Inflation, Taxes, and Corporate Investment Incentives

The relatively slow expansion of capital spending in the current recovery has been a cause of widespread concern. Some analysts have pointed to dramatic increases in the yields required by holders of corporate debt and equity claims to induce them to finance investments in plant and equipment. Other investigators have pointed to a number of factors which have acted to reduce the prospective earnings generated by the physical assets of corporations.

What is the relative importance of developments in financial markets, compared with the capital goods markets? With regard to financial markets, conventional measures of investors' returns have greatly overstated the yields that investors in the securities markets in fact required to finance corporate assets in the late sixties and seventies. In contrast, with regard to the markets for capital goods, the increase in the inflation rate over the past decade or so has greatly raised the effective tax rate on income from capital and has had a major role in impairing incentives for business investment. The interaction of inflation and the corporate tax structure also has been an important reason behind the dramatic increase in corporate use of debt financing over this period.

Overview of the analysis

When a corporation purchases a new capital asset, it anticipates certain net earnings from the expected sale of the output of the new asset after deducting expected labor and materials costs, taxes, and wear and tear on the asset. These net earnings may be paid out to bondholders in the form of interest, to stockholders in the form of dividends, or reinvested in the firm. The expected profitability of the capital asset is obviously greater the larger is the expected earnings stream and the smaller the cost of purchasing the asset. The ratio of current annual earnings to the replacement cost of corporate assets, therefore, is a summary measure of the expected profitability of acquiring a new capital asset. This important measure is referred to as the *rate of return* on corporate assets in the remainder of this article. Although in principle the rate of return on corporate assets should be measured by using an expected earnings series, here current earnings are used instead, since there is no data on businessmen's earnings expectations. While it is possible to try to construct an expected earnings measure based on a hypothesis about expectations, the difficulty is that there are many plausible hypotheses that would give widely differing results.

Another deficiency of the measure used here is that the rate of return incorporates the earnings performance of both old and new assets rather than new assets alone. It is not generally possible to decompose aggregate corporate earnings into earnings from older assets and those from newly purchased assets.

To assess the outlook for business capital spending, the rate of return on corporate assets must be compared with the average yield required to be paid when floating new securities in the debt and equity markets. The larger the spread between the rate of return on corporate assets and the yield required to finance such investments, the greater will be the incentive for

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business to expand existing facilities. In the discussion below, the yield required in corporate debt and equity markets to finance corporate assets will be referred to as the *cost of capital.*

The return on corporate assets

Both stockholders and debt holders provide financing for a firm's activities. The net earnings that could be paid out to these two groups of investors represent the total earnings of investors or *total capital income.* It might appear that income accruing to stockholders could easily be measured using corporate profits after taxes. However, corporate profits as conventionally measured do not fully take into account all operating costs. Operating costs include both labor and materials costs as well as the depreciation outlays required to offset the wear and tear and the obsolescence of physical plant and equipment. Actual wear and tear on the stock of capital is not the same as the deductions for depreciation used in computing corporate income tax liability. Tax-allowable depreciation will vary over time in accordance with the provisions of existing tax laws. To compute economic profits, the appropriate deduction is the replacement value of the wear and tear on plant and equipment, not the tax-allowable deduction In computing these economic profits, all resource costs —labor, materials, and wear and tear on plant and equipment—must be valued at current market prices. This issue is discussed in detail later.

Holders of corporate debt also have claims on corporate revenues and, to calculate total income accruing to capital, the interest payments which they receive should be added in When these interest payments are added to economic profits, the result is an estimate of the total income earned by the assets of nonfinancial corporations

This income measure does not include capital gains on corporate plant, equipment, or inventories, since these gains primarily reflect increases in the general level of prices. Even if these assets could be liquidated readily, no increase in command over economic resources would be obtained Exclusion of such capital gains is consistent with the following definition of income. total capital income is the maximum amount of money which could be spent by holders of corporate debt and equity during the current period and which would still enable them to spend the same amount in real terms in each ensuing period. In other words, if equity and bondholders elected to spend nominal capital gains from plant and equipment and inventories, they would have to liquidate some physical assets and thereby reduce the real value of the earnings stream in succeeding periods.

Total capital income also excludes the reduction of the real value of corporate liabilities to debt holders, which occurs as the general price level rises. There is no net effect on income, because total capital income is the sum of returns to holders of both corporate debt and equity. While the net debt of corporations is a liability of equity holders, it is an asset of individuals holding the debt. Hence, a decline in the real value of net debt makes equity holders better off

Table 1

Selected Balance-Sheet Items of Nonfinancial Corporations in 1976

At midyear, in billions of dollars

Assets		Liabilities	
Plant and equipment valued at replacement cost	1,022 9	467 7	Market value of net interest-bearing debt
Inventories valued at replacement cost	360 0	860 2	Market value of outstanding equity
Net noninterest-bearing financial assets	214 4		
Total replacement cost	1,597 3	1,327 9	Total market value

All items were calculated in the same manner as in the *Annual Report* of the Council of Economic Advisers (January 1977), Table 1, page 29 The data differ from that presented by the Council because the statistics the Council had available for 1976 were preliminary.

The right-hand side of the table shows the market value of the claims held against nonfinancial corporations. These items include both the market value of net interest-bearing debt and the market value of outstanding equity. The left-hand side of the table includes the replacement value of plant and equipment and inventories. These assets are valued at the current prices prevailing in the markets for new investment goods and materials On the left-hand side of the table, the final item is "Net noninterest-bearing financial assets", which include a number of financial assets that have not been netted out against corporate fixed income liabilities and hence do not appear in the "Market value of net interest-bearing debt". The most important components are demand deposits, currency, net trade credit, and direct foreign investment.

It will be noted that total assets and liabilities are not equal, as is the case in conventional accounting. Since in this table the valuations of the left- and right-hand side items are taken from different markets, there is no reason why they must add up to the same totals.

and debt holders worse off, leaving total capital income unchanged.

The debt concept which underlies the calculation of total capital income is a net concept, defined as the Council of Economic Advisers and many other economists have defined it. It is equal to the market value of gross corporate liabilities, including corporate bonds, notes, debentures, bank loans, and commercial paper outstanding, *minus* the market value of various fixed income assets such as Treasury bills, time and savings deposits, and certificates of deposit held by these same corporations. The market value of debt in 1976, as well as a number of other balance-sheet items, are recorded in Table 1.

While purchasing power reductions of the real value of net interest-bearing debt do not have an impact on total capital income, inflation-induced reductions in the real value of demand deposits, currency, and net trade credit do have an impact. Total capital income must be adjusted to reflect these purchasing power losses. Thus, total capital income after corporate taxes consists of aftertax economic profits (including adjustments to put depreciation and materials outlays on a current market price basis) plus the net interest payments of corporations and minus the purchasing power loss on currency, demand deposits, and net trade credit.

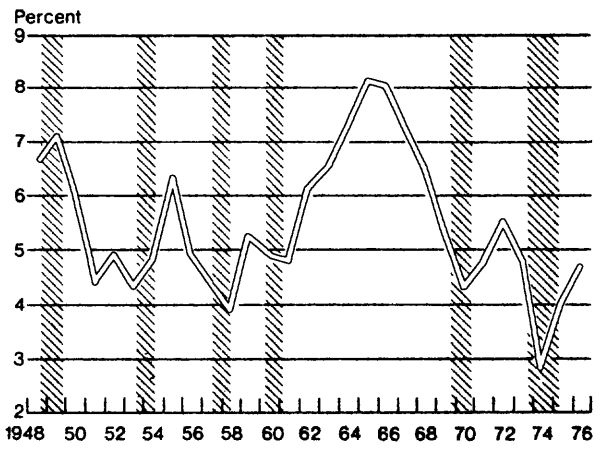
The rate of return that is earned on corporate assets, shown in Chart 1, is simply total capital income divided by the total replacement cost of all assets. Other investigators have sometimes omitted the value of net noninterest-bearing financial assets from total replacement cost when calculating the rate of return on assets. Their inclusion here is designed to preserve consistency in the definitions of total capital income and replacement cost.[1]

As would be expected, the rate of return on nonfinancial corporate capital displays substantial variation over the business cycle. It posts peaks in 1949, 1952, 1955, 1959, 1965, and 1972. The troughs and peaks generally correspond to expansions and contractions of the domestic economy. Taking the twenty years ended in the midsixties, there appears to be little trend in the data. However, the rate of return fell dramatically in the second half of the 1960's and in the 1970's. From a postwar high of 8.1 percent in 1965, the rate of return fell to a postwar low of 2.8 percent in 1974 and recovered to only 4.7 percent in 1976.

[1] Total capital income represents returns on both physical investments and financial assets If one excludes financial assets from the asset base, then the income component in total capital income which arises from the holding of these financial assets should be excluded from capital income It is not possibe to do this with the available data

Chart 1

Rate of Return on Corporate Assets



Shaded areas represent periods of recession, as defined by the National Bureau of Economic Research.

The cost of capital

Total capital income is more than an important concept with which economists can assess the true profitability of corporations. It is also an important notion for investors in corporate debt and equities. For these investors, total capital income represents the maximum corporate payout they can expect while keeping the prospect of future payouts—and hence their consumption possibilities—unimpaired.

The relationship between total capital income and the aggregate amount investors are willing to pay in order to obtain claims on this income is summarized by the cost of capital. The cost of capital is measured as total capital income after taxes divided by the sum of the market values of net corporate debt and outstanding equity. For example, if capital market participants are paying $20 for each dollar of capital income, the cost of capital works out to 5 percent.

Ideally, the cost of capital should indicate the value capital markets place on a permanent income stream of constant purchasing power. However, the cost of capital is measured here by using actual earnings rather than investors' long-run expected earnings, since no measure of those expectations is available. Thus the series used in this analysis is more sensitive to short-run changes in earnings than an ideal measure would be. This same deficiency, it will be recalled, characterized the rate of return.

The most striking feature of the cost of capital series, as shown in Chart 2, is its sharp decline during

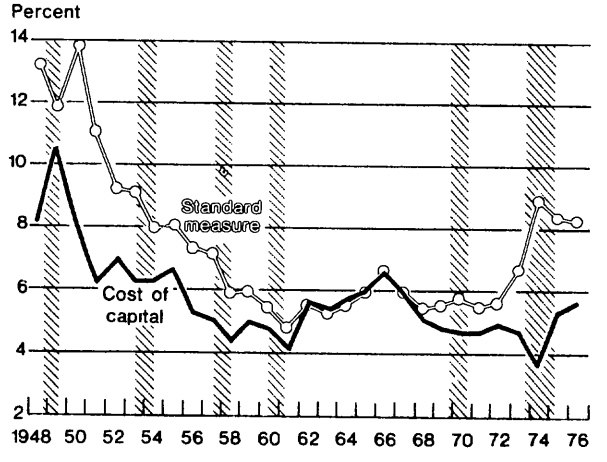
the fifties. The extremely high values of the cost of capital in the very early postwar period may have been due to the fact that consumer goods production had been very low during World War II. Immediately following the war, funds that might otherwise have been available to finance corporate investment were channeled instead into rebuilding consumers' stocks of goods to "normal" peacetime levels. At this time, consumption by households, especially of the stream of services furnished by durable and semidurable goods, was far below the levels commensurate with household incomes. Since the cost of capital can be regarded as the reward investors require to postpone their present consumption, one should have expected a large reward for further postponement at that time.

Another explanation of the high cost of capital following World War II is that investors required high "risk premiums" to hold claims to corporate income during this period. They may have done so because they were still wary after the unnerving investor experience during the 1929 market crash and the depression that followed.

In later postwar years, from the midfifties to the midseventies, the trend of the cost of capital was essentially flat—but with some cyclical variation. The series reached a peak of 6.6 percent in 1966 and then fell, on balance, to a level of 3.6 percent in 1974. Thereafter, it rose sharply in 1975 and by last year was up to 5.7 percent.

Chart 2

Cost of Capital Compared with Standard Measure



Shaded areas represent periods of recession, as defined by the National Bureau of Economic Research

The path of the cost of capital in recent years stands at odds with the impression of many businessmen and economists that the cost of financing investments has been very high in the past few years. These views have seemingly received empirical support from the elevated levels of earnings-price ratios of many corporations in the 1970's. There is a serious difficulty with the standard earnings-price measures, however. The "earnings" series used to construct them are based upon measures of production cost which do not properly value the materials used up in production, nor do they properly value the wear and tear (depreciation) on plant and equipment.

The difference arises because in conventional accounting the costs of goods used in production and of depreciation are measured in the prices prevailing at the time they were acquired; they are not measured at current market prices. It is crucial that all revenues and costs used to compute earnings be measured in dollars of the same period. Indeed, if some costs are measured in 1977 dollars and other costs are measured in 1965 dollars, then little meaning can be attached to aggregate cost or profits measures consisting of such disparate components.

In earlier years, when the underlying inflation rate was much lower and less volatile, the significance of such difficulties was not great. However, the problem of interpreting these measures becomes much harder in an inflationary environment, when profits as usually calculated and economic profits (profits measured on the basis of current market prices) give widely different results. The distortions which higher inflation rates have introduced into earnings-price ratios (as usually measured) mean that earnings-price ratios in the late sixties and seventies are not comparable to earnings-price ratios in earlier periods.

The misleading impression given by the standard earnings-price ratio can be illustrated by comparing the cost of capital with a weighted average of the standard earnings-price ratio and the yield on debt financing.[2] The latter series is called the "standard measure" in Chart 2 where it may be compared with the cost of

[2] The cost of capital, C, is defined as total capital income after tax (TCI) divided by total market value, V Total market value equals the sum of the market value of outstanding equity (S) and the market value of net debt (D) Thus, denoting net interest payments of nonfinancial corporations by the symbol NI, we may write the cost of capital as follows

$$C = \frac{TCI}{V} = \frac{TCI - NI}{S}\frac{S}{V} + \frac{NI}{D}\frac{D}{V}$$

In this formula, the term (TCI—NI) — S can be thought of as a revised earnings-price ratio

capital. While the two series look very similar over much of the sixties, in the past ten years they have diverged increasingly. Although the cost of capital in 1976 stood very close to its average value during the past twenty years, the standard measure reached its highest levels in over twenty years in 1974-76. The levels of the latter series in the past three years stem, of course, from its failure to measure aftertax corporate profits and the earnings-price ratio on the basis of current market prices.[3] When all costs and revenues which enter into corporate profits are measured in comparable units, the cost of capital in 1976 turns out to be almost a percentage point below its 1966 peak

Incentives for capital formation

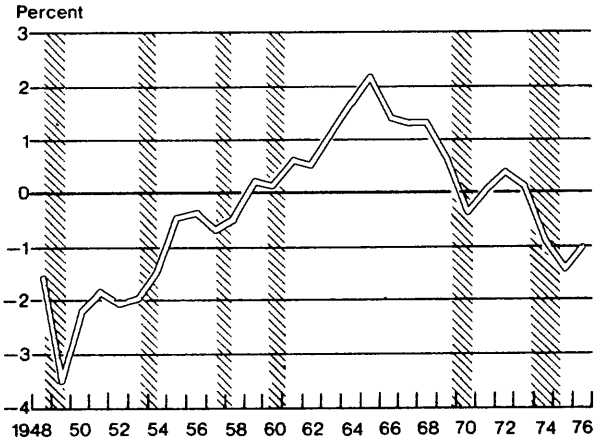
The incentives for capital formation depend on the spread between the rate of return on corporate assets and the cost of capital. It was pointed out previously that the aftertax return on corporate assets fell dramatically after 1965. Yet, the cost of capital did not fall nearly as much during the identical period and has on the whole been relatively stable ever since the midfifties (Chart 2). The spread between the rate of return and the cost of capital is shown in Chart 3. It appears that there was a continued improvement in the incentive to invest from the early 1950's to the mid-1960's, and there have been sharp declines in this incentive since then. Indeed, in 1975 and 1976, the spread between the rate of return on corporate assets and the cost of capital reached its lowest levels in more than twenty years.

The prevalence of negative values for the spread in Chart 3 seems surprising However, this difference measures only imperfectly the spread between the expected rate of return on *new* assets and the cost of capital because it is an average spread of the many different vintages of capital. There are a number of reasons why this average spread for old assets could differ systematically from the expected spread on new assets. For example, the existing capital stock always contains a certain number of obsolete or inefficient assets with negative spreads. The recent very rapid increases in energy prices, for instance, undoubtedly lowered the spreads for existing assets more than it lowered expected spreads on new assets. A second example concerns the different tax treatment of old and new assets. Many statutory changes in the tax law have applied only to new assets. In addition, the real value of the tax depreciation deductions for capital assets can be eroded by increases in the general price level during their lifetimes. This point is elaborated below; here it is sufficient to note that variations in the inflation rate are another source of difference in tax treatment of old, compared with new, assets. In addition to these kinds of complications, there are shortcomings in the measurement of the aggregate spread for existing assets. For all these reasons, the *movement* in the spread series is of more interest than its level in any particular period. Since most new capital goods are substitutes for existing assets, one may expect that the aggregate spread as charted and the expected spread for new assets will move very closely together.

The sharp drop in the spread between the rate of return and the cost of capital in the past decade or so essentially mirrors the decline in the rate of return on corporate assets. An important part of the reduction in the rate of return is attributable to the interaction of inflation and the corporate tax structure. This interaction has proceeded through a number of different mechanisms which are highlighted in Table 2. Column 1 provides a conventional accounting measure of capital income. Conventional methods of depreciation and inventory accounting understate costs and overstate profits during inflationary periods; adjustments for these overstatements are given in columns 2 and 3. Inflation also reduces the real value of the short-term financial assets held by corporations, and an adjust-

Chart 3

Difference between Rate of Return on Corporate Assets and Cost of Capital



Shaded areas represent periods of recession, as defined by the National Bureau of Economic Research

[3] The standard measure also lies significantly above the cost of capital during the late forties and fifties Much of this divergence is attributable to the spread between economic profits and accounting profits that arose during the very rapid inflation in the years 1945-51 While inflation rates were moderate during the remainder of the fifties, the initial postwar inflation continued to cause the two profits measures to diverge during the subsequent decade

Table 2

Capital Income and Adjustments

Year	(1) Accounting capital income before tax	(2) CCA	(3) IVA	(4) Purchasing power loss	(5) Total capital income before tax
1948	32 6	— 3 8	— 2 2	—1.9	24 7
1949	26 0	— 3 8	1 8	0.3	24.3
1950	39 3	— 3.9	— 4.9	—0 3	30 2
1951	40 2	— 4 5	— 1 2	—2 4	32 1
1952	35.1	— 4 4	1.0	—0 8	30 9
1953	36.2	— 4 0	— 1.0	—0 3	30 9
1954	33 6	— 3 2	— 0 3	—0 1	30 0
1955	43.8	— 2 1	— 1 7	0.1	40 1
1956	43.4	— 3 0	— 2 7	—0 6	37 1
1957	41 9	— 3 3	— 1 5	—1 5	35 6
1958	36.3	— 3 4	— 0 2	—1.2	31 5
1959	46.1	— 2 9	— 0 4	—0 4	42 4
1960	42 9	— 2.3	0 3	—0 7	40.2
1961	43 1	— 1.8	0 1	—0.5	40 9
1962	48.2	1.0	0 1	—0 6	48 8
1963	53 1	1 9	— 0 1	—0 7	54.1
1964	59 9	2 6	— 0 6	—0 8	61.2
1965	70.4	3.6	— 1.9	—0 9	71.3
1966	76 9	3.8	— 2.1	—1.8	76.8
1967	74 1	3 6	—1.7	—1.7	74 2
1968	82 0	3.6	— 3 4	—2.6	79 5
1969	81 5	3.5	— 5 5	—3.6	75 9
1970	72.1	1 5	— 5.0	—4.2	64 5
1971	81 1	0.5	— 5.0	—3 0	73 6
1972	94.9	2 7	— 6 6	—2 5	88 5
1973	115 8	1 8	—18.6	—5 1	94.0
1974	132.8	— 3 0	—40 4	—9 9	79.5
1975	133.2	—12 0	—12 0	—8 7	100 5
1976	163 0	—14 5	—14 1	—5 5	128.8

Entries in the fourth column are the previous year's average holding of demand deposits, currency, and net trade credit multiplied by the current year's growth in the consumer price index with its sign reversed.

All other data are from the national income and product accounts The first column is equal to accounting profits before corporate taxes plus net interest payments of nonfinancial corporations. The second column is the capital consumption adjustment. The third column is the inventory valuation adjustment The fifth column is the sum of the first four columns.

Source: Department of Commerce, Department of Labor, and Board of Governors of the Federal Reserve System

ment for these losses is shown in column 4. Since taxable profits are overstated, corporate tax liability is increased and, as described below, the effective tax rate on capital income is therefore raised.

Depreciation based on historical cost

Since depreciation expenses allowable for tax purposes are tied to a historical cost valuation of capital assets, the real value of such tax deductions is continually eroded in an inflationary economy. The process is cumulative, so that over time the original cost depreciation base of an asset is worth progressively less in terms of purchasing power. As the revenues of corporations rise with the upward march in the general level of prices, depreciation deductions fixed in historical dollars provide an ever less effective shield against the bite of the corporate income tax.

Another variable that affects the adequacy of depreciation deductions is how long a write-off period the tax authorities allow for various fixed assets. Prior to 1962, aggregate depreciation for tax purposes was less than the actual wear and tear on plant and equipment valued at replacement cost. Following the institution of more generous accelerated depreciation provisions in 1962, aggregate tax-allowable depreciation expenses taken by nonfinancial corporations were larger than wear and tear valued at replacement cost. The second column of Table 2—CCA (capital consumption adjustment)—shows the difference between tax-allowable depreciation claimed by nonfinancial corporations and replacement-cost depreciation. The positive values of the adjustment between 1962 and 1973 reflected the

more generous tax depreciation measures after 1962.

The impact of inflation on the erosion of the real value of depreciation deductions is cumulative. Therefore, total erosion depends on the rise in the general price level between the year of an asset's acquisition and the years in which depreciation allowances are taken. The erosion, which occurred as inflation accelerated after 1966, can be seen in the difference between tax-allowable depreciation and replacement-cost depreciation. It declined from a positive $3.8 billion in 1966 to a negative $14.5 billion in 1976, a swing of $18.3 billion. The adjustment declined in every year after 1966—except in 1972, when tax depreciation guidelines were liberalized. This decline indicates that the growth of tax-allowable depreciation has increasingly lagged behind the growth of the replacement-cost depreciation.

Rapid increases in the general price level occurred in the six years immediately following World War II as well as in the past ten years. The rapid inflation between 1945 and 1951 is reflected in the negative values of the CCA throughout the 1950's as shown in Table 2. Although inflation was much lower after 1951, the real value of the tax depreciation deductions of many assets was permanently reduced by the initial inflationary episode. The magnitude of the CCA gradually declined, however, as new assets came on stream. For one thing, these newer assets could be depreciated under the accelerated depreciation provisions which came into force in 1954. For another, the real value of the depreciation deductions for these newer assets was not affected by anything like the bout of inflation that immediately followed the war.[4]

Clearly, the faster the tax laws allow a corporation to write off an asset, the smaller will be the effects of inflation in increasing corporate tax liabilities. In an inflationary economy, the depreciation provisions currently in force discriminate against corporations that own long-lived assets with corresponding long write-off periods. One effect is to favor investment in equipment and to discourage investment in structures. Businesses also have an artificial incentive to alter their production methods so as to rely more heavily on assets that are short-lived or, better still, ones that can be completely expensed within a one-year period. Businesses that can make such changes in production methods are able to reduce at least some of their increased tax liability. This reduced tax liability, however, would very likely be obtained only at a cost of using somewhat less efficient production methods.

[4] The differential tax treatment of old and new capital assets which stems from the 1954 tax legislation and the 1945-51 inflationary episode also helps to explain the negative spread values observable in Chart 3 for the forties and fifties While the rate of return might be less than the cost of capital for an existing asset in the early fifties, this would not necessarily be the case for a new asset acquired in the subsequent years

Inventory accounting and inflation

The two common methods of inventory accounting employed by nonfinancial corporations are the so-called FIFO (first in-first out) and LIFO (last in-first out) methods. Under the more widely used FIFO method, materials used up in current production are assumed to have been purchased at prices corresponding to those of the oldest items in the inventory stock. In an inflationary economy, the latter prices will tend to run considerably below their replacement prices in the current market, which are the relevant valuation for materials when computing economic profits. Thus, FIFO costing of materials used in current production tends to understate materials costs and overstate profits. Nominal profits will then include nominal capital gains on inventories which do not make the corporation better off but merely reflect increases in the general price level. The understatement of materials costs will be larger the greater is the rate of inflation. Thus, with the use of FIFO inventory accounting, the effective corporate tax rate rises in an inflationary setting, thereby reducing the rate of return earned on corporate assets.

Under the LIFO inventory accounting method, materials used in current production are assumed to have been purchased at prices corresponding to those of the newest items in stock. This method comes much closer to deducting for materials used up at current market prices, the approach used in computing economic profits. In an inflationary environment, businesses have an incentive to switch from FIFO to LIFO inventory accounting to avoid an increase in effective tax rates. A disadvantage of switching to LIFO accounting, however, is that reported profits will show a large one-time reduction in the year of the switchover, and this reduction may be interpreted incorrectly by the equity markets. In 1974, when the inflation rate soared to double-digit levels, there was a good deal of changing over to LIFO inventory accounting in the manufacturing sector, particularly among the major materials industries where price increases were the largest. Since then, however, there has been little switching activity, as the inflation rate has moderated and firms appear to have become more concerned with the impact of a decline in reported profits on the prices of their shares in the stock market.

The third column of Table 2 shows the so-called inventory valuation adjustment (IVA), which puts the costing of materials used in current production on a current market price basis. The adjustment is largely a

correction for understatement of materials costs associated with FIFO accounting practices. It has been substantial since 1973, with an especially large correction occurring in 1974.

Loss of purchasing power on financial assets

Inflation reduces the purchasing power of the dollar-denominated noninterest-bearing financial assets of corporations. These assets include cash, demand deposits, and net trade credit. The sum of these losses in purchasing power is shown in the fourth column of Table 2. The amounts are largest after 1973, when the underlying inflation rate has been highest Of course, inflation also reduces the purchasing power of the corporation's debt. But since, as already pointed out, this reduction of purchasing power is a gain to equity holders and a loss to debt holders, it washes out in our measure of total capital income. Hence, the rate of return on corporate assets is unaffected.

The effective tax rate

When the adjustments in columns 2-4 (Table 2) are made to accounting profits, the result is the measure of total capital income used in this article, and this is shown in the fifth column. The effective tax rate on total capital income is corporate tax liabilities divided by total capital income before taxes. The results of such a calculation are shown in Chart 4. They exhibit a downward trend from the Korean war period into the midsixties. This trend reflected the liberalized tax depreciation provisions of legislation enacted in 1954 and 1962 as well as the introduction of the investment tax credit in 1962, its liberalization in 1964 (the Long Amendment), and the 1964 reduction of the corporate tax rate. This trend also reflected the diminishing importance of the 1945-51 inflation on the effective tax rate.

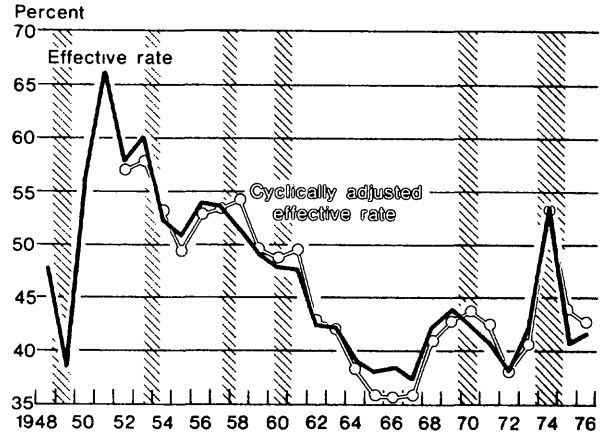
The decline in the effective tax rate finally came to a halt during the midsixties. In the ensuing years, the effective tax rate exhibits a rising pattern, with a dramatic but temporary bulge in 1974. This rise between 1965 and the midseventies was primarily the result of three major crosscurrents. The dominant upward influence on the effective tax rate, of course, came from the factors already discussed above, namely, tax depreciation provisions based on historical cost, FIFO inventory accounting, and purchasing power losses on short-term financial assets. There were some offsetting influences on the tax rate. Interest payments became an increasingly important component of total capital income before taxes, reflecting both the rise in nominal interest yields and the larger share of debt in the corporate financial structure. The latter development served to moderate the increase in the effective tax rate since corporate taxes are not paid on interest income distributed to holders of corporate debt. In addition, the share of interest payments was also increased by the relatively low levels of capacity utilization in the midseventies. These low utilization levels depressed the share of profits in total capital income, and moderated the increase in the effective tax rate further.

The path of the effective tax rate is compared in Chart 4 with that of a "cyclically adjusted" effective tax rate series. This adjustment removes the impact of variations in the capacity utilization rate on the payment of corporate taxes. The difference between the adjusted and unadjusted series is the impact of the cyclical factor on the effective tax rate.

The cyclically adjusted tax rate series reached a peak in 1974 that is well above subsequent levels in 1975 and 1976. In 1974 the tax rate hit 53.4 percent, some 18 percentage points above the 1966 level. The higher effective tax rate was largely due to the inventory gains which producers experienced in that year of double-digit inflation. However, the sharp jump in the tax rate didn't have much impact on investment decisions since a significant portion of this inflation was probably expected to be temporary and therefore the very high taxes were also not expected to persist. In addition, as noted above, the rapid 1974 run-up in materials prices induced a large number of manufac-

Chart 4

Effective and Adjusted Tax Rates on Capital Income



Shaded areas represent periods of recession, as defined by the National Bureau of Economic Research

turing firms to switch from FIFO inventory accounting, thereby reducing in subsequent years this particular source of increased corporate taxes. Of course, the lower effective tax rates in 1975 and 1976 are in part attributable to the moderation of the inflation rate from its 1974 pace and to the switch away from FIFO inventory accounting.

Over the past ten years, the cyclically adjusted effective rate rose slightly more than 7 percentage points, compared with a level of 35.7 percent at the beginning of the period. This increase represents the combined impact of inflation operating within the corporate tax structure as well as of statutory tax changes in the seventies which acted to lower the effective tax rate. The latter changes include the liberalization of the tax depreciation provisions in 1971 and a more generous investment tax credit in 1975. Analysis of the available information suggests that these statutory changes in the corporate income tax reduced the effective tax rate by about 2 9 percentage points in 1976 relative to 1966.[5] Adding this to the 7.1 percentage point rise in the cyclically adjusted effective tax rate between 1966 and 1976, the impact of inflation on the effective tax rate in the absence of other factors comes to an increase of about 10 percentage points over the ten-year period.

This increase in the effective tax rate reduced the rate of return on corporate assets by about 1.2 percentage points.[6] The reduction constitutes about half of the cyclically adjusted decline in the rate of return, for it can be estimated that, if capacity utilization in 1976 had been at its 1966 level, the decline in the rate of return would have been 2.5 percentage points.[7] Without cyclical adjustment, the rate of return on corporate assets dropped 3.3 percentage points from 1966 to 1976 (Chart 1).

Table 3
Corporate Borrowing Costs Adjusted for Corporate Taxes and Inflation

Change in	Percentage points
(1) Nominal interest rate	+5.0
(2) Aftertax borrowing cost	+2 6
(3) Inflation rate	+5 0
(4) Aftertax inflation adjusted borrowing cost (equals (2) minus (3))	−2.4

It might appear that the fall in the rate of return attributable to the higher effective tax rate is not large. However, suppose the rate of return falls 1 percentage point and the cost of capital remains unchanged, say, at 5 percent. This implies the market value of the debt and equity claims against nonfinancial corporations must fall by an amount equal to 20 percent of the replacement value of their assets.[8] Such a calculation suggests that an important part of the sour performance of the stock market in the past decade or so is related to inflation and the tax structure.

Taxes, inflation, and financial structure

Inflation and the corporate tax structure have had another important impact, namely, that corporations have turned increasingly to the bond markets in the past decade or so, and the importance of debt in the corporate capital structure has therefore risen greatly.

In the second half of the sixties and during the seventies, the cost of debt finance fell even though increases in nominal interest rates about kept pace with the rise in the inflation rate. In other words, if one looks at the difference between either the Aaa or the Baa bond rate and the percentage rise in the implicit price deflator of the gross national product or the consumer price index, this difference displays cyclical fluctuations but exhibits no trend after 1965. Since the marginal tax rate for most corporations is 48 percent, this

[5] This estimate, as well as the cyclically adjusted effective tax rate series, is based upon a regression equation in which movements in the effective tax rate depend on three explanatory variables The first is a variable incorporating statutory changes in the corporate income tax, and it is measured as the cumulation of the "initial stimulus" impacts of various legislative changes The second is a five-year moving average inflation rate (the consumer price index) The third is the Federal Reserve Board capacity utilization rate for the manufacturing sector

[6] This result is arrived at by multiplying the cyclically adjusted before-tax rate of return of 11 6 percent in 1966 by the inflation-induced rise in the effective tax rate of 10 percentage points

[7] The cyclical influence on the (aftertax) rate of return on corporate assets was estimated by examining a number of regression equations which "explained" the *before-tax* rate of return by movements in the capacity utilization rate, a five-year moving average inflation rate, and a time trend The cyclical influence of the capacity utilization rate proved quite insensitive to the particular regression used Denoting the cyclically adjusted before-tax rate of return as r_{bt} and the cyclically adjusted effective tax rate as t, we can write the cyclically adjusted rate of return on corporate assets (r_{at}) as $r_{at} = r_{bt}(1-t)$

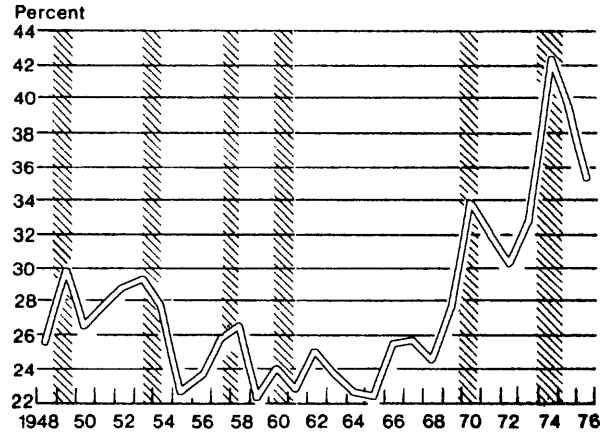
[8] Let the ratio of total market value to total replacement cost be denoted as q, let the cost of capital be denoted as c, and let the spread between the rate of return and the cost of capital be denoted as s Then the spread may be written as
$$s = c(q-1)$$
If the cost of capital is assumed constant, then a change in s (Δs) and a change in q (Δq) are related as follows
$$\Delta s = c\Delta q$$
Thus, if Δs is minus 1 percent and c is 5 percent, Δq is minus 20 percent

means that the aftertax borrowing cost of a typical corporation is 52 percent of the nominal interest yield on its debt obligations. In an inflationary environment, this aftertax borrowing cost must also be adjusted for the rise in the general level of prices, since the increase in the price level reduces the purchasing power of the outstanding debt. Thus, the real (inflation adjusted) aftertax borrowing cost of a corporation becomes 52 percent of the nominal interest rate minus the inflation rate. As shown in Table 3, if the nominal interest rate increases by 5 percentage points, the unadjusted aftertax borrowing cost rises by 2.6 percentage points (*i e.*, 5 × .52). If inflation reduces the purchasing power of each dollar borrowed by an additional 5 percentage points, the inflation adjusted aftertax borrowing cost of the corporation falls by 2.4 percentage points (*i.e.*, 5 minus 2.6 percentage points). This decline in the cost of corporate borrowing makes it attractive for corporations to increase the importance of debt in their capital structures.[9]

The choice of a particular debt-equity ratio involves comparing the marginal tax benefits of slightly more debt with the attendant increase in financial riskiness. This increased financial riskiness arises because of greater investor concern about corporations' solvency and their ability to meet fixed interest obligations when these interest payments are large. If a firm is unable to meet its fixed interest payments to debt holders, it may be forced to liquidate assets quickly at artificially low prices or borrow at exorbitant rates to fulfill its obligations to debt holders. However, since it is nominal interest payments which are deductible in computing corporate tax liability, higher nominal interest rates increase tax deductions. As analyzed above, if inflation and interest rates are rising equally, the cost of debt finance falls by the amount of the increased tax deductions. In such circumstances, a higher underlying inflation rate can increase the debt-equity ratios which firms settle on. This is in fact what happened in the sixties and seventies, as Chart 5 shows. For nonfinancial corporations the importance of debt relative to the market value of debt plus the market value of equity rose from 22 percent in 1965 to 42 percent in 1974, a movement which paralleled the acceleration in the domestic inflation rate.

Chart 5

Relative Importance of Debt in Market Value of Debt Plus Equity



Shaded areas represent periods of recession, as defined by the National Bureau of Economic Research.

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[9] Factors that affect decisions to issue debt or equity are also discussed in the article beginning on page 27