. Inflation implies that 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.² However, the individuals and institutions that lend to the corporations are taxed on the overstated nominal interest income.³ Our calculations show that the excess tax paid by the lenders is slightly greater than the tax saving of the corporate borrowers. Since the difference between the relevant tax rate for borrowers and lenders is quite small, the mismeasurement of interest income (or, equivalently, the real gains and losses on net corporate debt) can be ignored without seriously distorting the evaluation of the overall effect of inflation on the taxation of corporate sector capital.

¹ Studies that have focused on inflation's effect on corporate taxes include Davidson and Weil (1977), Lovell (1978), Shoven and Bulow (1976) and Tideman and Tucker (1977). The importance of looking through the corporation to examine the return to suppliers of debt and equity capital is stressed in Feldstein (1976), Feldstein, Green and Sheshinski (1978), and Feldstein and Summers (1978).

² Allowing the deduction of nominal interest payments that exceed real interest payments is equivalent to ignoring the real gains that accrue to corporations as inflation reduces the real value of outstanding corporate debt. In this context, debt should of course be regarded as gross debt minus nominal assets.

³ The extent of this taxation differs substantially among the different classes of lenders.

In addition to our analysis of the nonfinancial corporate sector as a whole, the present study makes use of an important new source of data for individual firms on the values of both replacement cost depreciation and depreciation based on historic costs. Beginning with the year 1976, the Securities and Exchange Commission has required large corporations to provide information on replacement cost depreciation and inventory profits as part of their annual form 10-K reports. We use these data together with other information on the financial and real performance of 327 individual manufacturing firms in order to examine how inflation has raised the effective tax rates on different industries.

In the first section of this study, we ignore the mismeasurement of interest expenses and income in order to focus on the additional taxation caused by historic cost depreciation and by existing inventory accounting methods. Section 2 then shows that the corporate tax savings that result from overstating real interest expenses are slightly more than balanced by the greater tax burdens that the mismeasurement of interest income imposes on the individuals and institutions that directly and indirectly supply debt capital to the corporate sector. The total increase in tax liabilities on corporate source income due to inflation is then estimated in section 3. Section 4 describes inflation's impact on effective tax rates. The fifth section then uses the data on individual firms to calculate the extent of additional taxation in each of the 20 different manufacturing industries. There is a brief concluding section that discusses the implications of these higher effective tax rates for capital formation and economic performance.¹

¹The analysis relates only to nonfinancial corporations even when the text refers only to corporations. Throughout the study we make no attempt to assess the extent to which the initial tax burdens are shifted to other capital or to labor by changes in the allocation of capital or in the financial decisions of households and firms. We also ignore state and local taxes and to that extent, understate total tax burdens.

1. Depreciation Rules, Inventory Accounting and Corporate Tax Payments

A desirable taxation criterion is that real tax payments should not be affected by changes in the overall price level which do not alter real income or wealth. Our tax system violates this standard in its treatment of corporate profits. When the price level rises and firms' real profits remain constant, their real tax payments rise both because of historical cost depreciation and FIFO inventory accounting. The real cost of the depreciating of a firm's capital stock is the replacement cost of the obsolescent capital. Yet for tax purposes firms are only permitted to deduct depreciation based on the original purchase price. In inflationary periods, this may be much less than the replacement cost. Similarly, the cost of depleting inventories is the replacement cost of the goods, not their original acquisition cost. Firms which use FIFO inventory cost deduct only the acquisition cost, giving rise to phantom inventory profits.

In this section, we discuss our estimates of how much existing depreciation and inventory rules raise corporate taxes in our inflationary economy. We ignore the role of debt and limit our attention to the tax burdens at the level of the corporation; this restriction is dropped in the subsequent sections where, as we noted in the introduction, we show that explicit recognition of debt has little effect on the total additional taxation of all the capital used in the corporate sector because of the offsetting effects of inflation on the taxation of borrowers and lenders. We begin this section by examining the experience for 1977, the most recent year for which all the required information is available. We then discuss the trends in inflation's effects on the taxation of corporate source income over the period since 1954.

1.1 The Experience of 1977

Before looking in detail at the data for 1977, we can summarize briefly the impact of inflation on the taxes paid by nonfinancial corporations in 1977. The cumulative effect of inflation reduced the depreciation allowed on existing plant and equipment by \$39.7 billion in 1977. This raised corporate tax payments by \$19 billion, on nearly one-third of the \$59 billion of corporate tax liabilities for 1977. Artificial inventory profits added an additional \$7 billion to tax liabilities. Thus, inflation raised corporate taxes from \$33 billion to \$59 billion, an increase of 79 percent. Stating this in a different way, the additional corporate tax caused by inflation accounts for 57 percent of the \$59 billion of corporate tax liabilities in 1977.

We can now examine the specific data used to calculate these additional tax burdens. The official national income account estimate of the 1977 real profits of nonfinancial corporations was \$113.9 billion.¹ Taxable profits for those corporations were \$143.5 billion in the same year. The \$30 billion difference between these two profit figures is the sum of the inventory valuation adjustment and the capital consumption adjustment. The inventory valuation adjustment (IVA) of \$14.8 billion implies that inflation added \$14.8 billion of false inventory profits to taxable income. The capital consumption adjustment (CCA) of \$14.7 billion actually reflects two countervailing differences between real straight-line depreciation and the depreciation allowed for tax purposes:

¹Survey of Current Business, November 1978. For earlier years, we use the Survey of Current Business, March 1976, pages 53-57, and updates in the Survey of Current Business. Depreciation is based on straight-line depreciation at 85 percent of the Bulletin F lives with depreciation calculated at replacement cost.

the accelerated depreciation rules made tax-deductible depreciation exceed straight-line depreciation by \$25.0 billion while inflation reduced the value of tax-deductible depreciation and raised taxable profits by \$39.7 billion. We shall refer to the two components of the CCA as the "acceleration component" (CCA-A) and the "inflation component" (CCA-I). Thus historic cost depreciation plus false inventory profits together added \$54.5 billion to taxable profits. With a 48 percent statutory marginal tax rate, inflation caused a \$26 billion increase in corporate tax payments.

In calculating the excess corporate tax payments we have implicitly assumed that accelerated depreciation and the investment tax credit were enacted to stimulate investment and not as an offset to inflation. It is clear that these features were enacted long before adjusting taxable income for inflation was a serious issue. Accelerated depreciation was introduced to the tax law in 1954 (a year in which the CPI actually fell) because of a conviction that tax depreciation lives were too long. Extensions of accelerated depreciation in subsequent years appear to have been instituted by a desire to stimulate investment rather than as an offset to inflation. As Stanley Surrey noted in connection with the 1971 acceleration provisions that created the asset depreciation range (ADR) system, "The new ADR system was urged by the Treasury and adopted by the Congress in 1971 not as a device needed to measure real net income ... but as incentive for the purchases of new machinery and equipment." (Surrey, 1973, p. 32). Similarly the investment tax credit was introduced as a countercyclical measure to simulate demand in 1962, a year in which the CPI rose only 1.2 percent.

Although the tax credits and accelerated depreciation that was legislated before the recent inflation can clearly be regarded as investment incentives rather than offsets to inflation, it can be argued that the changes

made in the Tax Reduction Act of 1975 (and in subsequent legislation) were intended at least partly as an offset to the inflationary distortions of the tax liabilities.¹ It is worth emphasizing therefore that these tax charges have done relatively little to reduce corporate taxes. The accelerated depreciation component of the capital consumption adjustment rose from \$20.4 billion in 1975 to \$25.0 billion in 1977, an increase proportional to the nominal level of fixed investment on the nonfinancial corporate sector. The increase in the amount of the investment tax credit between 1975 and 1977 due to the liberalization enacted in 1975¹ cannot be measured precisely but a reasonably accurate "upper-bound" estimate can be made. If the three percent increase in the I.T.C. rate applied to all equipment investment in 1977, the additional tax credit for nonfinancial corporations would have been only \$2.4 billion. This is clearly an overestimate of the additional investment tax credit because various limitations prevent all corporations from using the full 10 percent credit and because the rate is less than 10 percent on certain types of equipment. Furthermore, the 1975 liberalization of the I.T.C. can be ascribed at least as plausibly to anti-recession policy as to a desire to offset inflation's impact on taxable profits.

1.2 The Period Since 1954

It is useful now to see the growing impact of inflation on tax liabilities by examining the evolution of taxable income and taxes since 1954.² This analysis shows that, although inflation has caused some increase in corporate taxes for the past two decades, the period since 1970 has seen

¹The Tax Reduction Act of 1975 raised the investment tax credit from 7 percent to 10 percent and liberalized the accelerated depreciation rules.

²We begin with 1954 to avoid the complexities of the excess profits taxes that were levied during the Korean War. The Internal Revenue Code of 1954 represented a major overhaul of the tax law that, with amendments, continues to provide the framework for current tax legislation.

dramatically greater tax increases induced by inflation.

Table 1 presents annual information on the distortion of taxable profits caused by historic cost depreciation (CCA-I) and by artificial inventory accounting profits (IVA), the additional tax due to each of these, and the proportion of actual taxes that are accounted for by these excess taxes.

Consider first the reduced depreciation for tax purposes caused by historic cost accounting. Column 2 shows that this reduction in depreciation (CCA-I) remained less than \$10 billion a year until 1970 but reached \$39.7 billion in 1977. The 1977 level is nearly double the 1974 level and nearly eight times the level of 1967. This is reflected in the corresponding excess taxes shown in column 5. While the excess tax due to historic cost depreciation varied between \$2 billion and \$3 billion a year until 1967, it has doubled every three years since then: the excess taxes rose from \$2.4 billion in 1967 to \$4.8 billion in 1970, \$10.3 billion in 1974, and \$19.1 billion in 1977. While the excess tax caused by historic cost depreciation accounted for 9 percent of actual corporate taxes in 1967 (see column 8), they accounted for 32 percent of the taxes paid in 1977.

The artificial inventory profits also remained very small until 1967, never reaching \$3 billion (column 3). More recently, however, inventory profits have exceeded \$10 billion a year and the resulting excess profits have accounted for more than ten percent of actual taxes paid.

Column 10 summarizes the overall effect of both sources of increased taxation. Until 1967, the excess tax caused by inflation accounted for 10 percent to 20 percent of the corporate taxes actually paid. This implies that

TABLE 1

Inflation and Corporate Tax Liabilities, 1954-77

Year	Inflation Rate (CPI)	Overstatement of Taxable Profits			Excess Tax Due to			Percent of Actual Taxes Due To		
		Reduced Depreciation (CCA-I)	Inflated Inventory Profits (IVA)	Total	Reduced Depreciation	Inflated Inventory Profits	Total	Reduced Depreci- ation	Inflated Inventory Profits	Total
		Billions of Dollars			Billions of Dollars			Percent		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1954	-0.5	4.3	0.3	4.6	2.2	0.2	2.4	14.3	1.0	15.3
1955	0.4	4.4	1.7	6.1	2.3	0.9	3.2	11.3	4.4	15.7
1956	2.9	5.4	2.7	8.1	2.8	1.4	4.2	14.0	7.0	21.0
1957	3.0	6.0	1.5	7.5	3.1	0.8	3.9	16.4	4.2	20.6
1958	1.8	6.0	0.3	6.3	3.1	0.1	3.3	19.4	0.8	20.2
1959	1.5	5.9	0.5	6.4	3.1	0.2	3.3	14.8	1.2	16.0
1960	1.5	6.2	-0.3	5.9	3.2	-0.2	3.1	16.8	-0.9	15.9
1961	0.7	5.0	-0.1	4.9	2.6	-0.1	2.5	13.4	-0.3	13.1
1962	1.2	4.6	-0.1	4.5	2.4	-0.1	2.3	11.6	-0.4	11.2
1963	1.6	4.1	0.2	3.9	2.1	0.1	2.2	9.4	0.3	9.7
1964	1.2	3.9	0.5	3.4	2.0	0.3	2.2	8.1	1.2	9.3
1965	1.9	3.8	1.9	5.7	1.8	0.9	2.7	6.7	3.3	10.0
1966	3.4	4.2	2.1	6.3	2.0	1.0	3.0	6.8	3.5	10.3
1967	3.0	5.1	1.7	6.8	2.4	0.8	3.3	8.9	3.0	11.9
1968	4.7	6.1	3.4	9.5	3.2	1.8	5.0	9.6	5.4	15.0
1969	6.1	7.7	5.5	13.2	4.1	2.9	7.0	12.2	8.8	21.0
1970	5.5	9.7	5.1	14.8	4.8	2.5	7.3	17.5	9.1	26.6
1971	3.4	11.5	5.0	16.5	5.5	2.4	7.9	18.5	8.1	26.6
1972	3.4	12.5	6.6	19.1	6.0	3.2	9.2	17.9	9.5	27.4
1973	8.8	14.3	18.6	32.9	6.9	8.9	15.8	17.3	22.5	39.8
1974	12.2	21.4	40.4	61.8	10.3	19.4	29.7	24.1	45.4	69.5
1975	7.0	32.3	12.1	44.4	15.4	5.8	21.3	38.0	14.2	52.2
1976	4.8	36.0	14.1	50.1	17.3	6.8	24.1	32.2	12.6	44.8
1977	6.8	39.7	14.6	54.3	19.1	7.0	26.1	32.4	12.3	45.7

the excess tax raised the tax that would otherwise have been paid by up to 25 percent. During the most recent five years, however, the excess tax accounted for an average of 50 percent of the corporate taxes actually paid, implying that these taxes were doubled by the excess tax caused by historic cost depreciation and inflated inventory profits.

It is important to recognize that these distortions will continue to grow even if the rate of inflation does not accelerate any further. The understatement of an asset's depreciation allowance depends on the increase in the price level since it was purchased. Hence the understatement of accumulation will rise until inflation has lasted as long as the oldest asset which is still being depreciated. The accounting conventions used in our tax system make taxes very sensitive to the rates of inflation that we have recently experienced. The substantial additional tax burden caused by inflation will continue to grow unless either the tax law or the rate of inflation changes significantly.

2. Inflation and Debt: Corporate Gains and Lenders' Losses

We now turn to the crucial issue of corporate debt. Although inflation reduces the real value of outstanding corporate debt, this gain by corporations is not taxable income. Equivalently, corporations subtract nominal instead of real interest payments in calculating taxable profits. A number of previous writers on the relation between inflation and corporate taxes have concluded that the corporate tax saving from the exclusion of real gains on the debt is sufficient to offset the excess tax caused by the mis-measurement of depreciation and inventory profits.¹ This has been interpreted as implying that inflation has no net effect on the taxation of corporate source income.

These conclusions are misleading because they are based on considering only some of the taxes levied on corporate source income. The basic issue is not the effect of inflation on the corporations' tax liability but the effect of inflation on the taxation of capital used in the corporate sector. It is important to look through the corporation to the individuals and institutions that provide the equity and debt capital. 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.

This perspective is particularly important with respect to interest payments. While corporations are permitted to deduct nominal rather than

¹For example, Shoven and Bulow (1976) and Cagan and Lipsey (1978) reached this conclusion.

real interest payments, lenders are obliged to pay taxes on nominal interest receipts. The effect of inflation on the total taxation of interest income depends on the relative magnitude of the tax rates facing corporate borrowers on one hand and those who lend to corporations on the other. If the tax rate of corporate borrowers exceeds that of lenders, total tax payments fall. Otherwise, tax revenues rise.¹

The effect of dividend and capital gains taxes must also be considered. The measurement of income which gives rise to extra corporate tax payments reduces dividends and retained earnings. This causes a reduction in non-corporate taxes which partly offsets the increase in corporate taxes. Inflation also increases nominal capital gains but not real capital gains, leading to increases in noncorporate tax payments. A full calculation of the effects of inflation on the taxation of corporate source income requires taking account of these effects. The analysis that we present in this section shows that the relevant weighted average of the marginal tax rates paid by the individuals and institutions that lend to nonfinancial corporations is even greater than the marginal rate of tax that is saved by corporations and their shareholders because of the overstatement of true interest payments. More specifically, we shall show that the relevant marginal tax rate for those who lend to corporations is .0.420 while the relevant combined rate of corporations and their shareholders as borrowers is 0.404.² Ignoring the real gains and losses on corporate debt therefore results in an underestimate of the total excess tax on corporate source income

¹The potential balancing between borrowers and lenders is stressed in theoretical models of the effect of inflation in Feldstein (1976) and Feldstein, Green and Sheshinski (1978).

²The reason why the combined effective marginal tax rates for corporations and their shareholders is less than the 48 percent corporate rate is that the extra corporate tax payments lead to a reduction in taxes on dividends and retained earnings.

that is caused by inflation. However, since the difference between the effective marginal rates of the borrowers and the lenders is quite small, the whole issue of the real gains and losses on debt (or the mis-measurement of interest payments) can be ignored without distorting the measurement of the excess tax caused by inflation.¹

Although we believe it is important to examine the effect of inflation on the total tax burden on corporate source income, we shall also analyze the effect of inflation on the tax burden of the corporations and their shareholders. Our calculations, presented in Section 3, show that the extra taxes that the corporations and their shareholders pay because of inflation substantially exceed the amount they save by ignoring their inflationary gains on their net debts. Thus whether one looks at total capital income or only at the equity investors, the data show that inflation raises the effective tax burden.

2.1. Noncorporate taxation of equity income.

Owners of corporate equity pay dividend taxes on corporate income if it is distributed or capital gains taxes if it is retained. The rates at which these taxes are levied depend on the holder. Individuals, for example, pay taxes on dividend income at regular income tax rates but pay capital gains taxes at much lower effective rates. Different financial institutions pay taxes at varying rates on capital income. As noted below, pension income is essentially untaxed while certain institutions (e.g. life

¹Since the lenders and borrowers are not the same individuals, inflation does cause a redistribution of net income among individuals and institutions.

insurance companies) actually face higher capital gains tax rates than dividend tax rates.

The first step in finding the effective tax rate paid on equity income is to determine the distribution of ownership of corporate equity. Table 2 displays the pattern of ownership of corporate equity at the end of 1976 as reported in the official flow of funds accounts prepared by the Board of Governors of the Federal Reserve System. The bulk of the equity is held by households with significant fractions held by pension funds and life insurance companies. A small portion is held by other financial institutions. The second and third columns of the table indicate the marginal tax rates on dividends and capital gains for each type of stockowner. We assume that retained earnings are taxed at the capital gains tax rate.¹

We estimate that under 1976 law, the average marginal tax rate on individual dividend receipts was 39 percent.²

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.³

¹ Assuming retained earnings to be taxed at the capital gains rate involves the implicit assumption that each dollar of retained earnings raises share prices by \$1.00. Although Bradford (1977) and Auerbach (1977) have challenged this assumption by suggesting that the existing tax rules and dividends make the equilibrium value of retained earnings less than one, the possibility of distributing the corporate net worth through mergers and stock repurchases implies that even existing tax rules do not keep the value of retained earnings below one. While the issue is still in flux, we adopt the traditional assumption that each dollar of retained earnings raises the share prices by \$1.00.

² The marginal tax rate was found by using the NBER's TAXSIM model to estimate the additional tax payments arising from a 1% increase in dividend payments. The TAXSIM model is described in Feldstein and Frisch (1977). We allow for an estimated 7% of equity held by institutions which are not taxed but which are included by the flow of funds statistics in the household sector; this estimate of institutional ownership is derived from the SEC Statistical Bulletin.

³ Individuals who realize capital gains are taxed on the gain which occurred while they were holding the asset. Hence capital gains which accrue on assets which are passed at death completely avoid taxation. This is because the new owner is permitted to "step up" his basis for future tax liabilities.

TABLE 2

Effective Marginal Tax Rates on Dividends and Capital Gains

<u>Class of Investor</u>	<u>Value of Holdings</u> (\$ billions)	<u>Tax Rates On</u>	
		<u>Dividends</u>	<u>Capital Gains</u>
Households	566.4	.39	.05
Pension Funds ^a	112.9	0	0
Life Insurance	34.3	.072	.15
Other Insurance	17.1	.072	.15
Mutual Banks	4.4	.072	.15
Commercial Banks	.9	.072	.15
Other ^b	<u>46.8</u>	<u>0</u>	<u>0</u>
Total	782.8	.287	.047

Source: Flow of Funds Data for 1976. Tax rate calculations are described in the text. Note that tax rates represent conservative assumptions rather than estimates of most likely values.

^aIncludes both private pensions and the retirement funds of state and local government.

^bComprised primarily of foreign holdings.

Bailey (1968) has estimated that each of these factors approximately halves the effective tax rate on capital gains. Hence we assume a 5% tax rate on capital gains. This estimate is conservative because we ignore the taxes paid under the minimum tax and preference income provisions of the tax law.

We assume that no taxes are levied on the equity income of pension funds. In fact, pension recipients do pay taxes on pension income upon receipt. The effective rate is low, however, because the tax liability is postponed and because the recipients generally have low marginal tax rates during retirement. Moreover, increased pension returns may be associated with reduced employer contributions rather than increased benefits. In order to be conservative in our estimate of the effective tax rate on capital income, we assume a zero effective tax rate on pension income.¹

Life insurance companies and commercial banks are taxed at corporate tax rates on dividends and capital gains. They are permitted to exclude 85% of dividends because of the intercorporate dividend exclusion. Hence, their effective marginal tax rate on dividend income is 7.2%.² These institutions are taxed at a 30% statutory rate on capital gains realizations. We assume an effective rate of 15% on such gains because of the effect of deferral. Unlike our treatment of individuals, we assume that all gains

¹

It can be argued that the tax treatment of pension income is equivalent to a consumption tax because income put into pensions escapes all tax until the pension is withdrawn and presumably consumed. On this view, the effective tax rate on pension dividend and interest income is zero.

²This overstates the dividend tax rate for insurance companies because of the special rules applying to insurance companies.

are eventually realized.

A weighted average of the effective tax rates provides our estimates of the overall marginal effective rates on dividends and retained earnings. In order to determine the noncorporate tax rate on all equity income, it is necessary to determine how corporate profits are divided between dividends and retained earnings. We estimate this payout ratio by using the average payout ratio over the past decade.¹ The share of total profits going to dividends over this period was 46.1 percent, implying an overall tax rate on equity income of 15.7 per cent.

Using this figure it is possible to find the total tax increase on equity due to a mismeasurement of corporate profits. Suppose that corporate taxable income is increased by a single dollar with no change in real income. The corporation pays 48 cents more in taxes. Shareholder income in the form of dividends and retained earnings is reduced by 48 cents, leading to a decline of 7.6 cents in shareholder tax payments. Hence, total tax payments rise by 40.4 cents. Thus, the marginal tax rate on mismeasured income is 40.4%. Calculations of the increase in corporate taxes due to historical cost depreciation or false inventory accounting overstate by about 20% the true additional burden on the suppliers of equity capital.

¹In calculating the payout ratio, profits are adjusted for inflation effects on inventory and depreciation and on real indebtedness. We implicitly assume that there are no "clienteles" effects, so that payout ratio is the same for the equity owned by different classes of investors. Blume et al (1974) provide empirical support for this assumption.

2.2. The Value of Corporate Interest Deductions.

Corporations are permitted to deduct nominal rather than real interest payments. Increases in inflation raise the corporations' interest deductions, thereby reducing corporate tax liabilities. Although the corporate tax rate is 48%, the overstatement of interest expenses reduces total tax payments by less than 48%. This occurs because the increase in after-tax corporate income results in an increase in noncorporate tax payments on dividends and capital gains. In the preceding section 2.1, we showed that the effective marginal tax rate on dividends and retentions is 15.7 percent; i.e., it was demonstrated that the equity owners' tax rate on "mismeasured" corporate income was 40.4 percent. This is the correct measure of the reduction in tax liabilities due to the deduction of nominal interest. It is this 40.4 percent rate that can be compared to the marginal tax rate of corporate debt holders in order to determine the effect of inflation on the taxation of interest income and expenses. In the next part of this section we consider the extra tax paid by the holders of corporate debt.

2.3. The Tax on Corporate Debt Holders.

We now examine the extra taxes that the holders of corporate debt pay when interest rates rise in response to a higher rate of inflation. Equivalently, we estimate the amount by which their taxes would be reduced if the taxation of interest income were indexed. We also examine the extra taxes corporations pay on their interest bearing financial assets. In Table 3 we display the nonfinancial corporate sectors interest bearing financial assets and liabilities. The holders of these securities are shown in the different columns. These figures are derived directly from the official flow of funds accounts. The penultimate row provides the net corporate

Table 3

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

ASSETS	CREDITORS AND DEBTORS FOR INTEREST BEARING CORPORATE ASSETS AND LIABILITIES								NON-INTEREST BEARING CORPORATE ASSETS		Total
	House- hold	Private Pensions	Commercial Banks	Mutual S.B.	Life In- surance	Finance Companies	Other Insurance	Govern- ment	Misc.	Non-Interest Bearing	
Time Deposits	--	--	22.3	--	--	--	--	--	--	--	22.3
Consumer Credit	18.3	--	--	--	--	--	--	--	--	--	18.3
Security R.P.'s	--	--	--	--	--	--	--	--	4.7	--	4.7
Government Sec.	--	--	--	--	--	--	--	22.0	--	--	22.0
Commercial Paper (Net)	2.0	--	3.6	--	--	11.4	--	--	4.5	--	21.5
Trade Credit (Net)	--	--	--	--	--	--	--	--	--	71.1	71.1
Currency and Demand Deposits	--	--	--	--	--	--	--	--	--	47.5	47.5
TOTAL ASSETS	20.3	--	25.9	--	--	11.4	--	22.0	9.2	118.6	207.4
CORPORATE LIABILITIES											
Bonds	52.7	30.3	6.9	14.0	85.1	--	9.7	55.4	6.9	--	261.0
Mortgages	13.1	1.5	58.6	16.7	56.6	2.5	.3	4.6	--	--	153.9
Bank Loans	--	--	167.0	--	--	--	--	--	--	--	167.0
Financial Co. Loans	--	--	--	--	--	30.0	--	--	--	--	30.0
U.S. Govt. Loans	--	--	--	--	--	--	--	3.9	--	--	3.9
Misc. Liabs.	--	--	--	--	--	--	--	--	26.7	--	26.7
TOTAL LIABILITIES	65.8	31.8	232.5	30.7	141.7	32.5	10.0	63.9	33.6	--	642.5
NET LIABILITIES	45.5	31.8	206.6	30.7	141.7	21.1	10.0	41.9	26.9	-118.6	435.1
MARGINAL TAX RATES	35%	0	54%	24%	57%	56%	56%	0	0	0	42.0%

Note: See text for definitions and method of calculation. Assets and liabilities refer to 1976 and are derived from the Flow of Funds accounts. Note that tax rates represent conservative assumptions rather than estimates of most likely values.

debt holdings of each class of investor, formed by aggregating the entries in the column. In order to calculate the effective tax rate on the holders of corporate debt, we find the weighted average of marginal tax rates for each investor class.

Before describing our estimates of the specific marginal tax rates, several features of Table 3 deserve comment. First, most corporate debt is not in the form of bonds. Nearly half is comprised of bank borrowing and mortgages. Second, only a small proportion of corporate interest payments, less than 15%, goes to individuals. The largest portion goes to commercial banks. Third, it is important to recall that corporations themselves hold a large quantity of interest bearing financial assets. Inflation leads to the increased tax liabilities on increased income from these assets.¹

Our estimate of the marginal tax rate facing each class of creditors is shown in the bottom row of Table 3. These estimates are only approximate since the laws governing financial institutions are quite complex and since all of the desired information is not available. Fortunately, the estimates that are most uncertain generally apply to only small quantities of debt. When in doubt, we have selected relatively conservative assumptions. The rationale for each of our estimates now follows:

¹In some cases this leads to deductions for the issuers of the assets.

Households: According to the NBER TAXSIM model, the weighted average of the marginal tax rates on interest income is about 25 percent. However, this average includes bank deposit interest as well as interest on corporate securities. Since corporate bonds are held by more affluent taxpayers than ordinary bank account time deposits (see Projector and Weiss, 1966), the 25 percent overall figures for all interest payments is too low. We have selected a 35 percent tax rate on interest paid, thereby implying that household bondholders have lower marginal tax rates on average than household dividend recipients.

Pensions: These are conservatively treated as fully tax exempt, implying a zero marginal tax rate.

Commercial Banks: Commercial banks pay a 48 percent corporate income tax at the margin on interest receipts. Those interest receipts net of corporate tax are then subject to further taxes as dividends and retained earnings; we assume the same 15.7 percent rate for this equity income that we derived in section 2.1 for the equity income of nonfinancial corporations. Combining the 48 percent and the 15.7 percent implies an overall tax on this equity income of 56.1. However, when the interest rates that banks charge rise, banks also raise the interest payments that they make to their depositors. To the extent that these interest payments rise, the banks do not pay extra taxes but their depositors do. Of course, there is no increase in the interest paid on demand deposits. We assume that interest rate ceilings constrain the increase in other interest rates to 0.3 percent for each one percent increase in inflation. When this is allowed for, the total marginal tax rate on corporations and their depositors is approximately 54 percent.¹

¹This assumes that demand deposits account for 38% of total bank liabilities and that the marginal tax rate on the depositors at commercial banks is 25 percent.

Mutual Savings Banks. In some cases, these banks pay the same 48 percent tax as ordinary corporations. However, mutual savings banks with a sufficient fraction of their assets in the form of local mortgages are allowed to exclude a fraction of their portfolio income, a fraction that increases with the mortgage share. The overall effective rate must also reflect the extent to which mutual savings banks raise the interest rate they pay and the corresponding marginal tax rate of their depositors. We estimate a 24 percent overall rate for these institutions.

Life Insurance Companies: Life insurance companies are taxed according to the "Menge Formula" or "ten-to-one rule" which allows insurance companies to exclude a portion of their portfolio income before applying the 48 percent corporate tax rate (see Huebner, 1976 for a discussion of this tax rule). The procedure in the existing law is designed to separate investment income into an amount required to meet the funding requirements for existing insurance and a residual profit that is deemed taxable. To achieve this, life insurance companies pay tax on a percentage of income equal to ten times the difference between the average nominal yield on the portfolio (i) and the nominal yield that the insurance commissioners deem to be the appropriately conservative yield to use in calculating required reserves(s). Thus if the assets of the insurance company (A) are invested at a nominal yield of i , the total tax liability of the company is $T=0.48[10(i-s)]iA$. The change in the effective tax rate caused by inflation depends on how i and s adjust. As we noted above, the nominal market yield (i) generally rises point-for point for expected inflation. In contrast, the regulatory authorities have not altered s in response to inflation; historically, s has remained close to 3 percent for the past 70 years. The marginal tax rate implied by this tax formula for

increases in the interest rate is an increasing function of the initial marginal tax rate. Evaluating the marginal tax rate at the relatively conservative value of $i=0.07$ implies a marginal tax rate of 0.57¹. We use this value to be conservative; at higher initial interest yields, the effective marginal tax would be even greater. Note we are also conservative in ignoring the tax paid on dividends and retained earnings of the non-mutual life insurance companies.

Finance Companies and Other Insurance: These are taxed like ordinary corporations. Combining the 48 percent corporate rate with the additional tax on dividends and retained earnings yields an overall marginal tax rate of 57.1 percent on this type of income.

Government: We assume that government neither pays taxes on interest receipts nor deducts expenses for tax purposes. While increases in interest receipts may enable governments to reduce other taxes, there is no reason to suppose that capital taxes will be reduced. Moreover, other costs of government are increased by raising interest rates.

¹Note that at $i=.07$, a \$1,000 portfolio earns \$70. With $s=.03$ only 40 percent of this or \$28 is taxed; the tax is \$13.44 and the net income is therefore \$56.56. Raising the interest rate to $i=.08$ implies earnings of \$80 but 50 percent or \$40 is taxable. The tax is thus \$19.20, leaving a net income of \$60.80. Note that an extra \$10 of gross interest raises net interest income by only \$4.24. The effective marginal tax rate is thus 57.6 percent.

Miscellaneous: The interest on these assets are assumed to be untaxed. Note that "miscellaneous" includes assets and liabilities of the rest of the world so our no-tax assumption implies that no taxes are paid to either the U.S. or to foreign governments by foreigners owning bonds of U.S. corporations. It is clear that our assumption that all of this income is untaxed is very conservative.

In order to calculate the marginal tax rate on interest income, we have averaged the marginal tax rates shown in the final row of Table 3, **weighting by** the share of debt owned class of investors share of debt. The results imply a marginal rate of 0.420 on interest income.

This implies that inflation raises the taxation of interest income, since the tax rate that lenders pay exceeds that at which corporations deduct. Allowing in the overall calculation for the impact of inflation on debt thus actually strengthens the conclusion that inflation raises the effective taxation of capital income. This effect is, however, quite small. It is equal to 1.6 percent of net interest payments (the difference between the 42.0 percent of lenders and the 40.4 percent of corporate borrowers or about a half billion dollars per year.) This is dwarfed by the depreciation and inventory effects described in the previous section.

While several of our estimated marginal tax rates are only approximate, they pertain to relatively small amounts of debt. It is unlikely that a more exact estimate of these numbers would alter our basic conclusion that the tax on those who lend to corporations is at least as great as the rate at which corporations and their owners can deduct interest payments.

3. The Increased Taxation of Corporate Source Income

The first section of this paper presented calculations of the excess tax¹ paid by corporations because of the mismeasurement of depreciation and inventories. The current section extends that calculation in three significant ways to obtain the total increased tax on corporations, on equity owners and on all sources of capital for nonfinancial corporations.

Our calculations show that inflation raised the total tax on the income of nonfinancial corporations by \$32.3 billion. This amount is substantially greater than the \$26.1 billion additional tax paid by corporations themselves because of the mismeasurement of depreciation and inventory profits.

This section begins by analyzing the several effects of inflation in 1977. Estimates for the years since 1954 are then presented.

3.1 An Analysis for 1977

We proceed in three steps to calculate the total excess taxes on corporate source income in 1977. We first calculate the excess tax paid by the corporation itself, recognizing the effect of not taxing the real gains on debt as well as the effect on depreciation and inventory profits. We then extend this to obtain the total excess tax paid by equity owners, including the effect on the tax liabilities of the corporations and the shareholders. Finally, we extend the calculation to the total excess tax including the tax paid by those who lend to the nonfinancial corporations.

The calculations in section 1 showed that historic cost depreciation and the existing inventory accounting practices added \$ 26.1 billion to the 1977 tax liabilities of nonfinancial corporations. In 1977 these corporations had net

¹Throughout this section the term "excess taxation" refers to the additional taxes paid because of inflation.

interest bearing liabilities¹ of \$ 592.2 billion and non-interest bearing assets (primarily cash and net accounts receivable²) of \$ 130.9 billion. Their net nominal liabilities were thus \$ 461.3 billion. Since the 1977 inflation rate was 6.8 percent (the December to December increase in the CPI), these corporations had a real gain of \$ 31.4 billion on their net liabilities. Excluding the gain from the corporations' taxable income saved them \$ 15.1 billion in corporate tax. These tax savings thus offset approximately one-half of the \$ 26.0 billion of extra tax caused by the existing tax treatment of inventories and debt. Inflation caused corporations to pay an extra tax of \$ 11.0 billion in 1977.

The extra tax paid by the equity owners of the corporations differs in two ways from the extra tax paid by the corporations. First, as we discussed earlier, the extra tax paid at the corporate level leaves less income to be taxed as dividends. With a dividend payout rate of 0.46 and effective marginal tax rates of .287 on dividends and 0.047 on retained earnings, the \$ 11.0 billion of extra corporate tax reduces shareholders own taxes by \$ 1.7 billion. Second, the shareholders must eventually pay capital gain tax on the nominal increase in the market value of the company that results from inflation. Since this nominal increase in value is over and above the real increase due to retained earnings the extra tax paid on this nominal gain represents an unwarranted extra tax. We shall assume that the ratio of the market value to the real value of the corporation remains constant and that the nominal gain can be approximated by the product of the

¹See section 2 for a description of the composition of this net amount. Note that \$ 592.2 billion is net of the interest bearing assets of these firms.

²These assets also include Treasury bills and other federal government securities that bear interest since the important distinguishing feature of these "non-interest bearing assets" is that private individuals and institutions do not pay any interest on them.

inflation rate and the real value of corporate assets.¹ The relevant marginal rate of tax on these accrued nominal gains is the effective capital gains tax rate of 0.047. The real value of the physical assets of these corporations (plant and equipment, inventories and land)² in 1977 was \$1,684 billion. The inflation rate of 6.8 percent and the tax rate of 0.047 imply an additional capital gain tax of \$ 5.3 billion. The total excess tax on the equity owners of the nonfinancial corporations is therefore the sum of three terms: the \$ 11.0 billion of extra corporate income tax minus the \$ 1.7 billion resulting reduction in personal taxes plus the capital gains tax of \$ 5.3 billion. Inflation thus induced a net extra tax of \$ 14.6 billion on corporations and their owners in 1977.

To obtain the total excess taxation of corporate source income that is caused by inflation, the overtaxation of corporate creditors must be added to this \$ 14.6 billion. The net financial capital supplied by the creditors of these corporations was \$ 595.2 billion.³ The inflation rate of 6.8 percent imposed a real loss of \$ 40.3 billion that should have been offset against the interest income of the creditors. The effective marginal tax rate of 0.420 on interest income implies an excess taxation of \$ 17.7 billion.

Combining this \$17.7 billion with the \$14.6 billion implies an excess tax on corporations and their owners that yields a total excess tax on corporate source income of \$32.3

¹The actual nominal gain caused by inflation is very hard to disengage from other changes in market value. Theoretical considerations imply that a change in the expected rate of inflation will cause an inverse change in the market valuation ratio which then slowly returns to its equilibrium value (See Feldstein, 1978).

²The data came from Von Furstenberg (1977).

³We ignore the corporate assets in the form of government securities and net accounts receivable because these do not represent the supply of financial capital by private investors.

billion. This excess tax on corporate source income was 54 percent of the corporate income tax liabilities of \$ 59.0 billion and 35.0 percent of the combined corporate, shareholder and lender tax liabilities of \$ 93 billion. Stated in yet a different way, the excess tax of \$32.3 billion caused by inflation is equivalent to an additional wealth tax or capital levy of 2 percent on the real corporate assets of \$ 1684 billion. Since these corporations earn between 10 and 12 percent on their real assets¹, this extra tax absorbs between one-sixth and one-fifth of pretax real earnings.

3.2 The Period Since 1954

This same framework can be used to calculate the excess tax caused by inflation in each year since 1954. Since we do not have a detailed flow of funds calculation of the sort presented in section 2 for each year, we shall use the same effective marginal tax rates for all years. The calculations therefore represent the excess tax that would have been caused for each year if the 1976 statutory tax rates and composition of creditors and debtors had prevailed; differences due to using actual statutory rates and ownership information would be small relative to the differences over time caused by the changing history of inflation.

Table 4 traces the evolution of the inflation-generated excess taxation of corporate source income between 1954 and 1977. Column 2 repeats the figures from Table 1, column 7, of the excess tax at the corporate level due to the mismeasurement of depreciation and inventory profits. The corporate tax savings due to ignoring the real gains on net corporate debt are presented in column 3. It is worth noting that the excess tax due to the mismeasurement of depreciation and inventory profits always exceeds the tax savings on the debt gains. The net excess at the corporate level, presented

¹See Feldstein and Summers (1977).

TABLE 4

Changes in Tax Liabilities on Corporate Source Income Caused by Inflation, 1954-77

— Billions of Dollars —

Year	Inflation Rate	Corporations			Shareholders		Equity Capital	Creditors Net Corporate Interest	Total Corporate Capital	Excess Tax as Percent of Corporate Income Tax
		Depreciation and Inventories	Net Debt	Total	Dividends and Retained Earnings	Nominal Capital Gains				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1954	-0.5	2.4	0.1	2.5	-0.4	-0.1	2.0	-0.1	1.9	12.2
1955	0.4	3.2	-0.1	3.1	-0.4	0.1	2.8	0.1	2.9	14.4
1956	2.9	4.2	-0.5	3.7	-0.5	0.5	3.7	1.0	4.7	23.4
1957	3.0	3.9	-0.7	3.2	-0.4	0.6	3.4	1.2	4.6	24.1
1958	1.8	3.3	-0.5	2.8	-0.4	0.3	2.7	0.8	3.5	21.6
1959	1.5	3.3	-0.4	2.9	-0.4	0.3	2.8	0.7	3.5	16.9
1960	1.5	3.1	-0.4	2.7	-0.4	0.3	2.6	0.8	3.4	17.7
1961	0.7	2.6	-0.3	2.3	-0.4	0.2	2.1	0.4	2.5	12.8
1962	1.2	2.3	-0.5	1.8	-0.3	0.2	1.7	0.7	2.4	11.6
1963	1.6	2.2	-0.7	1.5	-0.2	0.4	1.7	1.1	2.8	12.3
1964	1.2	2.2	-0.5	1.7	-0.3	0.3	1.7	0.9	2.6	10.8
1965	1.9	2.7	-1.0	1.7	-0.3	0.5	1.9	1.5	3.4	12.5
1966	3.4	3.0	-2.0	1.0	-0.2	0.9	1.7	2.9	4.6	15.6
1967	3.0	3.3	-2.1	1.2	-0.2	1.0	2.0	2.9	4.9	17.7
1968	4.7	5.0	-3.8	1.2	-0.2	1.6	2.6	4.9	7.5	22.3
1969	6.1	7.0	-5.5	1.5	-0.2	2.9	4.2	7.2	11.4	34.2
1970	5.5	7.3	-5.8	1.5	-0.2	2.3	3.6	7.3	10.9	39.9
1971	3.4	4.9	-4.1	3.8	-0.5	1.5	4.8	5.0	9.8	32.8
1972	3.4	9.2	-4.5	4.7	-0.8	1.6	4.5	5.4	9.9	29.5
1973	8.8	15.8	-12.9	2.9	-0.4	4.5	7.0	15.7	22.7	57.3
1974	12.2	29.7	-21.0	8.7	-1.3	7.2	15.6	25.0	40.6	95.1
1975	7.0	21.3	-14.5	6.8	-1.1	4.8	10.5	16.7	27.2	66.6
1976	4.8	24.1	-10.2	13.9	-2.2	3.6	15.3	11.9	27.2	56.5
1977	6.8	26.1	-15.1	11.0	-1.7	5.3	14.6	17.7	32.3	54.3

See text for definitions and method of calculation.

in column 4, remains relatively low (less than \$ 5 billion) until 1974 when it jumped to \$ 8.7 billion.

The reduced taxation of dividends and retained earnings due to higher corporate tax payments is shown in column 5 and the capital gains tax liability on the nominal capital gains caused by inflation is shown in column 6. Combining columns 4, 5, and 6 gives the net increase in the taxation of equity capital presented in column 7. This excess tax on equity income remained less the \$ 5 billion until 1970 but has exceeded \$ 10 billion annually since 1974. The excess tax on equity income since 1970 has totalled more than \$ 80 billion.

Column 8 presents the very important excess tax on the individuals and institutions that provide debt capital to the nonfinancial corporations. This excess tax on lenders reached \$ 5.0 billion in 1968 and exceeded \$ 15 billion in 1973. The excess tax on those who lent to nonfinancial corporations has exceeded over \$ 100 billion in the brief period from 1970 to 1977.

The total excess tax on corporate source income caused by inflation is shown in column 9. Three things should be noted about these figures. First, this total excess tax caused by inflation exceeds the excess tax paid by corporations because of the mismeasurement of depreciation and inventory profits (column 2). Focusing exclusively on the extra corporate taxes paid because of the mismeasurement of depreciation and inventory profits is therefore a conservative evaluation of the total inflationary impact. Second, the total excess tax remained less than \$ 5 billion a year until 1966, doubled by 1970 and then doubled again by 1973. The excess tax has exceeded \$ 20 billion a year since 1973. Third, the total excess tax on corporate source income has exceeded \$ 180 billion in the period between 1970 and 1977.

Finally, column 10 states the total excess tax on corporate source income as a percentage of the corporate tax liability. Although the excess tax remained less than one-sixth of corporate income tax payments until the mid-1960's, it then quickly rose to more than one-third of the corporate income tax. For the final five years, the excess tax payments have been more than 50 percent of corporate tax liabilities.

4. The Effective Tax Rate on Corporate Source Income

This section presents our estimates of the total effective tax rate on the real capital income earned in the corporate sector. Our calculations show that the total tax on corporate source income in 1977, including the tax liabilities of shareholders and lenders as well as of the corporations themselves, was \$ 91.8 billion, an effective tax rate of 67 percent on the real pretax income of the nonfinancial corporate sector. The data show that this 67 percent represents a substantial increase in the effective tax rate over the past decade and a return to the effective tax rates of the mid-1950's.

The substantial increase in the effective tax rate despite statutory reductions reflects the impact of inflation. The \$32.3 billion of extra tax caused by inflation in 1977 accounts for more than one-third of the total tax on corporate source income, raising the effective total tax rate from 43 percent to 66 percent. The extra tax caused by inflation has thus offset all of the accelerated depreciation and other legislated tax reductions during the past two decades.

4.1 The Effective Tax Rate in 1977

The best 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 the corporations - to the total real income available before tax for the shareholders and creditors. The official national income estimate of 1977 profits with the inventory valuation adjustment and capital consumption adjustment was \$113.9 billion. Net nominal interest payments by nonfinancial corporations were \$33.7 billion. It seems at first that the total pretax income available for shareholder and creditors could be obtained

by simply adding these adjusted profits and net interest on the grounds that it is unnecessary to adjust interest payments for inflation since any correction to nominal interest expenses by the corporation would require an equal correction to nominal receipts by creditors. Although this is a generally correct principle, one further modification is required. 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 a gain to the government and to the corporations' customers and not to individual or institutional investors. The corporations' loss on these financial assets should therefore be subtracted from other corporate profits. In 1977, these assets were \$130.9 billion; the inflationary loss was therefore \$8.9 billion. The 1977 total pretax corporate sector income available for shareholders and creditors was therefore \$138.7 billion.

Our estimated total tax of \$91.8 billion on this income consists of five components. (1) The largest of these is the corporate income tax payments of \$59.0 billion. This alone represents an effective tax rate of 42.5 percent on total corporate source income. (2) Dividends in 1977 were \$39.1 billion; an effective tax rate of 0.287 on dividends implies a tax liability of \$11.2 billion¹ and adds 8.1 percent to the effective tax rate. (3) The national income account estimate of \$16.0 billion of retained earnings² ignores the real gain on outstanding debt. With a net debt of \$461.3 billion and a 6.8 percent inflation rate, the additional real retained earnings were \$31.4 billion.

¹This calculation uses our estimated marginal tax rate on dividends to measure the average tax rate on dividends. This causes an overstatement of the tax liability but the error is likely to be very small.

²This is the official figure for undistributed profits corrected for the inventory valuation and capital consumption adjustments.

The total retained earnings of \$47.4 billion are eventually subject to capital gains taxation with an effective tax rate of 0.047; this adds \$2.2 billion to the total tax and 1.6 percent to the effective tax rate.

(4) An additional capital gains tax liability results from the nominal increase in the value of corporate assets that accompanies a general rise in the price level. We abstract from the particular market fluctuations of 1977 and calculate that the real capital stock with an initial value of \$1,684 billion rose by 6.8 percent. With a tax rate of 4.7 percent, this nominal increase implies an effective tax of \$5.4 billion, adding 3.9 percent to the total effective tax rate. (5) Finally, the nominal interest payments of \$33.7 billion were taxable income of the creditors. With a tax rate of 0.42, these interest payments involve a tax liability of \$14.2 billion, adding 10.2 percent to the effective tax rate.² The total of these five figures of tax payments is thus \$92.0 billion for a total effective tax rate of 66.3 percent.

Before turning to a comparison of 1977 with earlier years, it is useful to contrast the actual effective tax rate of 66.3 percent with several alternative rates that are frequently cited. Perhaps the most common measure of the corporate tax burden is the ratio of the \$59.0 billion corporate income tax to the conventionally measured corporate profits of \$143.5 billion; the resulting rate of 41.1 is a gross underestimate of the actual total rate. An alternative and more sophisticated rate is the ratio of the corporate

²We are again using an estimated marginal tax rate as an average tax rate on this income. This causes some overstatement, particularly for life insurance companies. Adjusting this to use an average rather than marginal tax rate for life insurance companies might reduce the tax by up to \$2 billion dollars.

income tax to the sum of corporate profits with the inventory valuation and capital consumption adjustments (\$113.9 billion) plus the real gains on the net corporate debt (\$31.4 billion); the resulting ratio of 40.6 percent is again less than two thirds of the total burden. These calculations underline the importance of looking beyond the corporation to the shareholders and creditors in order to obtain a correct picture of total tax burdens on capital used in the corporate sector.

4.2 Variations in the Effective Total Tax Rate Since 1954

Table 5 traces the variations in the effective total tax rate on corporate capital since 1954. The total real income presented in column 1 is the sum of real profits as measured by the national income statistics and net nominal interest payments with an adjustment for corporate losses on government assets and net accounts receivable.

Actual corporate tax liabilities as a percentage of this total real income have declined nearly one fifth since the mid-1950's. Moreover, there has been no increase at all in this ratio between 1970 and 1977.

The varying taxes on shareholders and creditors in columns 3 through 6 reflect variations in dividends, full retained earnings, inflationary appreciation, and interest payments. The same 1977 effective tax rates are assumed for each tax base; allowing for statutory changes would raise taxes on dividends and interest income in the earlier years and reduce the taxes on retained earnings and inflationary appreciation in those years but these effects would be relatively small.

The net result of these changes is shown in the total effective tax rate presented in column 7. Despite the decline in the relative corporate

TABLE 5

The Effective Tax Rate on Capital Income of the Nonfinancial Corporate Sector

Year	Total Real Income (Billions of Dollars)	Taxes as a Percentage of Total Real Income					Total
		<u>Corporate Income Tax</u>	<u>Taxes on Shareholders and Creditors</u>				
			Dividends	Real Retained Earnings	Nominal Capital Appreciation	Interest Income	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1954	\$ 30.4	51.6	7.8	2.0	-0.2	2.3	63.5
1955	39.8	51.1	6.8	2.1	0.2	1.8	61.9
1956	36.5	54.8	8.0	2.1	1.3	2.1	68.4
1957	35.6	53.4	8.6	2.3	1.6	2.7	68.5
1958	31.8	50.6	9.3	2.2	1.1	3.7	67.0
1959	42.0	49.2	7.4	2.2	0.7	3.3	62.8
1960	40.2	47.7	8.3	2.2	0.7	3.8	62.8
1961	41.1	47.4	8.3	2.1	0.3	4.2	62.2
1962	48.7	42.4	7.6	2.4	0.6	4.1	57.1
1963	53.8	42.4	7.6	2.5	0.7	3.9	57.1
1964	61.2	39.1	7.3	2.6	0.5	3.8	53.3
1965	70.9	38.3	7.1	2.7	0.7	3.8	52.5
1966	76.2	38.7	6.9	2.8	1.2	4.3	53.9
1967	73.8	37.5	7.4	2.8	1.3	5.2	54.2
1968	78.7	42.7	7.6	2.8	2.0	5.6	60.8
1969	74.9	44.5	8.0	2.8	3.0	7.7	66.0
1970	64.2	42.5	9.0	1.2	3.5	11.7	67.8
1971	73.7	40.5	7.9	1.1	2.1	10.7	62.3
1972	88.0	38.0	7.2	1.4	1.8	9.6	58.0
1973	90.2	43.9	7.7	2.1	5.0	11.3	70.0
1974	76.2	56.0	10.0	2.1	9.4	17.2	94.9
1975	100.2	40.8	8.4	1.7	4.8	13.6	69.3
1976	126.3	42.5	7.4	1.4	2.9	10.7	64.9
1977	138.7	42.5	8.1	1.6	3.9	10.2	66.3

See text for definitions and method of calculation.

tax payments, the overall effective tax rate is as high now as it was in the mid-1950's. The effect of inflation has been powerful enough to offset the introduction of the investment tax credit, the cuts in the corporate tax rate, and the more rapid acceleration of depreciation.

5. Inflation and Corporate Tax Liabilities in Two-Digit Manufacturing Industries

Although historic cost depreciation and existing accounting practices raise the tax liabilities of all corporations, their importance varies substantially among different industries. The current section presents information for each of the twenty 2-digit manufacturing industries. For manufacturing as a whole, the additional taxes in 1976 caused by historic cost depreciation and existing accounting practices accounted for slightly more than half of all the federal tax liabilities of these firms. These additional taxes varied from less than 25 percent of actual taxes in a few industries to 100 percent of the taxes paid in several others. If the taxes are expressed as a percentage of the real value of capital used in these industries, the additional tax varies from less than one percent of capital to nearly three percent of capital. The very high tax rates that result in several of the industries make it particularly difficult for them to compete for capital. If these additional tax burdens persist, the allocation of capital among manufacturing industries will be substantially distorted by inflation.

Our analysis of the additional tax burdens of individual industries is based on information supplied by individual firms in their annual reports and 10-K forms. Beginning with 1976, the Securities and Exchange Commission has required the largest firms to supply information on replacement cost depreciation and on inflation-adjusted inventory gains as well as on historic cost depreciation and on their inventory profits as they are used for tax purposes. We use the differences between the inflation-adjusted and the unadjusted figures for depreciation and inventories to measure the overstatement of taxable profits. For each

industry, we then compare the total additional tax liabilities implied by these overstated profits with the actual tax liabilities paid by the firms in our sample. We also calculate the additional tax payments as a percentage of the real value of the capital used by the sample firms in the industry.¹ Finally, we use the ratio of sales by the sample firms to sales by all firms in the industry to estimate the total additional taxes caused in each industry in 1976 by historic cost depreciation and by prevailing accounting methods.

Although the general approach of these calculations parallels the analysis of section 1, there are several differences that should be borne in mind in interpreting the results. First, the information supplied by the firms represents consolidated accounts and not just the domestic activities that were analyzed in section 1. Because we are forced to include the overseas depreciation and inventory gains, we overstate the extent of overtaxation. Second, the firms provide the historic cost depreciation and replacement cost depreciation as alternative measures of "book" depreciation rather than "tax" depreciation. Since the straight-line "book" depreciation is less than the accelerated "tax" depreciation, this procedure causes us to understate the extent of overtaxation. The net effect of these two countervailing biases cannot be determined from the existing data but is unlikely to be large enough to distort the conclusions of the analysis.

The sample of firms for which we have information represents approximately 50 percent of the total sales of manufacturing firms. Because

¹ Estimates of the replacement cost value of plant, equipment and inventories are also required by the SEC.

of the nature of the S.E.C. requirement, the sample consists exclusively of large firms. Moreover, the coverage varies substantially among the industries with a very much smaller fraction of sales in the samples for some industries than for others. The tables in this section indicate the number of firms in each sample and the fraction of sales that the sample firms represent.¹

Table 6 presents information on the extent of reduced depreciation and the consequent additional taxation. The first two columns show the number of firms in the sample and the percentage of the total industry sales accounted for by the sample firms. The third column shows the understatement of depreciation, i.e., the difference between replacement cost depreciation and historic cost depreciation. The additional tax liability presented in column 4 is calculated by summing (for all the sample firms in the industry) 0.48 times each firm's understated depreciation up to the limit of the tax actually paid by the firm. Note that this is a very conservative statement of the additional tax for any firm in which the limit constrains our calculated amount because it assumes that no additional profits would have been earned even at a zero tax rate and disregards the possibility of loss carry forwards. Column 5 expresses the additional tax as a percentage of the total federal tax liability of the firms in the sample while column 6 states the additional tax liability as a percentage of the replacement cost value of the firms' real capital stock.² The remaining two

¹To estimate total sales in each industry, we use the Compustat file of 2500 firms prepared by Standard and Poors. The 1332 manufacturing firms in this file represent 1976 sales of \$1,052 billion or 87 percent of all manufacturing sales as estimated by the Federal Trade Commission. We use the Compustat file to estimate total sales by industry in order to be sure that firms are classified by industry in the same way as in our replacement cost sample.

²The real capital stock includes inventories as well as property, plant and equipment but excludes financial assets and liabilities.

TABLE 6

Inflation, Depreciation and Corporate Tax Liabilities in Manufacturing Industries

S.I.C. Code	Industry	Sample Firms					Estimated Industry Totals		
		(1) N	(2) Sales Coverage (percent)	(3) Reduced Depreciation (\$Million)	(4) Additional Taxes (\$Million)	(5) Additional Taxes Percent of: Actual Taxes Paid	(6) Taxes as Percent of: Replacement Value of Capital	(7) Reduced Depreciation (\$Million)	(8) Additional taxes (\$Million)
20	Food & Kindred Products	28	45	574	275	24.4	1.3	1282	615
21	Cigars and Cigarettes	6	70	139	37	12.1	.7	196	94
22	Textile Mill products	6	25	81	39	41.6	1.5	330	158
23	Apparel & other Finished products	6	22	14	7	12.2	.6	64	31
24	Lumber and Products	6	83	683	252	100.0	2.5	825	304
25	Furniture & Fixtures	4	69	15	7	28	.9	23	11
26	Paper & Products	20	70	670	322	87	2.0	960	461
27	Publications & Printing	12	50	89	43	16	1.5	178	85
28	Chemicals & Products	43	62	1266	608	34	1.3	2039	979
29	Petroleum Products	22	49	2241	1076	53	1.3	4543	2180

Table 6 continues on next page

Table 6 Continued

Inflation, Depreciation and Corporate Tax Liabilities in Manufacturing Industries

S.I.C. Code	Industry	Sample Firms						Estimated Industry Totals	
		(1) N	(2) Sales Coverage (percent)	(3) Reduced Depreciation (\$Million)	(4) Additional Taxes (\$Million)	(5) Additional Taxes as Percent of: Actual Taxes Paid	(6) Taxes as Replacement Value of Capital	(7) Reduced Depreciation (\$Million)	(8) Additional taxes (\$Million)
30	Rubber & Misc. Plastics	5	48	376	93	100.0	1.1	786	194
31	Leather & Products	3	58	20	10	7.9	.9	35	17
32	Glass, Clay & Stone products	23	81	425	204	52.9	1.5	521	250
33	Primary Metals	20	64	1451	180	100.0	.4	2265	280
34	Fabricated Metal Products	12	46	120	58	32.0	1.7	260	125
35	Non-electrical machinery	45	64	414	199	10.4	.5	646	310
36	Electrical machinery	26	60	500	240	24.6	1.1	828	398
37	Transportation Equipment	24	62	1243	597	22.2	1.4	1996	958
38	Instruments	12	49	94	45	12.8	.7	194	93
39	Misc. Manufactures	4	41	30	15	19.9	1.0	75	36

All figures refer to 1976. The number of firms in the sample for each industry is shown in column 1; these firms account for the percentage of industry sales in column 2. See text for definitions and methods.

columns are estimates for all the firms in the industry and not just the sample; they are obtained by rescaling the sample values for each industry by the ratio of total industry sales to sales in the sample.

The related importance of the additional taxes that resulted from the understatement of depreciation varied substantially among the 20 individual industries. Column 5 shows that these additional taxes represented less than one-sixth of actual 1976 tax liabilities in six of the twenty industries. These are primarily non-durable goods (tobacco, apparel, printing and publishing, and leather and footwear) but also include the non-electrical machinery and instruments industries). At the other extreme, there are four industries in which the additional tax represents more than three-fourths of actual tax liabilities: primary metals, rubber, paper, and wood products.

A similar picture of very substantial variation emerges when the additional taxation is related to the replacement cost value of the firms' real capital stock (column 6). The additional tax varies from 0.4 percent of the real capital stock in the primary metals industry¹ and 0.5 percent in the non-electrical machinery industry to 2.0 percent in the paper industry and 2.4 percent in the wood products industry.

For manufacturing as a whole, the reduction in real depreciation totalled \$18.0 billion or half of the reduction for all nonfinancial corporations that was discussed in section 1. Nondurable goods industries (SIC codes 20 through 29) accounted for 58 percent of this reduced depreciation or \$10.4 billion. Reduced depreciation in durable goods industries (SIC codes 30 through 39) was \$7.6 billion. The additional tax caused by the understatement of

¹This tax is kept so low because the extra tax is assumed to be no greater than actual taxes paid which, in the case of primary metals, were kept low by extremely low real profits.

depreciation was \$7.6 billion, of which \$4.9 billion was in nondurable goods industries and \$2.7 billion was in durable goods industries.

Table 7 presents the combined effects of reduced depreciation and overstated inventory profits. The organization of the table parallels that of Table 6. The results presented in column 5 show very substantial variation among industries in the importance of the extra tax as a percentage of actual taxes paid. In two of the industries (leather and non-electrical machinery), the extra tax amounted to less than 25 percent of the actual tax paid. In contrast, four of the industries (wood and wood products; paper; rubber; and steel) would have paid no tax if depreciation had been calculated at replacement cost and if the artificial inventory profits were also eliminated. Column 6 confirms the picture of substantial variation among industries by comparing the additional tax to the replacement value of the real capital stock. The extra tax paid (as limited by the total tax paid) varied from less than one percent of the capital stock on the primary metals and non-electrical machinery industries to nearly three percent of the capital stock in the food industry and in textiles.

For all manufacturing industries, the mismeasurement of depreciation and inventories totaled \$27.1 billion or 54 percent of the aggregate reported for all nonfinancial corporations in section 1. Of this \$27.1 billion total, 58 percent was accounted for by nondurable manufacturing. Note that this 58 percent is the same as the figure for depreciation only, implying that the mismeasurements of inventories and depreciation are distributed in the same way. The additional taxation for manufacturing firms totalled \$11.3 billion, of which \$7.4 billion was in the nondurable goods industries.

TABLE 7

Inflation, Depreciation and Corporate Tax Liabilities in Manufacturing Industries

S.I.C. Code	Industry	Sample Firms					Estimated Industry Totals		
		(1) N	(2) Sales Coverage (percent)	(3) Overstatement of profits (\$Million)	(4) Additional Taxes (\$Million)	(5) Additional Taxes Percent of: Actual Taxes Paid	(6) Taxes as Percent of: Replacement Value of Capital	(7) Overstatement of profits (\$Million)	(8) Additional taxes (\$Million)
20	Food & Kindred Products	28	45	1339	642	57.0	3.0	2989	1435
21	Cigars and Cigarettes	6	70	378	181	33.0	1.8	535	257
22	Textile Mill products	6	25	153	73	78.7	2.9	623	299
23	Apparel & other Finished products	6	22	46	22	40.6	2.0	211	102
24	Lumber and Products	6	83	678	252	100.0	2.5	820	304
25	Furniture & Fixtures	4	69	35	17	65.1	2.0	52	25
26	Paper & Products	20	70	858	371	100.0	2.3	1230	532
27	Publications & Printing	12	50	153	74	28.2	2.6	308	148
28	Chemicals & Products	43	62	1796	862	48.9	1.8	2892	1388
29	Petroleum Products	22	49	2970	1426	70.3	1.8	6025	2892

Table 7 continues on next page

Table 7 Continued

Inflation, Depreciation and Corporate Tax Liabilities in Manufacturing Industries

S.I.C. Code	Industry	Sample Firms						Estimated Industry Totals	
		(1) N	(2) Sales Coverage (percent)	(3) Overstatement of profits (\$Million)	(4) Additional Taxes (\$Million)	(5) Additional Taxes as Percent of: Actual Taxes Paid	(6) Taxes as Replacement Value of Capital	(7) Overstatement of profits (\$Million)	(8) Additional taxes (\$Million)
30	Rubber & Misc. Plastics	5	48	694	9.3	100.0	1.1	1448	194
31	Leather & Products	3	58	59	28	22.7	2.6	101	48
32	Glass, Clay & Stone products	23	81	593	284	73.7	2.0	725	348
33	Primary Metals	20	64	1828	180	100.0	.4	2852	280
34	Fabricated Metal Products	12	46	186	89	49.5	2.6	401	193
35	Non-electrical machinery	45	64	707	339	17.8	.9	1103	529
36	Electrical machinery	26	60	949	455	46.6	2.1	1571	754
37	Transportation Equipment	24	62	1644	789	29.4	1.8	2639	1267
38	Instruments	12	49	221	106	30.1	1.5	456	219
39	Misc. Manufactures	4	41	51	24	33.1	1.7	124	60

All figures refer to 1976. Overstatement of profits includes the effects of both historic cost depreciation and artificial inventory profits. The number of firms in the sample for each industrial is shown in column 1; these firms account for the percentage of industry sales in column 2. See text for definitions and methods.

6. Conclusion

The tax laws of the United States were designed for an economy with little or no inflation. The analysis in this paper has shown that, with the existing tax laws, inflation substantially increases the effective tax rate on capital income in the nonfinancial corporate sector. In contrast to earlier studies of the impact of inflation on corporate tax burdens, we have considered not only the tax paid by the corporations themselves but also the taxes paid by the individuals and institutions that supply capital to the corporate sector. This is particularly important for a correct treatment of corporate debt; our calculations indicate that the additional tax paid by lenders because of inflation is actually slightly greater than the taxes that corporate borrowers save by deducting higher nominal interest payments.

The overall effect of inflation with existing tax laws was to raise the real 1977 tax burden on corporate sector capital income by more than \$32 billion. This extra tax represented 69 percent of the real after-tax capital income of the nonfinancial corporate sector, including retained earnings, dividends, and the real interest receipts of the corporations' creditors. The extra tax raised the total tax burden on nonfinancial corporate capital income by more than one-half of its noninflation value, raising the total effective tax rate from 43 percent to 66 percent.

The substantial increase in the effective tax rate on capital used in the nonfinancial corporate sector can influence the performance of the economy in a number of important ways. The most obvious of these is a reduction in the rate of capital formation in response to the reduction in the real after tax return.¹

¹ Although this reduction cannot be unambiguously established, in any realistic life cycle model a lower net return will reduce private saving (Summers, 1978). Some preliminary empirical evidence tends to support this view (Boskin, 1978).

Moreover, since the tax rules that we have emphasized do not apply to residential real estate, the combination of inflation and existing tax rules will encourage a redistribution of investment away from the corporate sector and to residential construction and consumer durables. Within total corporate investment, existing tax rules will induce firms to invest more in inventories and less in equipment and structures.

The evidence on individual manufacturing industries presented in Section 5 shows that there is substantial variation among industries to the extent to which inflation has caused greater tax burdens. In some industries, the additional tax induced by inflation accounts for less than 25 percent of actual taxes paid, in other industries, the additional tax induced by inflation is responsible for the entire actual tax payment. The additional tax varies from less than one-half percent of the real capital in two industries to nearly 3 percent in others. Thus substantial variation implies a further source of capital misallocations among individual industries within the ~~overall~~ manufacturing sector.

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