Is Leverage a Tax Dodge—or Not?

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In passing the Tax Reform Act of 1986, policymakers wanted to ensure that corporations would pay their fair share of tax. In response to reports that profitable corporations were paying low rates of tax and sometimes even receiving refunds, Congress broadened the corporate tax base, rescinded the investment tax credit, and instituted a new minimum tax. The issue of adequate tax payments has not gone away, however, because corporations have been taking larger interest deductions as a result of having substituted debt for equity on their balance sheets. These actions undermine the attempts of the architects of the Tax Reform Act to increase corporate taxes in order to compensate for reduced tax collections from individuals. They also add to general concerns about the size of federal budget deficits.

This study begins by measuring the aggregate tax consequences of corporate leverage decisions. Section I constructs measures of effective tax rates on debt and equity income. The tax law encourages corporations to use debt instead of equity because they can deduct interest payments from taxable income. Under current tax rates, the U.S. Treasury collects about $8 billion less in annual revenues than if the leverage ratio were at its 1970s average and about $14 billion less when compared to the ratio at the beginning of the 1980s.

Section II examines the tax implications of recent transactions in which corporations effectively increased their leverage not by changing their financing of new investment projects, but by reducing their outstanding net worth. Share repurchases and cash acquisitions, including leveraged buyouts, generate additional capital gains revenues and sometimes additional corporate income tax revenues. In the aggregate, it appears that these revenues might offset roughly $5 billion of the revenue losses measured in Section I.

Section III discusses prospects for the use of high proportions of debt to finance future corporate investments. Developments in tax law and continuing risks of bankruptcy should hold down the use of debt

issues to fund capital expansion. On the other hand, innovations in financial markets and financial institutions that make debt less risky or that reduce its costs to corporations with previously low access to debt might enable U.S. corporations to expand their leverage to match those of their foreign counterparts.

Section IV argues that policymakers concerned with stemming further revenue losses should look to responses other than outlawing certain controversial forms of restructurings or restricting interest deductions that appear to be excessive. Even though the recent rise in leverage cannot be attributed to changes in tax law, debt continues to be taxed more lightly than equity. Policymakers might therefore consider altering tax laws to provide more neutral treatment of income from debt and equity capital. However, increased leverage is beneficial under some circumstances, and some tax proposals have negative side effects, so policymakers should choose carefully among the possible responses. Section V concludes the article.

I. Leverage and Revenues—Avoiding Double Taxation

In 1960, the corporate leverage ratio (defined as credit market debt relative to the sum of this debt plus net worth) was 26.0 percent (first panel of chart 1). The ratio rose through 1970, reaching 31.5 percent. By the beginning of the next decade, leverage was reduced to 23.4 percent, but then rose again to 34.4 percent by 1988. To summarize these patterns, the average annual corporate leverage ratio in the 1980s was comparable to those in the 1960s and 1970s. The extent of the change during the 1980s, as well as the final level of the ratio, are higher than observed in either of the two previous decades, however.

During the 1960s and 1970s, nonfinancial corporations on average raised 26 percent of their funds through debt instruments and 74 percent through equity. Since 1984, over 40 percent of their funds have come from issuing debt (second panel of chart 1). In these statistics, debt refers to all interest-bearing funds and includes bonds, mortgages, commercial paper, and bank loans. Equity comprises both retained earnings and new share issues.

This change in the mix of finance affects government tax receipts on income generated in the corporate sector. This section indicates that government revenues decline by 27 cents if a dollar is earned by capital financed by debt rather than equity. The rise in the debt-to-equity ratio in recent years has caused revenues to be about $8 billion lower in 1988 than they would have been if the ratio had remained at its 1970s average.

The Taxation of Debt

Corporations deduct interest payments from taxable income. Interest income is fully taxable to recipients at the personal income tax rate, or at the corporate income tax rate if the debt is held by a corporation. If the recipient is a tax-exempt entity, such as a pension fund, it pays no tax on interest received. Foreigners generally pay zero or low rates of tax to the U.S. government on interest received from U.S. corporations. Overall, the tax rate on corporate debt is a weighted average of the tax brackets of households and other holders of debt.

Table 1 summarizes the historical treatment of debt at approximately ten-year intervals since 1970 (and the appendix provides the details of these calculations). In addition, the year 1986 is included to indicate the value of these tax rates just prior to the Tax Reform Act enacted that year. All the tax rates in this table are computed with respect to nominal interest. (The issue of the effective rate of tax on real interest receipts is deferred until the discussion of tax incentives in Section III.)

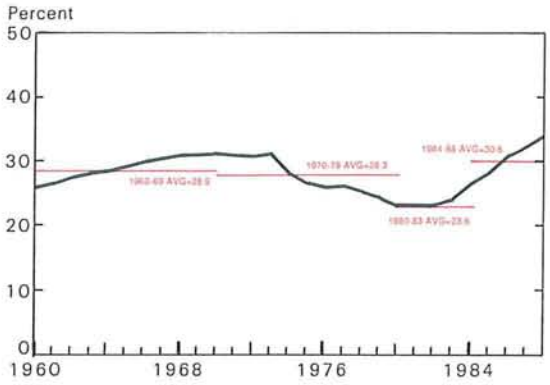
The tax rate paid recently by individuals is relatively low compared to rates from the previous two decades. Weighted according to the distribution of interest income among recipients, the rate was 21.5 percent in 1988, compared to 25.5 percent in 1986 and 28.5 percent before the tax cuts in the Economic Recovery Tax Act of 1981. For the most part, households are indirect holders of corporate debt because they have deposits in financial institutions making loans to corporations or purchasing their bond issues. The earnings on these accounts are taxed much as if households held corporate debt directly, except that households also receive imputed income in the form of checking account services rather than a market rate of interest on checking accounts. The second line of the table is a multiplicative adjustment to reflect the fact that this imputed income is not taxed. An estimated 14 percent of households' interest earnings are currently in the form of imputations, leaving a net tax rate of 18.5 percent. All other years are adjusted similarly.

Insurance companies also hold corporate debt, and their current 34 percent tax rate is also the lowest

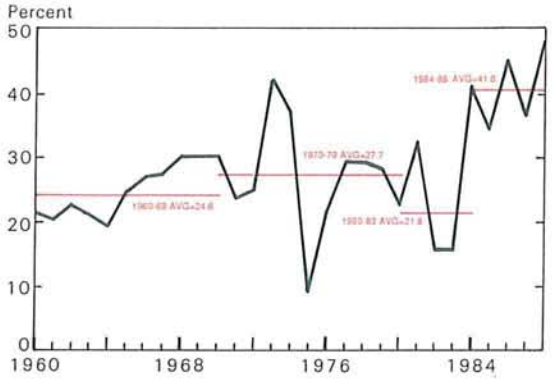
Chart 1

Corporate Financing through Debt Instruments

Debt Outstanding Relative to Debt plus Net Worth[a]



Debt Issued Relative to Debt, Internal Funds, plus Net New Equity Issued



[a]Net worth measured using the replacement cost of tangible assets.

Source: Board of Governors of the Federal Reserve System, *Balance Sheets for the U.S. Economy 1949-1988, Flow of Funds Accounts*, and FAME database.

experienced during the past two decades.[1] The remainder is held by untaxed retirement funds and by foreigners, who pay a very low overall tax rate to the U.S. government on their interest income.[2] Since 1970, tax-exempt institutions and foreigners have increased their share of debt holdings from under 30 percent to 40 percent.

Reflecting these various trends, the weighted tax rate on corporate debt is about 13 percent, compared to 16 percent before Tax Reform, and about 20 percent in 1970 and 1980.

The Taxation of Equity

Equity income is taxable both to corporations and shareholders (table 2 and the appendix). As in the computations related to debt, the rates in this section take nominal earnings as the tax base. (Rates based on real incomes are discussed in Section III.) As noted above, the corporate tax has declined over time. The top tax rate under the corporate income tax is now 34 percent, compared to 46 percent between 1979 and 1986. In 1970, the basic rate was 48 percent, but a surtax effectively brought the rate to 49.2 percent. Unlike the case in many European countries, corporate-level taxation does not depend on whether earnings are retained by the corporation or paid out to shareholders as dividends.[3]

The taxation of shareholders varies with the form in which income is earned. Except for a small exclusion that existed prior to the Tax Reform Act of 1986, households are taxed on dividends at the same rates that apply to other sources of income, such as wages and salaries. Most dividends are earned by shareholders with high incomes. As a result, the weighted average rate indicated for 1988, 25.7 percent, reflects a high fraction of dividends paid to taxpayers in the 28 and 33 percent brackets, and a relatively low fraction in the 15 percent bracket. The trend over time shows the effects of successive cuts in marginal brackets that ranged up to 70 percent between 1965 and 1980. In 1980, for example, the weighted average tax rate on dividends was 39.0 percent. As corporate shareholders, insurance companies have been subject to much lower rates, because only 20 percent of intercorporate dividends (15 percent prior to the 1986 reform) are included in taxable income.[4] The U.S. government collects taxes on dividend income earned

Table 1
Federal Tax Rates on Interest Income from Corporate Debt

	1970	1980	1986	1988
Households				
Weighted Individual Income Tax Rate	.248	.285	.255	.215
Multiplicative Adjustment for Untaxed Imputed Interest	.794	.858	.842	.860
Net Tax Rate	.197	.245	.215	.185
Insurance Companies				
Corporate Income Tax Rate	.492	.460	.460	.340
Foreigners	.026	.037	.021	.021
Weights for Debt Holders				
Households	.503	.490	.494	.502
Insurance Companies	.222	.159	.106	.099
Foreigners	.008	.027	.089	.087
Tax-Exempt Institutions	.267	.324	.311	.312
Weighted Tax Rate	.209	.194	.157	.128

Source: See the Appendix.

by foreigners, but the statutory rate of 30 percent is often reduced to between 5 and 15 percent by tax treaties.[5]

Capital gains are now fully taxable to individual shareholders. Earlier, only 40 to 50 percent were included in taxable income. Full inclusion has more than offset the effects of cuts in statutory marginal personal income tax rates in the 1986 Tax Reform Act. Accounting for these changes in tax rates and the exclusion rate, capital gains are now taxed at a weighted average rate of 21.5 percent, compared to 13.8 percent in 1986 and approximately 16 percent in both 1970 and 1980.

Calculating an effective rate of tax involves further assumptions, however, because capital gains are not taxable until they are realized. Also, if shareholders do not sell their shares before they die, tax on gains accrued during their lifetime is forgiven entirely. To calculate an effective present-value capital gains tax, it is necessary to make assumptions about these advantages of deferral and forgiveness at death. A common assumption is that deferral reduces the effective rate by half; this corresponds roughly to a 10-year holding period on average (King and Fullerton 1984, chapter 6 and works cited therein). A shorter holding period would lead to a higher effective tax rate. The forgiveness of capital gains taxes at death is usually assumed to halve the effective rate again (same citations). With these adjustments, the current effective capital gains rate is still at a historic

Table 2
Federal Tax Rates on Income from Corporate Equity

	1970	1980	1986	1988
Corporate Income Tax Rate	.492	.460	.460	.340
Dividend Income				
Households				
Weighted Individual Income Tax Rate	.308	.390	.329	.257
Insurance Companies				
Multiplicative Adjustment for Intercorporate Dividends	.15	.15	.15	.20
Net Corporate Income Tax Rate	.074	.069	.069	.068
Foreigners	.131	.144	.117	.117
Capital Gains Income				
Households				
Weighted Individual Income Tax Rate on Capital Gains	.165	.157	.138	.215
Advantage of Deferral and Step-up of Basis at Death	.25	.25	.25	.25
Net Tax Rate	.041	.039	.035	.054
Insurance Companies				
Tax Rate on Capital Gains	.35	.28	.28	.34
Advantage of Deferral	.5	.5	.5	.5
Net Corporate Income Tax Rate	.175	.14	.14	.17
Foreigners	0	0	0	0
Weights for Equity Holders				
Households	.790	.688	.645	.607
Insurance Companies	.028	.037	.031	.033
Foreigners	.032	.041	.057	.064
Tax-Exempt Institutions	.150	.234	.268	.296
Weighted Tax Rate for Equity Holders				
Dividends	.250	.277	.221	.166
Capital Gains	.037	.032	.027	.038
Total Tax Rate, Corporations plus Equity Holders				
Dividends	.619	.609	.579	.449
Capital Gains	.511	.477	.475	.365
40% Dividends, 60% Capital Gains	.554	.530	.517	.399

Source: See the Appendix.

high, but the 5.4 percent rate is much more modest than that on realized gains. Insurance companies also enjoy the benefits of deferral, making their effective capital gains rate equal to 17 percent if the same deferral assumption is made as for households, as in King and Fullerton. (This assumption probably understates this effective tax rate, to the extent that insurance companies trade more frequently.) Foreigners do not pay capital gains taxes on their holdings of U.S. equities.

Changes in portfolios have tended to reinforce the historical trend of reduced taxation of dividends and to offset the increased taxation of capital gains. Tax-exempt institutions, including pensions and nonprofit organizations, held 30 percent of corporate equities in 1988, double their share in 1970. Over this same period, households have reduced their share of ownership from 79 percent to 61 percent. Applying ownership weights identically to dividend and capital gains income and further assuming that corporations typically pay out about 40 percent of their earnings in dividends (Poterba 1987) provides a total tax rate on corporate equity.[6] Including the effects of the corporate income tax, the overall rate is now estimated at 40 percent, down from over 50 percent in the previous years shown.

Revenue Effects of Financing Investment by Debt Rather than Equity

The findings in tables 1 and 2 may be combined to yield revenue results. The difference between the effective tax rates on equity and debt has fallen, but it remains substantial. Every dollar of corporate earnings attributable to debt was recently taxed at a rate of 13 cents, while a dollar attributable to equity was taxed at 40 cents. This difference of 27 cents compares to 36 cents in 1986, 34 cents in 1980, and 35 cents in 1970. As expected, the recent tax differential reflects the reduction in the corporate tax rate in the 1986 reform. The differential is lower than the corporate rate in all years because the weighted tax rate for equity holders has been lower than that for debt holders.

In addition to these tax rates, the reduction in revenues from increasing leverage depends on the size of corporate debt and equity, the rates of return attributable to each, and the change in leverage relative to historical values. (For simplicity, any changes in the mix of holders of debt and equity resulting from changes in the aggregate leverage ratio are ignored in these calculations.)[7] Table 3 indicates how these factors affect revenues. In equation (1), revenues equal the effective tax rate on debt (t^D) times interest paid on debt (I) plus the effective tax rate on equity (t^E) times taxable corporate earnings (Y). Equation (2) restates the first in terms of effective tax rates, an interest rate (I/D), a rate of return to equity (Y/E), and leverage (D/[D+E]). Equation (3) then converts this result into the change in revenue due to a 1 percentage point change in the leverage ratio.[8]

The value of corporate debt plus equity is estimated at $5,570 billion in 1988, from the Federal Reserve data used to generate the first panel of chart 1. The effective interest rate (I/D) is assumed to be 10.8 percent, from the observed Moody's Baa corporate bond rate. The rate of return to corporate equity (Y/E) is assumed to be 9.0 percent, from data on corporate income statements and balance sheets.[9]

These assumptions imply that revenues fall by $1.23 billion if leverage increases by 1 percentage point. The aggregate revenue loss associated with

Table 3
Equations for Computing Revenue Effects of Leverage

(1) Tax Revenues as a Function of Interest and Earnings

$$T = t^D \times I + t^E \times Y$$

(2) Tax Revenues as a Function of Rates of Return on Debt and Equity and the Leverage Ratio

$$T = \{t^D \times (I/D) \times (D/[D+E]) + t^E \times (Y/E) \times (E/[D+E])\} \times (D+E)$$

(3) Change in Tax Revenues from a Percentage Point Increase in the Leverage Ratio

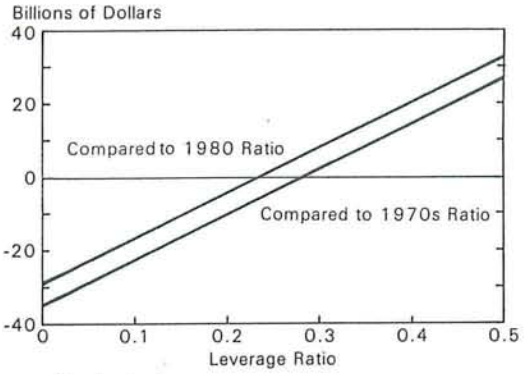
$$\Delta T = .01 \times \{t^D \times (I/D) - t^E \times (Y/E)\} \times (D+E)$$

Notation

- T Estimated revenues from corporate-source income (the sum of the corporate income tax and the individual income tax, including withholding taxes on foreigners).
- t^D Effective tax rate on interest (from table 1).
- I Corporate interest payments.
- t^E Effective tax rate on equity income (from table 2).
- Y Corporate earnings net of interest and other deductions, gross of tax.
- D Corporate debt.
- E Corporate equity.

Chart 2

Revenue Loss from Corporate Leverage, Using 1988 Parameters



Source: See the text.

recent leverage ratios depends on which historical value is used as a reference point. Comparing the 1988 ratio of 34.4 percent to the 1980 ratio of 23.4 percent (first panel of chart 1) yields a revenue loss of $13.5 billion (chart 2). Using the 1970s average leverage ratio of 28.3 percent for comparison yields a revenue loss of $7.5 billion. These revenue losses may be compared to corporate profits tax receipts of $112 billion in 1988, and income tax receipts on dividends, capital gains, and interest estimated at roughly $40 billion.[10]

These calculated revenue losses may be conservative if changes in leverage primarily have reflected shifts in demand for debt and equity, rather than shifts in portfolio preferences. In this case, a lower leverage ratio would probably be associated with a lower rate of return on debt relative to equity, as well as a lower weighted average tax rate on interest

Table 4

Corporate Debt Issues and Selected Uses, 1970–1988

Billions of Dollars

	Net Debt Issued by Nonfinancial Corporations	Share Repurchases	Cash Acquisitions			
			Total		Leveraged Buyouts	
			Source A	Source B	Source C	Source D
	(1)	(2)	(3)	(4)	(5)	(6)
1970	28.4	1.2	n.a.	4.3	n.a.	n.a.
1971	25.9	0.7	n.a.	3.5	n.a.	n.a.
1972	31.5	2.1	n.a.	4.5	n.a.	n.a.
1973	68.4	1.6	n.a.	5.1	n.a.	n.a.
1974	50.8	2.1	n.a.	4.4	n.a.	n.a.
1975	13.2	2.1	n.a.	4.3	n.a.	n.a.
1976	40.1	1.9	n.a.	7.6	n.a.	n.a.
1977	66.7	3.4	4.3	8.4	n.a.	n.a.
1978	71.0	3.5	7.2	11.7	n.a.	n.a.
1979	68.1	4.5	16.9	16.8	n.a.	0.6
1980	57.8	5.0	13.1	16.0	n.a.	1.0
1981	103.3	4.0	29.3	28.6	3.1	2.3
1982	43.9	8.1	26.2	18.7	3.5	2.8
1983	54.8	7.7	21.2	22.2	4.5	7.1
1984	169.6	27.4	64.2	44.1	18.8	10.8
1985	132.4	41.3	70.0	71.1	19.6	24.1
1986	203.7	41.5	74.5	57.5	46.4	20.2
1987	145.5	54.3	62.2	48.2	35.6	22.1
1988	207.5	52.1[a]	65.2[a]	n.a.	42.9	60.9

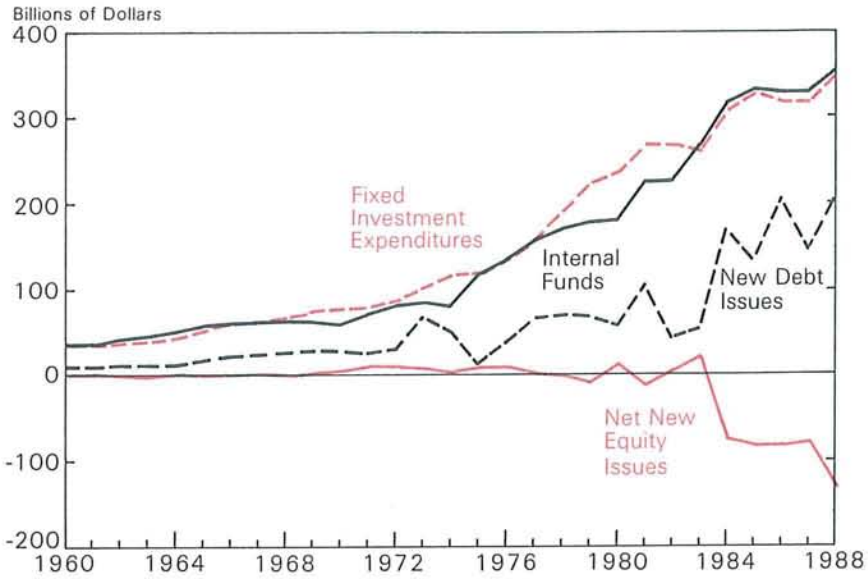
[a]Obtained by doubling the preliminary estimate for the first half of 1988. The authors indicate that their revised data will show an increase over the preliminary estimate.

n.a. = not available.

Source: Column 1: Board of Governors of the Federal Reserve System, *Flow of Funds*. Columns 2 and 3: 1970–76 from Shoven (1987); 1977–88 from Bagwell and Shoven (1989). Column 4: Hatsopoulos, Krugman, and Poterba (1989). Column 5: *Mergers and Acquisitions* magazine, as reported in U.S. Joint Committee on Taxation (1989) and by telephone. Column 6: *Mergerstat Review 1988*.

Chart 3

Sources and Uses of Funds of Nonfinancial Corporations



Source: Board of Governors of the Federal Reserve System, *Flow of Funds Accounts* and FAME database.

relative to equity earnings, as a consequence of a rebalancing of portfolios to accommodate corporate demand for leverage (see footnote 7). Taking these effects into account would raise the computed revenue loss from leverage.

II. Corporate Restructurings and Tax Revenues

The computations in section I indicated the revenue consequences when corporations finance new investments using debt rather than equity. To some extent, the increase in the leverage ratio in recent years has been caused not by an expansion of debt in order to augment the capital stock, but rather with a reduction in net worth. Since about 1984, corporations have been repurchasing their own shares in record amounts, and they have also been purchasing the shares of other corporations through mergers and acquisitions. In addition, management groups and financiers have been taking companies private by purchasing the stock of other shareholders. This section measures the revenue consequences of these restructurings, and finds that they generate tax receipts that partially offset the losses measured in section I.

Background on Corporate Restructurings

Share repurchases, cash mergers, and cash acquisitions of other companies have increased sharply in the last several years (table 4). At the high end of the estimates, total share repurchases plus cash mergers and acquisitions averaged $30 billion from 1980 to 1983, $92 billion in 1984, and over $110 billion in each subsequent year through 1988.

The concomitant increase in corporate debt suggests that corporations financed many of these transactions by borrowing. From 1980 to 1983, net issues of corporate debt averaged $65 billion annually (table 4). Net debt issues jumped in 1984, to $170 billion, and have remained above $130 billion in each year since. This rise in debt has exceeded the increase in corporate investment over this period (chart 3).

More direct evidence indicates the use of debt issues and asset reductions in financing these transactions. In the largest stock buybacks announced for 1988, internal cash flow and "cash on hand" figured prominently, but debt was an important source for

Table 5
Financing for Largest Announced Stock Buybacks in 1988

	Value (Billions of Dollars)	Percent of Shares Repurchased	Reported Financing
UAL Corporation	2.84	63	Borrowing from banks, asset sales
IBM	2.00	3	Internal cash flow
CSX	1.86	38	Cash, short-term borrowing, asset sales
Sears Roebuck	1.75	10	Asset sales
RJR Nabisco	1.38	8	Funds on hand
Digital Equipment	1.26	10	Internal cash flow
Gillette	1.19	23	Borrowing from banks and commercial paper market
Schlumberger	1.11	11	Funds on hand
Dow Chemical	1.04	6	Funds on hand
GTE	1.01	8	Internal cash flow
Tenneco	.99	12	Asset sales
Ameritech	.97	15	Internal cash flow
Hewlett-Packard	.95	11	Internal cash flow
Minnesota Mining & Mfg.	.83	6	Internal cash flow
BellSouth	.71	4	Funds on hand
Georgia-Pacific	.70	19	Internal cash flow and borrowing
J.C. Penney	.69	11	Long-term borrowing from insurance companies
MCI Communications	.68	16	Funds on hand and new issues of preferred stock
Fireman's Fund	.67	39	Funds on hand and stock of the seller
Pacific Telesis	.59	5	Funds on hand

Note: This list is drawn from the *Wall Street Journal* compilation of January 3, 1989. The data are generally taken from announcements, not actual purchases, and may include more than one announcement. However, companies that did not appear to follow through on plans to repurchase shares during 1988 were dropped from the list.
Source: *Wall Street Journal* and company news releases.

share repurchases by UAL, Gillette, Georgia Pacific, and J.C. Penney (table 5).[11] Rosengren (1989) found that 50 percent of the financing in a sample of recent hostile takeovers came from debt, 15 percent from sales of physical assets, and 35 percent from internal funds and new equity issues. Finally, leveraged buyouts (LBOs) are a subset of acquisitions in which companies are taken private in transactions funded predominantly by debt. The source used for column 6 of table 4 includes buyouts in which at least half the funding came from borrowing, but ratios of debt to other sources of funds as high as 10 to 1 are not uncommon in LBOs, and one survey found an average ratio of over 5 to 1 (Jensen 1987).

An Analytical Overview

Share repurchases and cash acquisitions reduce government revenues by lowering the amount of income subject to corporate taxation. This is true regardless of whether these transactions are financed by increases in debt or reductions in assets. When corporations purchase shares by issuing debt, the "double tax" applicable to equity income is replaced by the single level of tax applicable to interest. When corporations pay for shares by reducing their financial or physical assets, funds paid out to shareholders are no longer subject to corporate taxation (assuming they are not reinvested in the corporate sector). Thus the analysis in section I of the change in revenue attributable to change in leverage is directly applicable. The method of finance affects only the extent of the change in leverage. For a given value of share repurchases or cash acquisitions, debt-financed restructurings have a larger effect on leverage than do asset-financed restructurings.[12] The revenue estimates of section I already took into account the aggregate change in leverage in recent years, however, so no further adjustment to that set of calculations of revenue losses is necessary.

In other respects, share repurchases and cash mergers increase revenues. As part of these restructurings, shareholders sell corporate equities and therefore incur a capital gains tax. Because households must now include all capital gains from sales of corporate stock in their taxable income, this may be a

significant source of revenue. Additionally, reorganized corporations resulting from mergers and acquisitions may be more efficient and therefore may generate greater operating revenues than the former structures would have generated. This, too, would augment tax revenues. The remainder of section II calculates these increases in revenues.

Revenue Gains from Restructuring

Capital gains taxes from shareholders who sold their stock in corporate restructurings and greater corporate income tax revenues due to higher operating income after companies were reorganized totalled about $5 billion in 1988. These revenues offset as much as two-thirds of the current revenue losses from the aggregate increase in the debt-equity ratio compared to the 1970s value.

Table 6 indicates how the estimate for capital gains tax revenues was derived. Judging from preliminary data for 1988, the total value of shares sold in buybacks and cash mergers and acquisitions might have been $140 billion (line 1).[13] In repurchases and corporate acquisitions, potential sellers are offered a premium over the prevailing price.[14] Taking 40 percent as an estimate, the pre-buyout value is $100 billion (line 3). Adding another 30 percent to account for normal capital gains (Henderson 1989) yields estimated total capital gains in these transactions of $70 billion.[15]

Table 6
Estimate of Capital Gains Revenues from Share Repurchases and Cash Acquisitions, Using 1988 Data
Dollar Values in Billions

(1) Value of shares sold	$140.0
(2) Buyout premium	.4
(3) Value before buyout [(1)\[1+(2)]]	$100.0
(4) Normal capital gain relative to selling price	.3
(5) Basis [(3) × [1 − (4)]]	$ 70.0
(6) Capital gains [(1)−(5)]	$ 70.0
(7) Households' share	.4
(8) Households' capital gains [(6)×(7)]	$ 28.0
(9) Tax rate	.215
(10) Capital gains tax [(8)×(9)]	$ 6.0
(11) Value of acceleration[a]	.379
(12) Value of capital gains revenues[b]	$ 4.3

[a]Applied to normal capital gain only.
[b][(1)−(3)]\(6) × (10) + [(3)−(5)]\(6) × (10) × (11)
Source: See text.

According to data on stock market volume, households' share of trades was about 20 percent in 1988 (Securities Industry Association). The rest was probably accounted for by untaxed institutions, judging from the ownership data in appendix table 1. The calculations double this household share, to account for the fact that all owners sell in a takeover situation. Using the capital gains tax rate of 21.5 percent from table 2, capital gains revenues from these transactions were $6 billion (line 10). The government gains because shares were sold earlier than they would have been without the reorganization and because purchasers offer a premium to shareholders. If shares would have been sold ordinarily after ten years instead of five, and if a 10 percent discount rate is applied, the revenues are worth $4.3 billion (line 12).[16] This is close to three-fifths of the $7.5 billion revenue loss shown in chart 2 when comparing the 1988 leverage ratio to those in the 1970s.

Increased operating efficiency is another possible source of greater tax revenue in the case of an acquisition of another company or through an LBO. If resources are used more productively following the restructuring, annual receipts from the corporate income tax will rise.[17] This additional revenue is likely to be small in the aggregate. The value of cash acquisitions reported since 1970 is about one-tenth of the current value of outstanding equity (table 4 and Federal Reserve *Balance Sheets*). One study indicated that a sample of management buyouts increased operating revenues by 25 percent three years later (Jensen, Kaplan, and Stiglin 1989). This estimate is likely to be too high for measuring permanent effects of all acquisitions on aggregate revenue collections. Even if it measures accurately the effects for LBO companies, it does not count income losses elsewhere in the economy. Part of these shareholders' gains undoubtedly came at the expense of employees, suppliers, and shareholders in other corporations. Assuming operating income rises by 10 percent, applying this to one-tenth of pre-tax corporate earnings (from National Income Accounts data), and computing corporate income tax liabilities at a 34 percent rate, the additional tax revenue is only $1.0 billion (.1 x $307 billion x .1 x .34).[18]

III. Incentives for Debt Finance

Future revenues depend upon what happens to corporate leverage. On the one hand, some may point to the ups and downs of corporate leverage

patterns (first panel of chart 1) as an indication that recent revenue losses associated with leverage are a temporary aberration. On the other hand, the string of five successive years of high use of debt relative to equity finance (second panel of chart 1) may suggest that corporations have a new, higher target for leverage. This section reviews some of the major determinants of corporate leverage and indicates the prospects for the future.

On the whole, changes in tax policy under the Tax Reform Act of 1986 and typical fluctuations in business conditions will discourage corporations from increasing leverage further. By contrast, corporations' desire to lower their cost of capital in order to enhance their international competitiveness may encourage them to raise their use of debt. As discussed below, however, they are unlikely to increase leverage substantially unless their relationships with financial institutions change.

National Business Conditions

Given the choice between issuing new shares and issuing new debt, corporate shareholders generally prefer to finance investment using debt, to prevent the dilution of their returns. During economic slowdowns, however, they will be more cautious in using debt because of the bankruptcy risk associated with the obligation to pay interest on a regular basis. Historical evidence supports these points. The recessions in 1970, 1974–75, and from 1980 to 1982 coincided with reduced reliance on new debt issues (charts 1 and 3). The national economic expansion since 1982 has contributed to lower perceived risks, and therefore higher leverage, in keeping with the trend observed during the expansion between 1961 and 1969. This explanation fits the patterns in the 1980s at least as well as any other. It also suggests that 1980 is an outlier, so policymakers should not attach great weight to revenue losses computed by comparing leverage ratios at the beginning and end of the 1980s.

The tendency for debt financing to be cyclical suggests a limit to future increases in leverage.

The tendency for debt finance to be cyclical suggests a limit to future increases in leverage. As long as business cycle fluctuations remain part of our economic future, it is hard to envision sustained high use of debt for many years.

Tax Incentives

Taxes affect financing decisions because they alter the pretax rate of return (or "hurdle rate") required on an investment in order to satisfy investors' expectations for an after-tax return. Debt finance lowers corporations' hurdle rate because interest payments are deductible. But because of risks associated with high leverage, corporations are willing to incur some added cost from using equity finance. On the whole, it appears that the Tax Reform Act did not reduce the hurdle rate for debt-financed investments relative to equity-financed investments. Therefore increases in corporate leverage since 1986 cannot be explained by changes in tax incentives. Furthermore, these changes in tax incentives cannot be used to argue that corporations will continue to increase their use of debt.

The analysis of section I provided a key insight on tax incentives. By reducing the top corporate income tax rate from 46 percent to 34 percent, the Tax Reform Act of 1986 lowered the taxes paid on a dollar of income attributable to equity compared to those paid on income attributable to debt. Holding all other factors constant, this change will tend to reduce corporate leverage.

The calculations of section I are not a perfect measure of incentives, however, for two broad reasons. First, they indicate tax liabilities in 1988, but not taxes expected in the future from current financial decisions. Second, they do not consider how additional tax provisions of the Tax Reform Act may indirectly affect the market for corporate debt and equity.

For consistency, calculation of future taxes resulting from current activity requires reexpressing future returns in constant dollars. This sharpens the distinction between effective taxation of income from debt and equity because corporate interest deductions and capital gains income are both overstated as a result of inflation.[19] Another adjustment relates to the weights on dividend and capital gains taxes for equity finance. Under the so-called "new view" of dividends, the individual income tax on dividends affects capital costs at the margin only to the extent that corporations issue new shares (see Fullerton,

Henderson, and Mackie 1987 and references therein for further analysis and discussion). New share issues historically have accounted for no more than about 5 percent of equity funds raised, which provides a much less important role for dividend taxation than the "old view" in which the analysis is based on a payout rate of around 40 percent.

Added together, these adjustments reinforce the conclusion that the Tax Reform Act will discourage increases in corporate leverage. Fullerton, Gillette, and Mackie (1987) found that the effective marginal tax rate on corporate investment financed by debt rose from −0.339 to +0.099 because of the Tax Reform Act. The tax rate on equity investments rose only slightly, from 0.522 to 0.535. (Both sets of numbers also take into account revisions in depreciation allowances and the repeal of the investment tax credit, which are applicable equally for debt and equity finance.)

The Tax Reform Act did not decrease the hurdle rate for debt-financed investments relative to equity-financed investments.

The Tax Reform Act may also have affected corporate leverage indirectly by removing other corporate deductions, by changing the competition for borrowed funds, and by revising the taxation of other assets. Under one view of corporate behavior, corporations attempt to lower their capital costs by using the most attractive tax avoidance mechanism available. In the early 1980s, generous depreciation allowances provided a reduction in taxable income, and the investment tax credit further reduced corporations' tax liabilities. When these tax shelters were removed in the 1986 Act, corporations might have turned to debt finance as an alternative mechanism to lower their tax obligations. Givoly, Hayn, Ofer, and Sarig (1989) found some empirical support for this view.[20] This analysis does not explain why leverage started to rise noticeably around 1984, however.

The Tax Reform Act could also have an indirect effect on corporate leverage through its relative effects on tax rates of corporations and other borrowers. In an economy in which debt is issued by corporations, noncorporate businesses, and households, the "optimal" issuer of debt is the sector with the highest marginal tax bracket, because that sector attaches the highest value to deductibility of interest and is therefore willing to pay the highest rates. Before the Economic Recovery Tax Act of 1981, households and owners of noncorporate businesses were the "optimal" debtors because their top tax bracket of 70 percent exceeded the 46 percent rate of corporations. Their relative preference for deductions was reduced when the 1981 Act lowered their top tax bracket to 50 percent, while keeping the corporate rate at 46 percent. The 1986 reform made corporations the "optimal" debtors by reducing their top rate to 34 percent and lowering high-income taxpayers' rates to 28 and 33 percent. This analysis accounts for general changes between the 1970s and the 1980s (see Steuerle 1989a), but not for patterns within each decade.

Finally, Tax Reform changed the relative attractiveness of corporate securities and other assets. For example, the Act eliminated various tax shelters, causing households to prefer corporate equities to these other investments. (Or, to put it another way, corporations might be able to attract more equity investors without paying a higher rate of return.) Sorting out the net effects on corporate finance requires analyzing the various provisions of the Tax Reform Act, figuring out which assets are the closest substitutes for corporate securities, and evaluating the behavior of households and institutions in different circumstances.[21] In the most comprehensive analysis of portfolio effects performed so far, Galper, Lucke, and Toder (1988) concluded that the net impact of the Tax Reform Act is a slight decrease in corporate debt-equity ratios.

In summary, an analysis of tax changes casts doubt on the view that corporations will continue to increase their leverage. In essence, lower statutory corporate income tax rates reduce the tax penalty for using equity finance, and this one change dominates other changes under most modes of analysis.

International Competition

Another argument for continued high use of debt is that the United States ratio is out of line with practices abroad (Kopcke 1989b). In an economic environment where U.S. companies face severe international competition, high leverage may be their only means to lower capital costs. Other measures, such as fiscal and monetary changes, require government action.

This argument is similar to the one that main-

tains that corporations are using interest deductions as a substitute for other tax shields lost in the Tax Reform Act. Unlike depreciation allowances, however, interest payments require a form of finance that increases the risk of bankruptcy. Some observers are skeptical that the current institutional arrangements between financiers and corporations could support a further large increase in leverage. For example, McCauley and Zimmer (1989) indicate that, unlike the situation in the United States, banks in Japan and Germany are also shareholders in the companies to which they make loans. When these foreign corporations face financial crises, bankers are likely to provide assistance, thereby lowering the bankruptcy risk associated with a given degree of leverage. Also, McCauley and Zimmer point out that corporations in the United States may not be effective in cutting capital costs by increasing leverage if they must pay a sizable risk premium for additional borrowing.

In at least one respect, however, institutional arrangements now support higher leverage in the United States. The development of the so-called junk bond market has lowered the cost of intermediation and made debt more accessible to mid-sized corporations. On the other hand, some recently issued debt may eventually be converted to equity. Highly leveraged transactions (HLTs) by banks often involve stock warrants as well as debt instruments.

An analysis of tax changes casts doubt on the view that corporations will continue to increase their leverage.

Summary

Debt is attractive to corporations because it enables existing corporate shareholders to maximize their share of returns, and because it encourages expansion by reducing the cost of capital. Corporations took advantage of these long-standing benefits when they increased their use of debt starting in the mid-1980s. Their increased preference for leverage appears to lie in the lower perceived risks associated with sustained economic recovery. A similar phenomenon had occurred in the latter half of the 1960s. A further significant expansion in debt finance, and its attendant consequences for tax revenues, would require a continued shift in benefits relative to costs. Changes in tax policy under the Tax Reform Act of 1986 have, on net, probably diminished the comparative benefit of debt finance. Use of debt may rise for other reasons, such as a change in the relationships between corporations and their creditors that would lower bankruptcy risks. But unless such shifts in the cost of debt relative to equity materialize, the revenue losses associated with the use of debt finance will probably level off or even subside.

IV. Implications for Tax Policy

This study has found that the relationship between corporate leverage and tax revenues is complex. In the aggregate, increases in the use of debt reduce revenues for the U.S. Treasury and tax burdens for corporations. But, somewhat paradoxically, some of the most leveraged transactions reduce tax revenues the least (or even raise revenues) because the buying and selling of ownership rights and tangible assets result in capital gains revenues. These additional revenues offset a large share of recent revenue losses. This suggests that policymakers concerned with revenue losses should not attempt to restrict certain forms of corporate restructurings such as leveraged buyouts.

Future revenue losses will be held down unless financial arrangements cause a reduction in the bankruptcy risk associated with debt, or unless corporations' preferences make them willing to bear more risk. A reduction in the riskiness of debt would produce some desirable results. It would enable corporations to adopt a financial structure that lowers their cost of capital, and therefore would promote economic growth through a higher rate of investment. Policymakers should probably not react by penalizing leverage in this case. The strongest case for a change in tax policy will be made if policymakers believe that corporations are taking on undue risks through their leverage decisions. Even in this case, policymakers must weigh their concerns about leverage and reductions in tax revenues against goals for economic growth, and they may be constrained by administrative feasibility.

Restrictions on Interest Deductibility

One potential policy response is to disallow or otherwise restrict corporate interest deductions when

corporations rely "too much" on debt. It may be argued that in these cases debt takes on some characteristics of equity. This approach has not been fruitful in the past, however. Under the terms of the 1969 Tax Reform Act, the U.S. Treasury was to promulgate regulations distinguishing debt from equity. The Treasury finally advanced tentative regulations in 1980, made subsequent revisions, but formally abandoned its efforts in 1983 after deciding that such rules were unworkable.

The legal distinction between debt and equity has evolved over time.[22] Early tax court decisions focused on a corporation's debt-to-equity ratio in distinguishing interest from payments to shareholders. Companies with "excessive" ratios had to limit their interest deductions. As a result of these decisions, many corporations came to view 4 to 1 as a safe limit. However, since the mid-1950s, courts have relied less and less on this principle, in some cases disallowing and in other cases permitting interest deductions for corporations with low leverage ratios, and in still other cases permitting interest deductions for corporations with high leverage ratios, especially where these high ratios were temporary. In the case of closely held corporations where debtholders and shareholders are likely to be the same individuals, the courts now tend to consider whether independent lending institutions would have advanced funds on the same terms as the insiders. If not, then debt must be reclassified as equity. More generally, interest deductions have been disallowed when the terms of payment to debtholders have fluctuated significantly with the fortunes of the business. It is doubtful whether these legal distinctions between debt and equity could restrict interest deductions to any significant extent, since securities that corporations regard as debt have generally passed muster in the courts.

Tax Incentives

Another approach to discouraging leverage is equalization of the tax treatment of debt and equity. The revenue results differ, depending on whether taxes on debt are increased to the level of taxes on equity, whether taxes on equity are reduced to the level of taxes on debt, or whether the tax treatment of both should be amended to meet somewhere in the middle. Additional factors should matter in choosing among these options. Proposed measures differ in their level of administrative difficulty. They also have different implications for fairness. Lower taxes on equity income (without any offsetting changes in tax rates) may be viewed as unfair since upper-income taxpayers own a disproportionately large fraction of corporate securities. On the other hand, those who believe that income from all sources should bear identical tax treatment may favor policies to eliminate the "double tax" on income from corporate stock ownership. Finally, these policies differ in their effect on the cost of capital. All else equal, tax policies that lower the cost of capital promote investment and economic growth. Also, policies that eliminate the extra corporate tax will tend to lead to more efficient allocation of capital, thus also increasing national income.

All else equal, tax policies that lower the cost of capital promote investment and economic growth.

Raising the taxes owed on debt to those on equity provides the greatest increase in revenues, but is not a desirable way to discourage leverage. The anomaly under a separate corporate income tax is that equity is taxed twice, not that debt is taxed only once. A double tax on debt would put the United States out of line with tax structures in the rest of the world. In all other industrialized countries, corporations are allowed to deduct interest payments in computing taxable income (Sinn 1987). The resulting increase in the cost of corporate capital would deter corporations from locating investments in the United States, especially when added to the more restrictive capital cost recovery provisions in the Tax Reform Act of 1986 (see Henderson 1986).

Taxing equity income only once would, of course, cause revenues to fall. But advantages include a lower cost of capital. Higher investment and an improved allocation of capital would tend to raise national income, resulting in some positive feedback effect on tax revenues. (Policymakers could also choose to offset revenue losses by raising personal income tax rates, but this would raise the required returns on investment, and partially offset their attempt to lower the cost of capital.)

A single level of tax on equity income could be achieved by integrating the corporate and personal income tax systems. Under full integration, shareholders would be allocated a portion of corporate

income corresponding to their fraction of outstanding equity. This income would be added to other income reported on their tax return, as in the existing treatment of partnership income.

So far, full integration has been considered too cumbersome to be implemented, in part because of additional recordkeeping and reporting requirements for corporations and stockholders. Under an integrated tax, shareholders would have to adjust the basis of their stock to account for undistributed earnings on which they had been taxed. Without an adjustment, they would incur excess capital gains taxes when they sold their shares. Corporations, in turn, would face a simultaneity problem under an integrated tax if they themselves held shares. They would find it difficult to allocate their income to shareholders on a timely basis because it would depend on income they received from their ownership of shares. As a final example, policymakers would have to decide whether to apply limitations on operating losses, capital losses, and tax credits to the corporation as a whole or to individual shareholders. Limits imposed shareholder by shareholder would be more in keeping with the principle of integration, but would complicate shareholders' tax calculations. Limits imposed on the corporate entity would be simpler, but might lead to undesirable tax shelter activity, similar to that which necessitated complicated corrections to partnership taxation in the Tax Reform Act of 1986. Many other administrative difficulties are cited in McLure (1979, Chapter 5) and the U.S. Congressional Budget Office (1985, Chapter 8). As a result of these difficulties, full integration is not practiced in any country (Sinn 1987), although it is currently under preliminary study at the U.S. Treasury Department. The widespread use of computers may now facilitate implementation of a fully integrated income tax, but policymakers would probably need to streamline the tax laws compared to those now applicable to partnerships.

A much simpler approximation to full integration would involve using the corporation to pay taxes on behalf of shareholders and doing away with any further individual income tax on corporate distributions and, perhaps, capital gains (Steuerle 1989b). The tax rate could be set at any level, but likely candidates are the top rate of corporate tax (34 percent) or the top rate of individual tax (28 percent). This proposal would leave some difference in the tax between debt and equity to the extent that these top rates are above the average rates on interest income.

Many foreign countries have instituted partial integration through favored treatment of dividend distributions. Of the twenty-four countries surveyed in Sinn (1987), eighteen have a partly integrated tax system, and of these, five in effect fully eliminate the extra corporate-level tax on dividends (table 7). In the early rounds leading up to the Tax Reform Act, proposals included allowing corporations to take a partial deduction for dividend payments. Partial integration still taxes income from debt at a somewhat lower rate than income from equity. Such a policy also maintains double taxation on the buildup of value through retained earnings. In the absence of

Table 7
Alternative Systems for Taxing Income from Corporate Equity and International Practices in 1986

Classical System
- No distinction between retained earnings and dividend distributions under the corporate income tax.
- No adjustment of individual shareholders' tax to reflect corporate income tax paid.
- Used in Australia, Luxemburg, the Netherlands, New Zealand, Switzerland, and the United States.[a]

Partial Integration
- Split Rate System or Partial Imputation of Dividends
  - Split rate system has a differential corporate income tax rate for retained earnings and dividend distributions.
  - Alternatively, partial imputation system permits a portion of the corporate income tax paid on dividends to be deducted from the individual income tax paid by shareholders.
  - Used in Austria, Belgium, Canada,[a] Denmark,[a] Finland,[a] France, Iceland, Ireland,[a] Japan, Spain, Sweden,[a] Turkey, United Kingdom.[a]
- Full Imputation of Dividends
  - Full corporate income tax paid on dividends can be deducted from the individual income tax paid by shareholders.
  - Used in Greece, Italy, Norway,[a] Portugal, West Germany.

Full Integration
- Taxation of retained earnings and dividends at shareholders' individual income tax rates. No separate corporate income tax.
- Not used anywhere.

[a]Capital gains realized at least one year after purchase of shares are taxable under the individual income tax. In other countries, long-term capital gains are not taxed. Most countries tax capital gains on assets held less than one year.
Source: Sinn (1987), figure 3.1 and text.

other changes, these earnings would still be taxed under the corporate income tax and when they were realized as capital gains.

A policy to reduce the tax on dividends without reducing the tax on retained earnings and capital gains would tend to favor established companies at the expense of growing corporations that do not pay dividends (Kopcke 1988). Also, depending on one's views on tax incentives (see, for example, the "new view" described in section III), it might cause revenues to fall substantially without providing much of a reduction in capital costs.

The final alternative would be to equalize the effective corporate taxes on debt and equity without changing total tax payments (Hatsopoulos, Krugman, and Poterba 1989). Under this plan, corporations would take a deduction based on their total capital, and the rate of deduction could be set initially so as to approximate current interest deductions in the corporate sector. The details of this plan would have to be worked out in order to provide changes in the rate of deduction as actual capital costs changed. The elimination of full deductibility of interest payments would put the United States' tax treatment of debt at odds with that in other countries, however, and might lead to complicated arrangements to change the "location" of finance. Large U.S. corporations have already taken advantage of lower interest rates in Japan by issuing yen and dual-currency bonds combined with currency swaps (Smith, Smithson, and Wilford 1989, pp. 220).

V. Conclusions

U.S. corporations have increased their use of debt in recent years, thereby avoiding the "double taxation" of equity income. Costs to the U.S. Treasury were held down by the Tax Reform Act of 1986, which reduced the tax differential between debt and equity finance by lowering statutory tax rates for corporations. Also, corporations have accumulated debt and reduced equity in the course of reorganizations. However controversial mergers and acquisitions might be, these moves as well as corporations' repurchases of their own shares have caused the realization of capital gains which in turn provided more tax revenues. This article has estimated the revenue cost of a more leveraged corporate sector to be between $8 billion and $14 billion in 1988. (The choice of a historical reference point inevitably causes the variation in these estimates, since there is no established "normal" leverage ratio.) But the higher capital gains and corporate income tax revenues generated by corporate restructurings, estimated at roughly $5 billion, must be counted as an offset.

Revenue costs could rise in the future if corporations use high ratios of debt finance to fund new investments. This seems unlikely, given the usual fluctuations in business conditions and changes introduced in the 1986 Tax Reform Act. On the other hand, pressures to lower the cost of capital may lead to new relationships between financial intermediaries and corporations that result in higher leverage. Under this situation, policymakers should not attempt to restore revenues by raising taxes on debt finance, because this would discourage investment. The clearest case for intervention is if policymakers feel that corporations are taking on too much risk in their financing policies. Even in this case, policies that equalize the tax treatment of debt and equity have differing results for revenues and capital costs, and policymakers must choose between competing goals. Tax integration proposals generally require sacrificing some revenue in return for a low cost of capital, and some forms of integration provide greater relief to corporations paying dividends than to those retaining their earnings. Alternatively, a general deduction for capital costs regardless of the source of finance does not sacrifice revenues and has no direct effects on the cost of capital, but poses some difficulties in a world where interest deductions generally are fully deductible.

Appendix: Calculation of Tax Rates in Tables 1 and 2

The calculations of effective tax rates on income from corporate debt and equity follow the procedures used to provide U.S. data for an international comparison of tax policies by King and Fullerton (1984). The current study modifies this methodology by excluding taxes imposed by state and local governments. State and local income taxes have less of an effect on tax disparities between debt and equity because the rates of tax are lower. Few states have corporate or personal tax rates exceeding 10 percent, and several do not have any tax on these forms of income (Advisory Commission on Intergovernmental Relations). In any case, a thorough analysis would have to consider data on the geographic distribution of corporate profits, interest deductions, interest earnings, dividends, and capital gains. Obtaining this information would be a major study in itself, and King and Fullerton made only rough calculations of state and local taxes in the United States (they were more significant for other countries in their study). On the other hand, federal withholding taxes on foreigners' interest and dividends earned in the United States are included in the revenue calculations in this study. King and Fullerton omitted them because they limited their analysis to domestic ownership of assets.

Table 1

Households' weighted tax rates on interest income for 1980, 1986, and 1988 are from the U.S. Treasury Department's Individual Tax Model, as reported in Cilke and Wyscarver (1987). For 1970, the rate was estimated by examining historical changes in marginal tax rates at different income levels during the 1970s as reported in Steuerle and Hartzmark (1981), and applying this information to the average marginal tax bracket of interest recipients observed in 1980. The adjustment for imputed interest is calculated using the procedure of King and Fullerton, p. 223, based on data from the Flow of Funds on checkable deposits. The corporate income tax rate for insurance companies is the top statutory rate, as reported by Pechman (1987), table A-8.

The effective withholding tax rates on foreigners' interest income were obtained from Lewis (1988–89) and telephone conversations with the author. The rate for 1970 is based on data for 1973, since that was the earliest year available for disaggregated categories of taxes. The rate for 1988 was assumed to be identical to that in 1986. Interest paid to foreigners was $646 million in 1973, $2.604 billion in 1980, and $11.781 billion in 1986. The corresponding taxes withheld were $17 million, $96 million, and $249 million, respectively.

The weights for debt holders were obtained using the procedures of King and Fullerton, pp. 240–243. The first step was to measure corporate net debt in each year from the Flow of Funds accounts (appendix table 1). These data are the difference between liabilities (consisting of bonds, mortgages, bank loans, issues of commercial paper, bankers' acceptances, and finance company loans) and assets (consisting of demand and time deposits, security repurchase agreements, commercial paper held, and consumer credit).

Because the Flow of Funds reports detailed information on only total corporate and foreign bonds, not nonfinancial corporate bonds, as well as total mortgages, not nonfinancial corporate mortgages, it is necessary to assume that these categories of nonfinancial corporate debt are distributed among holders in the same proportions as the available debt categories (appendix table 2 for 1988 data). Using the King-Fullerton methodology and Flow of Funds data, each type of net debt was allocated to individuals and institutions in four sectors: households, insurance companies, tax-exempt institutions, and foreigners (appendix table 3 for 1988 data). Most forms of corporate debt were assigned directly to one class of holders, as in King and Fullerton. Households hold very little corporate debt directly, but are taxed on interest received from intermediaries such as commercial banks that hold corporate obligations. The household category includes these indirect forms of ownership. The final allocation of ownership of corporate net debt in each year is shown in appendix table 4.

Table 2

In table 2, the corporate tax rate is identical to that in table 1, and the shareholder tax rates were computed separately for dividends and capital gains. Households' weighted tax rates on dividend income are also from Cilke and Wyscarver and Steuerle and Hartzmark. Insurance companies are taxed according to the corporate income tax rate, but a large fraction of dividends is excluded from the base. These statutory exclusion rates are reported in Pechman (1987) and earlier editions.

Effective withholding tax rates on foreigners' dividend income were obtained from the same sources as for interest income. Dividends paid to foreigners were $1.476 billion in 1973, $3.148 billion in 1980, and $6.507 billion in 1986. The corresponding taxes withheld were $193 million, $453 million, and $759 million, respectively.

The household tax rates on capital gains are taken from the U.S. Congressional Budget Office (1988), table 8. The advantage of deferral and step-up of basis at death is taken from the estimate of King-Fullerton and is assumed not to vary from year to year. Insurance companies' tax rate is the statutory corporate rate on capital gains as reported in Pechman, and the deferral assumption comes from King-Fullerton.

The distribution of ownership of corporate equities was calculated from Flow of Funds data using the methodology described in King and Fullerton, pp. 239–240 (appendix table 5). Seven percent of the recorded household holdings is allocated to nonprofit institutions in all years.

Appendix Table 1

Composition of Corporate Net Debt

Billions of Dollars

	1970	1980	1986	1988
Corporate Liabilities	343.3	741.9	1317.1	1651.1
Bonds	166.8	365.6	664.2	885.0
Mortgages	58.9	85.0	61.4	96.2
Bank Loans n.e.c.	103.6	229.9	464.7	501.9
Acceptances	3.1	17.1	28.1	32.6
Finance Company Loans	10.9	44.3	98.7	135.4
Corporate Assets	66.5	139.8	294.7	308.1
Demand Deposits	44.1	57.1	114.3	120.0
Time Deposits	5.3	37.9	87.5	99.6
Security Repurchase Agreements	.2	28.4	70.5	79.5
Net Commercial Paper	2.3	−8.6	−10.0	−28.4
Consumer Credit	14.6	25.0	32.4	37.4
Net Total (Liabilities Less Assets)	276.8	602.1	1022.4	1343.0

Source: Calculated by the author from Board of Governors of the Federal Reserve System, *Flow of Funds Accounts* using the methodology of King and Fullerton (1984), chapter 6.

Appendix Table 2

Holdings of Corporate and Foreign Bonds and Total Mortgages, 1988

	Corporate and Foreign Bonds		Total Mortgages	
	Billions of Dollars	Percent of Total	Billions of Dollars	Percent of Total
Individuals and Nonprofit Institutions[a]	115.5	8.3	174.6	5.4
Commercial Banks	83.4	6.0	669.2	20.5
Savings Institutions	77.1	5.5	971.1	29.8
Mutual Funds	68.4	4.9	0	0
Finance Companies	0	0	68.8	2.1
Real Estate Investment Trusts	0	0	7.8	.2
Mortgage Pools	0	0	810.9	24.9
Life Insurance Companies	437.0	31.4	232.6	7.1
Other Insurance Companies	60.3	4.3	5.2	.2
Private Pensions	180.5	13.0	5.7	.2
State and Local Government Retirement Funds	160.6	11.5	15.6	.5
Rest of the World	180.2	12.9	0	0
Sponsored Credit Agencies	0	0	152.6	4.7
Brokers and Dealers	29.2	2.1	0	0
State and Local General Funds	0	0	98.6	3.0
U.S. Government	0	0	48.0	1.5
Total	1392.2	100.0	3260.7	100.0

[a]Includes nonfarm, noncorporate business.

Source: Board of Governors of the Federal Reserve System, *Flow of Funds Accounts*.

Appendix Table 3

Holdings of Nonfinancial Corporate Liabilities and Assets, 1988

Billions of Dollars

	Bonds[a]	Mortgages[a]	Bank Loans n.e.c.	Acceptances	Finance Company Loans	Total Liabilities	Total Assets[b]	Net Debt (Liabilities Less Assets)
Individuals and Non-profit Institutions	73.4	5.2	0	0	0	78.6	37.4	41.2
Commercial Banks	53.0	19.7	501.9	32.6	0	607.3	253.2	354.1
Savings Institutions	49.0	28.7	0	0	0	77.7	45.9	31.8
Mutual Funds	43.5	0	0	0	0	43.5	0	43.5
Finance Companies	0	2.0	0	0	135.4	137.4	−28.4	165.8
Real Estate Investment Trusts	0	.2	0	0	0	.2	0	0.2
Mortgage Pools	0	23.9	0	0	0	23.9	0	23.9
Life Insurance[c]	89.7	2.2	0	0	0	91.9	0	91.9
Other Insurance Companies	38.3	.2	0	0	0	38.5	0	38.5
Private Pensions	114.7	.2	0	0	0	114.9	0	114.9
Life Insurance Pensions[c]	188.1	4.7	0	0	0	192.8	0	192.8
State and Local Government Retirement Funds	102.1	.5	0	0	0	102.6	0	102.6
Rest of the World	114.6	0	0	0	0	114.6	0	114.6
Total of Above	866.4	87.5	501.9	32.6	135.4	1623.9	308.1	1315.8
Sponsored Credit Agencies	0	4.5	0	0	0	4.5	0	4.5
Brokers and Dealers	18.6	0	0	0	0	18.6	0	18.6
State and Local General Funds	0	2.9	0	0	0	2.9	0	2.9
U.S. Government	0	1.4	0	0	0	1.4	0	1.4
Total	885.0	96.2	501.9	32.6	135.4	1651.1	308.1	1343.0

[a]Allocation uses the percentages in appendix table 2.

[b]Demand deposits of $120.0 billion allocated to commercial banks. Time deposits of $99.6 billion allocated to commercial banks ($53.7 billion) and savings institutions ($45.9 billion). Security repurchase agreements of $79.5 billion allocated to commercial banks. Net commercial paper (−$28.4 billion) allocated to finance companies. Consumer credit of $37.4 billion allocated to individuals.

[c]Allocation of life insurance company holdings to insurance and pensions according to relative reserves.

Source: Calculated by the author from Board of Governors of the Federal Reserve System, *Flow of Funds Accounts* using the methodology of King and Fullerton, chapter 6.

[1] The modeling here abstracts from the use of the Menge formula for taxing life insurance companies. Prior to the passage of the Deficit Reduction Act of 1984, the tax rate on interest earned by life insurance companies depended on the rate of interest. With an adjustment for this formula, King and Fullerton (1984) estimate that the tax rate for insurance companies was 41 percent in 1980. Throughout this paper, the top statutory corporate income tax rate is used as an estimate for all corporations. Most corporate income is taxable at this rate.

[2] By eliminating withholding taxes on interest from portfolio investments, the Deficit Reduction Act of 1984 eliminated a large share of foreigners' taxes on interest earned in the United States. In 1986, these taxes amounted to only about $250 million, compared to about $12 billion in interest paid to foreigners, for an effective rate of two percent (Lewis 1988–1989). Even before the 1984 legislative changes, the statutory withholding rate of 30 percent was reduced substantially by tax treaties. Withholding taxes represent the entire income tax liability of foreign investors to the U.S. government because they do not file tax returns in the United States. Apart from these measured revenue effects, the withholding taxes may have been largely irrelevant in determining foreigners' willingness to invest in the United States because these taxes could be credited on their tax returns in their home country.

[3] Foreign industrialized nations often allow some form of dividend relief, either through a credit or lower rate on dividend payments (see McLure 1979, U.S. Treasury 1984, volume I, Appendix C, and Sinn 1987, chapter 3). For further discussion, see section IV of this paper. The United States had a surtax on undistributed profits in 1936 and 1937.

[4] Absent the relief for intercorporate dividend distributions,

Appendix Table 4

Ownership of Corporate Net Debt

Billions of Dollars

	1970	Percent of Total	1980	Percent of Total	1986	Percent of Total	1988	Percent of Total
Households	136.1	(50.3)	289.0	(49.0)	494.6	(49.4)	660.5	(50.2)
Individuals and Nonprofit Institutions	19.9		21.2		21.7		41.2	
Commercial Banks	71.4		163.3		304.0		354.1	
Savings Institutions	31.3		36.6		14.9		31.8	
Mutual Funds	2.9		6.3		30.3		43.5	
Finance Companies	9.5		54.7		110.3		165.8	
Real Estate Investment Trusts	.5		.2		.1		.2	
Mortgage Pools	.6		6.7		13.3		23.9	
Insurance Companies	60.1	(22.2)	93.8	(15.9)	106.0	(10.6)	130.4	(9.9)
Life	53.0		76.3		75.7		91.9	
Other	7.1		17.5		30.3		38.5	
Tax-exempt Institutions	72.2	(26.7)	191.3	(32.4)	310.9	(31.1)	410.3	(31.2)
Private Pensions	24.8		57.6		83.2		114.9	
Life Insurance Pensions	17.6		63.3		136.9		192.8	
State and Local Government Retirement Funds	29.8		70.4		90.8		102.6	
Rest of the World	2.2	(0.8)	16.2	(2.7)	89.2	(8.9)	114.6	(8.7)
Total	270.6	(100.0)	590.3	(100.0)	1000.7	(100.0)	1315.8	(100.0)
Addendum								
Sponsored Credit Agencies	2.9		5.9		3.5		4.5	
Brokers and Dealers	1.4		1.5		15.0		18.6	
State and Local Government General Funds	.6		2.0		2.0		2.9	
U.S. Government	1.3		2.5		1.3		1.4	

Source: Calculated by the author from Board of Governors of the Federal Reserve System, *Flow of Funds Accounts* using the methodology of King and Fullerton (1984), chapter 6.

the corporate income tax could be a "triple tax" rather than a "double tax."

[5] Withholding taxes represent the entire income tax liability of foreign investors to the U.S. government. As in the case of withholding taxes on interest, withholding taxes on dividends may not deter foreigners' investment in U.S. equities because these taxes can be credited on their tax returns in their home country.

[6] The total tax rate on dividends is equal to the corporate income tax rate plus the shareholder tax on dividends times the quantity one minus the corporate income tax rate. The total tax rate on retained earnings is computed as the corporate income tax rate plus the shareholder tax on capital gains times the quantity one minus the corporate income tax rate. This latter calculation assumes that, on average, retained earnings give rise to capital gains on a dollar-for-dollar basis. McLure (1979) made the identical assumption in a study of corporate taxation. Some authors also add in the discounted value of the additional tax on future dividends paid out of income generated by current retained earnings. Proponents of the "new view" of dividend taxation (discussed briefly in section III) point to this future tax in arguing that dividend taxes are irrelevant in the corporations' cost of retaining earnings. Dividend taxes must be paid currently if the corporation decides not to retain earnings, or eventually if it does retain earnings.

[7] As corporate leverage changes, the expected interest rate and rate of return to equity change in order to achieve a balance between the securities that corporations issue and what households and institutions wish to hold in their portfolios. As corporations increase their demand for debt, they must offer a higher interest rate to induce households and institutions to supply debt (holding all other factors constant). The changing distribution of holdings would also affect the weighted average tax rates on income from debt and equity. As former equity holders have shifted into debt, they have probably raised the observed tax rate on interest. This is because households' ownership of equity is more concentrated in the upper part of the income distribution than is their ownership of debt. Also, tax-exempt institutions own a smaller proportion of corporate equity than of debt. The revenue estimates in this section take the 1988 interest rates, returns on equity, and weighted ownership rates as the reference point, and thus provide more conservative estimates of current revenue losses from increased leverage than would be obtained from an analysis using historical rates of return and ownership rates. By symmetry, estimates of future revenue losses (gains) from further increases (decreases) in leverage are overestimated (underestimated) when

Appendix Table 5
Ownership of Corporate Equity
Billions of Dollars

	1970	Percent of Total	1980	Percent of Total	1986	Percent of Total	1988	Percent of Total
Households	677.5	(79.0)	1080.2	(68.8)	1888.1	(64.5)	1892.8	(60.7)
Individuals	634.9		1033.5		1719.8		1697.2	
Commercial Banks	0.1		0.1		0.1		0	
Savings Institutions	2.8		4.2		7.0		8.0	
Mutual Funds	39.7		42.4		161.2		187.6	
Insurance Companies	24.2	(2.8)	57.6	(3.7)	89.5	(3.1)	103.2	(3.3)
Life	11.0		25.3		27.2		28.9	
Other	13.2		32.3		62.3		74.4	
Tax-exempt Institutions	128.6	(15.0)	366.6	(23.4)	785.2	(26.8)	923.3	(29.6)
Private Pensions	67.1		223.5		456.4		511.2	
Life Insurance Pensions	3.6		21.0		49.2		60.7	
State and Local Government Retirement Funds	10.1		44.3		150.2		223.7	
Nonprofit	47.2		77.8		129.4		127.7	
Rest of the World	27.2	(3.2)	64.6	(4.1)	166.6	(5.7)	198.4	(6.4)
Total	857.5	(100.0)	1569.0	(100.0)	2929.4	(100.0)	3117.7	(100.0)
Addendum								
Brokers and Dealers	2.0		3.3		17.7		12.3	

Source: Calculated by the author from Board of Governors of the Federal Reserve System, *Flow of Funds Accounts* using the methodology of King and Fullerton (1984), chapter 6.

current ownership rates are used. For further discussion of the expected distributional shifts when leverage changes, see Auerbach (1989b).

[8] This revenue calculation does not take into account the changing generosity of other deductions or credits. For example, depreciation allowances may exceed or fall short of the value of economic depreciation, and investment tax credits offset tax liability prior to 1986. At best, the calculation indicates the effects of debt and equity finance holding constant all other aspects of corporate tax law. For further details of how taxation of income from corporate activity is influenced by factors other than the financing mix, see Henderson (1986). In particular, the cutbacks in capital cost recovery provisions in the Tax Reform Act of 1986 caused the total effective tax rate for corporate-source income to rise even though the statutory income tax rate for corporations fell from 46 percent to 34 percent.

[9] Using a single interest rate rather than a weighted rate for debt of different maturities may be justified by the relatively flat current term structure of interest rates. The equity rate of return is computed by starting with corporate earnings subject to taxation relative to the book value of corporate equity for corporations outside of finance, insurance, and real estate, as reported in recently available data from tax returns (1985 *Statistics of Income: Corporation Income Tax Returns*). It is then adjusted downward according to Federal Reserve data on the ratio of net worth computed using the book value relative to the replacement value of assets (1988 *Balance Sheets for the U.S. Economy*) Finally, it is adjusted upward to reflect a judgmental adjustment for the increase in taxable corporate income from the Tax Reform Act of 1986. Traditionally, the rate of return on stocks has been higher than the rate of return on bonds (Ibbotson Associates 1987). Both their calculations and the methodology used in this study indicate a reversal of this pattern in the 1980s.

[10] According to equation 2 in table 3, total revenues (T) for 1988 were approximately $158 billion.

[11] Cash on hand could be the result of previous debt issues or asset sales, or of retained earnings. More formal econometric research has indicated that cash flow in excess of investment opportunities and lower than desirable debt-equity ratios increase the likelihood that firms will repurchase shares (Shoven 1987, Bagwell and Shoven 1988).

[12] If debt is used to purchase shares, leverage changes by $1/(D+E)$ times the purchase amount. If assets are reduced, leverage changes by a factor of $D/(D+E)^2$. The latter ratio equals the former ratio times $D/(D+E)$, which is less than one.

[13] An extrapolation from Bagwell and Shoven (1989) gives an estimate of $117.3 billion (see table 4), but they indicate that further data will increase the estimate.

[14] Studies of repurchases have indicated premiums on the order of 20 percent (Bradley and Wakeman 1983). In the case of hostile takeovers, historical premiums have averaged over 30 percent, and in more recent times they have averaged about 50 percent. For LBOs, the Securities and Exchange Commission calculated average premia of 40 percent between 1980 and 1988 (U.S. House of Representatives Committee on Energy and Commerce 1989).

[15] This may be high for share repurchases because those who sell shares back to the issuing company are most likely to have the highest original purchase price (Bagwell and Shoven 1989).

[16] The calculations should also take into account the revenue obtained from shares that would have been held until death and therefore would never be taxed on the appreciation in value over

the owner's lifetime. This revenue is difficult to estimate. It is probably small compared to the sources of revenue that are taken into account. The amount of the premium offered in part reflects these capital gains and other tax liabilities (Hayn 1989).

[17] One of the anomalies of our system of taxation is that this increased profitability is taxed twice—once through the capital gains tax when the restructuring takes place and again through the tax on corporate income (Kopcke 1989a).

[18] Other studies have found that leveraged buyouts increase tax revenues on net, even accounting for the corporate income taxes lost from higher debt-equity ratios. Because LBOs are a narrow and relatively unusual subset of debt transactions among U.S. corporations, and because the studies do not consider offsetting revenue losses elsewhere in the economy, the results should not be generalized into broader revenue estimates.

In response to Congressional inquiries, Kohlberg Kravis Roberts & Company (KKR) undertook a study of the 17 companies in which it had sponsored a leveraged buyout and in which it still maintained an equity position (Kohlberg Kravis Roberts 1989). The study indicated that, considering the year of the buyout and three subsequent years, total taxes paid by the LBO company and its creditors and investors increased by over 70 percent as a result of the buyout. The study did not attempt to compare the KKR companies to any control group, or to apply the methodology to additional LBOs. Another recent study used 1989 tax law and income flows resulting from 48 large LBOs announced between 1979 and 1985 (Jensen, Kaplan, and Stiglin 1989). On the basis of the most favored set of assumptions and discounting future revenues back to the time of the LBO, the resulting tax gains were twice the size of the resulting tax losses. Under more conservative assumptions, gains were 10 percent higher than losses. Finally, Gravelle (1989) conducted an analytical study of LBOs and showed that the sign of the revenue effects is quite sensitive to the assumed holding period for stock in the absence of the buyout and to assumptions about the permanence of increased debt.

A common impression from these studies is that leveraged buyouts are highly specialized transactions. In most cases, a company is taken over with the purpose of radical restructuring, followed by a public offering of its stock or sales to other investors within three to seven years. For those reasons, there are additional capital gains revenues beyond those considered in this study. (There are also some additional tax losses. LBO companies are able to use loss carrybacks when high debt burdens result in net operating losses, and they tend to omit dividend payouts, which lowers personal income tax receipts.) To the extent that the initial high debt ratios are reduced in future years, the ongoing tax losses associated with leverage are diminished.

These specialized characteristics imply that the tax losses from LBOs may be lower than for other debt transactions—and LBOs may even generate revenue gains. They also imply that the findings for LBOs are not likely to affect the majority of U.S. corporations, since it is doubtful that many companies have the potential to generate such high rates of return for their investors as a result of concentrated restructurings.

Another important point, already mentioned in the text, is that the studies of LBOs look at the revenue effects for these companies only, rather than examining the economy at large. When leveraged buyouts result in greater operating revenues, these gains can come from taking business away from other corporations, which in turn earn lower profits and therefore pay lower taxes. Gains in operating revenues may also come about through reducing costs, but these also result in lower incomes (and therefore tax payments) for the persons or companies affected. Because the studies of LBOs do not examine effects on other parts of the economy, they are of limited relevance for calculations of aggregate revenues.

[19] Because the tax code has not distinguished nominal and real interest payments, taxable income of corporations tends to be understated in times of inflation, but this is exactly matched by an overstatement of taxable income for their creditors. (This statement abstracts from other aspects of taxation that cause corporate income to be overstated.) Corporations are in a higher statutory tax bracket than their creditors on average and therefore the tax loss is greater than the tax gain once a correction is made for inflation (see Henderson 1986 for further discussion). The basis for capital gains is not indexed to inflation, so taxes relative to real capital gains are higher than indicated in the revenue figures presented above. See Poterba (1989) for estimates of the inflation- and deferral-adjusted effective capital gains rate under various assumptions on nominal returns and holding periods.

[20] To the extent that these other deductions had caused firms to experience tax losses in the early 1980s, interest deductions were less valuable because they were only partially used. This argument, presented in Auerbach (1989b), provides another reason why the use of debt might have been held down in the earlier period and increased subsequent to 1986.

[21] For example, households that tend to roll over their equity portfolios frequently would be especially deterred from holding equities because of the large increase in taxes on realized capital gains. On the other hand, households that do not trade shares frequently now have an increased incentive to hold corporate equities because of the reductions in dividend tax rates and the top statutory corporate income tax rate in the 1986 Act. Pensions and endowments funds should also now shift funds into corporate equities because they are not affected by individual income taxes and are benefited by the corporate rate reduction.

[22] For further elaboration on the material in this section, see Wolfman (1982 pp. 117–123 and 1987 supplement pp. 18–21).

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