Volume Title: Tax Policy and the Economy: Volume 2

Volume Author/Editor: Lawrence H. Summers, editor

Volume Publisher: MIT Press

Volume ISBN: 0-262-19272-1

Volume URL: http://www.nber.org/books/summ88-2

Publication Date: 1988

Chapter Title: Do We Collect Any Revenue from Taxing Capital Income?

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Chapter URL: http://www.nber.org/chapters/c10938

Chapter pages in book: (p. 89 - 130)

# DO WE COLLECT ANY REVENUE FROM TAXING CAPITAL INCOME?

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## EXECUTIVE SUMMARY

The wide variation in effective tax rates on income from different types of capital received by different investors creates numerous tax arbitrage opportunities that result in a loss in both government revenue and economic efficiency. The objective of this chapter is to estimate the revenue and distributional effects of tax arbitrage, using tax data from 1983, by examining the effects of two tax changes that would each substantially reduce the opportunities for tax arbitrage.

Our principal conclusions are as follows:

1. Taxing real rather than nominal interest income would have raised government revenue in 1983 by $25.5 billion.
2. This increase in revenue would occur mainly at the expense of those in the highest tax brackets.
3. Taxing the cash flow from real capital and exempting from tax any income from financial assets would have raised government revenue by $17.4 billion. Since this tax change eliminates all distortions to savings and investment decisions, our revenue forecast suggests that the tax law in 1983 subsidized savings and investment on average.

We would like to thank Chris Ferrall, Laura Kalambokidis, and Joseph Daniel for careful and able research assistance.

4. This tax change would benefit those in the highest tax brackets, who have large income from financial assets, at the expense of those in lower tax brackets.
5. Either tax change should improve the efficiency of the allocation of existing capital and improve savings incentives.

## 1. INTRODUCTION

The appropriate tax treatment of capital income has been debated for many years among both academics and government officials. Perhaps as a result of this debate, the actual tax treatment of capital income is extremely complicated and has changed frequently. IRAs, pensions, and equivalent plans are taxed as they would be under a cash-flow tax,[1] and the return to owner-occupied housing and consumer durables is tax exempt. Many other types of capital income are taxed, some quite heavily. The asset whose income is probably taxed most heavily is one that pays interest income, where the entire nominal return on the asset is fully taxable each year.

This chapter argues that the simultaneous presence of these differences in the tax treatment of various types of capital income, and differences in personal tax rates, leads to substantial inefficiencies and inequities in the existing tax system. We argue that if these differences in the tax treatment of various types of capital income were eliminated, the tax system would raise more revenue and be less distorting, even if all capital income were made entirely tax exempt.

The problem with the current tax system is that the combination of differences in the tax treatment of different types of capital and differences in personal tax rates inevitably opens up arbitrage opportunities. In a typical case, an individual or a firm in a high tax bracket borrows heavily to buy a lightly taxed or tax-exempt asset and thereby runs a large tax loss on the transaction. Most likely, the interest payments are ultimately received by an individual in a low tax bracket or a tax-exempt entity such as a pension fund. The possibilities for tax arbitrage are many.[2] For example, high-tax-bracket individuals, say in a 50 percent tax bracket, may borrow money at the going market interest rate, of say 8 percent, from lower-tax-bracket individuals, either directly or more likely through a financial

[1] Under a cash-flow tax, investment expenditures would be deductible in the year made, and any future cash flow including revenue from the sale of capital assets would be fully taxable. The government, in effect, acts as a coinvestor, paying some percentage of any expenses and receiving that percentage of the income, and in present value collects no revenue from a marginal investment.

[2] See Steuerle (1985) for an enumeration of various forms of arbitrage.

intermediary, and invest the funds in tax-exempt bonds paying, for example, 6 percent. The interest payments they make on the borrowed funds are tax deductible.[3] The interest payments received by the lower-tax-bracket individuals are taxable, but at a very low tax rate, say 15 percent, so that on net the government loses tax revenue from this transaction. To complete the circle, these lower-tax-bracket individuals could obtain the funds needed to make the loan by having their (low-income) municipality borrow money at the tax-exempt rate and make the funds available to the residents, either through reduced local taxes or through expenditure on goods that local residents would otherwise have purchased directly. Of course, the low-income residents would need to pay the interest on this debt each year. The net result, per dollar of loan, for low-income individuals, high-income individuals, and the government would be as follows:

| Transaction | Return to low-income individual | Return to high-income individual | Government tax revenue |
|---|---|---|---|
| Tax-exempt bond | $-0.06$ | $+0.06$ | 0 |
| Loan | $+0.08(1-0.15)$ | $-0.08(1-0.5)$ | $.08(0.15-0.5)$ |
| Total | 0.008 | 0.02 | $-0.28$ |

As we see, both low- and high-tax-bracket individuals gain through this tax arbitrage, at the expense of the government.

Several provisions have been enacted trying to restrict specific forms of arbitrage. For example, individuals cannot deduct the interest from loans used to purchase municipal bonds. Also, municipalities are now limited in the degree to which they can issue municipal bonds and invest the proceeds *themselves* in taxable bonds, though they can provide the funds to their residents, who then can invest in taxable bonds, as in the preceding example. However, any of these provisions are difficult to enforce, and in any case many other arbitrage possibilities remain. If this tax arbitrage is important enough, the government's attempt to tax capital income could collect little or no revenue, or even (as we find) result in a loss in tax revenue as well as create a host of distortions affecting capital allocation, risk sharing, and saving-and-investment decisions.[4]

[3] The tax law does not allow the deduction of interest on loans where funds are used to buy tax-exempt bonds. This restriction can normally be avoided by using other capital, such as a house, as collateral for the loan.

[4] This point was made strongly in Steuerle (1985). Gordon and Slemrod (1986) focus on arbitrage possibilities available to municipalities.

One objective of this chapter is to provide a preliminary assessment of the importance of tax arbitrage, using data from individual tax returns in 1983 made available to researchers by the Treasury. We focus initially on the tax treatment of interest income, since many types of tax arbitrage involve borrowing to invest in more lightly taxed assets, and attempt to calculate the effect on tax revenue and on the net income of different types of individuals of subjecting to tax real rather than nominal interest income. In the results reported here we find that had this tax change been enacted in 1983, tax revenue would have risen, with the burden of the rise borne heavily by those in higher tax brackets.[5] We also argue that the resulting behavioral responses would have increased revenue further *and* increased efficiency.

We also explore the effects of moving to a modified cash-flow tax in which all forms of capital income from financial assets are made tax exempt, whereas investments in real assets are treated as they would be under a consumption tax.[6] Had these changes been made in 1983, otherwise leaving the tax structure unchanged, government revenue net of interest expense would have increased slightly—we estimate tax revenue would fall very slightly, with a fall in personal taxes just offsetting a rise in corporate taxes, but that the resulting fall in the market interest rate would save the government more than enough in interest payments to offset the net loss in tax revenue. The main beneficiaries from the tax change would be those in the highest income group who have large capital income.

These results do not take into account the effects of the recently enacted tax changes. To some degree, the narrowing of tax rate differentials, the cutback in several tax preference items, and the drop in the inflation rate since 1983 will all reduce the gains from the two tax changes we investigate here. However, the United States is now a large debtor, so any reduction in the interest rate we pay on this debt is now much more important. Data restrictions prevented us from attempting to examine the effects of modifying the current law, so our results that examine the situation in 1983 must be viewed merely as suggestive of what might happen if the changes were made now.

The organization of the chapter is as follows. In section 2 we discuss intuitively what we would expect to happen to the economy if real rather

[5] We are aware of the political obstacles to limiting the full deductibility of nominal mortgage interest payments. This chapter estimates the economic returns to overcoming the political obstacles. In Canada, mortgage interest is not deductible. Whether owner-occupied housing is harmed by such a tax change depends on the degree to which the market interest rate falls in response to the tax change.

[6] Specifically, we allowed expensing of new investments and taxed the cash flow arising from these investments.

than nominal interest income were taxed. In section 3 we then use the available data to forecast the size of the change in tax revenue and in the tax payments by different income groups if real rather than nominal interest were taxed or if a modified cash-flow tax were enacted, all assuming no changes in behavior or in market prices. Then in section 4 we discuss how our forecasts would change when behavioral and price changes are taken into account. Finally, we include a brief discussion of the efficiency effects of these two tax changes, an estimate of the revenue losses from likely transition rules were a cash-flow tax enacted, a discussion of how the situation has changed due to the Tax Reform Act of 1986, and a short summary of the chapter.

## 2. IMPLICATIONS OF CHANGING THE TAXATION OF INTEREST INCOME

It helps to understand the effects of a change in the tax treatment of interest income in the complicated real world if we first think about this tax change in a very simple stylized context. Consider a closed economy in which everyone has the same tax rate and there is no government debt, so all interest payments by one individual represent interest receipts by another individual. If all interest payments are deductible in calculating taxable income, and all interest income is taxable, the interest-related tax base is exactly zero—interest payments exactly offset interest receipts. If all taxpayers face the same tax rate, it follows immediately that tax revenue collected on interest must also be exactly zero. Furthermore, reducing the tax on interest income would not change tax revenue—what is lost in revenue from reducing the tax on interest income is gained in revenue from reducing the deductibility of interest payments. In fact, in response to a tax change the market interest rates would adjust so as to leave the net of tax borrowing and lending rates exactly unchanged. Through this change in the market interest rate, all borrowers and lenders are left unaffected by the tax change, and therefore the bond market continues to clear. This tax change would have no real effects whatsoever.[7]

What if there were government debt as well? In this case, the interest-related tax base becomes positive. Because the government collects revenue on its outstanding debt, it would appear to lose revenue from a reduced tax rate. This is not correct. Because the market interest rate would

[7] This argument depends on the presumption that the Internal Revenue Service could defend the zero tax base against attempts to underreport interest income and generate illegitimate interest deductions. The incentive for this type of evasion would likely depend on both the tax rate on interest income and the difference between this rate and the tax rate on other types of capital income.

adjust to leave the net of tax interest rate unchanged, what the government loses in tax revenue from reducing the tax on the interest received by holders of government bonds, it would gain from paying a lower interest rate to the holders of government bonds. As in the absence of government debt, the change in interest taxation has no real effects on the economy or on government revenue.

Forecasting the effects of this tax change becomes more complicated when certain other factors are introduced. Consider a slightly more realistic example in which there are two assets: bonds, where the nominal income is taxable, and physical capital, where only the real income is taxable. (We assume the inflation rate is positive.) In addition, let different investors face different tax rates. In this setting, we would end up initially with those facing the highest tax rates borrowing from the other individuals to buy all the physical capital—the relatively tax-favored status of physical capital is most valuable to those facing the highest tax rates. Those facing lower tax rates end up lending to both the government and higher-tax-rate individuals. If the tax rate on interest income and the deductibility of interest payments were now reduced, the market interest rate would fall as before, although estimating the size of the fall would be more complicated. If the policy change is large enough, bonds would become the tax-favored asset and portfolio holdings would reverse, so those in the highest tax brackets would lend to both the government and those in the lowest tax brackets, and those in the lowest tax brackets would borrow to buy all the physical capital.

To estimate the effect of reducing the taxation of interest on government revenue, we start by calculating the change in revenue arising from a change in the fraction of interest income and payments that are taxable or tax deductible, assuming no other changes in taxable income. In the foregoing example, this would provide a clear gain in tax revenue. As before, we would, in addition, need to take into account the fall in the market interest rate, which again saves the government revenue, though it changes the size of interest income and interest deductions appearing on individual tax returns. Since the interest deductions are taken by those in high tax brackets, and the interest income is received by those in lower tax brackets, the fall in the market interest rate raises tax revenue further by reducing the gains from tax arbitrage. In addition, however, we would need to take into account any rearrangement of individual portfolios, in this case the possible shift in ownership of physical capital from high- to low-tax-rate individuals, and any change in total savings and physical investment. We will discuss these and other complications in section 4.

Recognizing that the United States is open to international flows of capital also has important implications. If, for example, foreigners own

U.S. bonds on net, then cutting the tax rate on interest income (holding the effective withholding tax on interest paid to foreigners constant) raises more revenue than in the previous example, everything else equal, since to that extent interest deductions on domestic tax returns exceed interest income. Any fall in the market interest rate also lowers the amounts paid in interest to foreigners. In 1983, however, according to the data in the *Survey of current business* foreigners paid $47.9 billion in interest payments to U.S. firms while receiving only $28.9 billion in interest in return. Although on net they received $13.1 billion in interest payments from the federal government, they still would gain from any fall in the interest rate. By 1988, however, the net flows should have reversed.

In addition, when the economy is open, a tax change will cause shifts in foreign versus domestic ownership of assets. Since, by assumption, only domestic residents directly benefit from the reduction in the taxation of interest income, foreign residents will find domestic bonds less attractive after the tax change due to any fall in the interest rate. They therefore will shift funds invested in bonds into other securities, both foreign and domestic. Domestic residents, conversely, will shift out of these other securities into bonds. This rearrangement of portfolios raises tax revenue to the extent that bonds remain more heavily taxed than other assets.

Reducing the taxation of interest income is likely to reduce the welfare of taxpayers at the extremes of the income distribution. Those in the highest tax brackets who are net debtors would find it more expensive to borrow, so they are made worse off. But, in addition, those in the lowest tax brackets may suffer because they would receive a lower interest rate on their positive holdings of bonds, but they do not benefit substantially from the lower tax rates. However, a sizable fraction of the funds invested at low or zero tax rates belong to pension plans that are heavily owned by those in higher tax brackets, so these higher-tax-bracket individuals lose on both counts. All residents benefit indirectly, however, from the gain in government revenue that can be used to finance additional expenditures or to lower tax rates. Aggregate individual losses will be less than the net increase in government revenue to the extent that there is an efficiency gain from the tax change and a gain at the expense of foreigners, who now receive a lower return on their holdings of bonds.

Rather than changing proportionately the fraction of interest income and interest deductions entering into the calculation of taxable income, an alternative would be to restrict solely the fraction of interest deductions allowed.[8] Under this alternative, individuals would save considerable

[8] The Tax Reform Act of 1986 included a variant of this through its provision to restrict interest deductions, other than mortgage interest payments, to investment income. Individuals can

amounts in taxes simply by using their interest-bearing assets to reduce any debts. Individuals still receiving net interest income would find, as under the current law, that bonds are the most heavily taxed asset. Individuals with net interest deductions, however, would find investments in the retirement of outstanding loans to be tax free, therefore among the most lightly taxed assets. These sharp differences in the relative attractiveness of investments in bonds would create particularly large tax arbitrage opportunities, with taxes falling substantially when net lenders exchange bonds with net borrowers in return for almost any other asset. This arbitrage would therefore take the form of those in debt going short in some other asset and using the proceeds to repay their loans. Such transactions do not occur much now, since taxes discourage them, but presumably financial innovations would quickly occur to facilitate this form of tax arbitrage. As a result, it is difficult to forecast with any confidence the implications of such a tax change.

## 3. EXPLORATION OF THE DATA

We begin our study of alternative systems of capital income taxation by first calculating the effects of a tax change assuming no changes in reported income. Thus, we ignore price effects, behavioral responses to the tax change, and changes in income from equity resulting from the changes in the corporate tax law. In section 4, we discuss the likely implications of these complications for our results.

In calculating the effects of a tax change, we use data on the 1983 income tax returns of a representative cross section of 29,821 individuals made available by the Treasury. We forecast how tax revenue and the after-tax income of different types of individuals would have been changed had the 1983 tax law included the proposed modifications, in order to understand the historic effects of the tax treatment of interest income, and of capital income generally.

To provide some sense of the distributional implications of these tax changes, we need a measure of how well off people were initially. One straightforward approach is to use the value of adjusted gross income (AGI) reported on the individual's tax return. A crucial problem with this figure, however, is that it measures in part the extent to which individuals have made use of tax arbitrage to reduce their taxable income—a number of seemingly very rich individuals end up with very low AGI through clever use of the tax law. Academics have normally focused on the present value

get around this restriction, however, to the extent that they can use their interest-bearing assets to repay existing debt, or they can reclassify existing debt as a mortgage. Only to the extent that these simple remedies are insufficient will the following discussion apply.

of lifetime income as a more reasonable measure of economic welfare; a commonly proposed alternative is comprehensive income. Neither can be calculated with any degree of reliability from the existing data. The measure of well-being we employ is our best estimate of labor income.[9] Labor income has the advantage of being relatively stable over an individual's lifetime, so it is highly correlated with a true measure of the present value of the individual's lifetime income. However, labor income will not be an accurate measure of economic position for those who are retired or for those who have yet to enter the labor force full time. We therefore treat separately any households who report a member over age 65 or who indicate on their tax return that they are being claimed as a dependent on someone else's tax return. For purposes of comparison with other studies of the distributional impact of tax law changes, we also report some of the results broken down by AGI brackets instead of by labor income brackets.

In Tables 1–2, we report our estimates of interest income and payments, other capital income, and various other components that enter into the calculation of individual tax liabilities in 1983, by labor income group. Table 1 reports the aggregate figures across returns in each income group, and Table 2 reports the average value per return. (Tables 1*a* and 2*a* report the same figures by AGI brackets.) Given the limited information available from the Treasury, some items had to be estimated. The procedures we employed to make these estimates are described in detail in the appendix. For example, partnership net income, but not the interest deductions of a partnership, was reported in the tax file. To estimate interest deductions, we multiplied reported net income by the ratio of interest deductions to net income observed in the aggregate data in the *1983 statistics of income for partnerships,* doing this separately for partnerships with positive versus negative net income. Also, in constructing the figures for itemized deductions in columns 8 and 9, we defined column 9 as the amount of extra deductions allowed, beyond the standard deduction, due to the availability of all itemized deductions except for interest payments, whereas column 8 measures the additional deduction available due to the deductibility of interest payments. Therefore, the sum of columns 7 and 8 equals the additional deductions taken, beyond the standard deduction, by itemizers.

We also report in column 1 of Tables 3–4 net interest income (income less payments) by labor income group, and in column 2 of Tables 3–4 we report net taxable capital income, defined to equal the sum of net interest income and other capital income, including the capital income component of self-employment income as derived by the procedure described in the

[9] There are some complications in measuring the labor income of the self-employed, which are discussed further in the appendix.

## TABLE 1

*Aggregate Statistics on Income and Tax Payments by Labor Income Group*
*1983 Individual Income Tax Returns (millions of 1983 dollars)*

| Labor income group | Returns | Estimated labor income | Schedule B interest income | Other interest income | Other capital income | Adjustment to income | Adjusted gross income | Schedule A interest deductions |
|---|---|---|---|---|---|---|---|---|
| <20K | 50,105,872 . | 434,457 . | 35,164 . | −14,140 . | 27,064 . | −21,203 . | 461,266 . | 14,737 . |
| 20K–40K | 23,816,452 . | 680,622 . | 18,885 . | −10,093 . | 10,343 . | −25,764 . | 673,918 . | 46,366 . |
| 40K–70K | 8,114,064 . | 402,447 . | 11,838 . | −9,024 . | 11,168 . | −21,925 . | 394,484 . | 37,626 . |
| 70K–100K | 1,028,676 . | 83,481 . | 2,902 . | −3,436 . | 5,345 . | −6,475 . | 81,807 . | 8,400 . |
| >100K | 588,128 . | 102,480 . | 4,889 . | −8,332 . | 16,855 . | −6,497 . | 109,400 . | 9,977 . |
| >Age 65 | 11,239,388 . | 106,453 . | 79,859 . | −6,662 . | 44,542 . | −3,315 . | 220,876 . | 4,722 . |
| Depend. | 913,920 . | 783 . | 2,144 . | 7 . | 1,110 . | −7 . | 4,036 . | 0 . |
| Total | 95,806,480 . | 1,810,721 . | 155,682 . | −51,680 . | 116,427 . | −85,185 . | 1,945,785 . | 121,827 . |

| Labor income group | Other excess deductions | Standard deduc. + exemptions | Taxable income | Tax on taxable income | Surtaxes and credits | Investment tax credit | Total tax liability |
|---|---|---|---|---|---|---|---|
| <20K | 8,702 . | 227,077 . | 360,440 . | 41,116 . | 2,238 . | −704 . | 42,650 . |
| 20K–40K | 16,036 . | 144,914 . | 541,592 . | 85,373 . | 1,337 . | −954 . | 85,756 . |
| 40K–70K | 19,450 . | 54,124 . | 310,635 . | 64,978 . | 1,275 . | −908 . | 65,345 . |
| 70K–100K | 6,816 . | 6,831 . | 63,565 . | 17,752 . | 565 . | −351 . | 17,966 . |
| >100K | 11,254 . | 4,060 . | 86,825 . | 34,260 . | 535 . | −1,093 . | 33,703 . |
| | 18,316 . | 65,077 . | 167,147 . | 34,252 . | 1,093 . | −301 . | 35,044 . |
| >Age 65 | 0 . | 3,016 . | 4,608 . | 417 . | 1 . | −3 . | 415 . |
| Depend. | | | | | | | |
| Total | 80,575 . | 505,099 . | 1,534,811 . | 278,147 . | 7,045 . | −4,314 . | 280,879 . |

1. Returns are classified by labor income, as reported in column 2.

2. Row labeled ">Age 65" includes all returns with at least one age exemption.

3. Row "Depend." includes returns for persons claimed as dependents and having unearned income.

## TABLE 1*a*

*Aggregate Statistics on Income and Tax Payments by Adjusted Gross Income*
*1983 Individual Income Tax Returns (millions of 1983 dollars)*

| AGI group | Returns | Estimated labor income | Schedule B interest income | Other interest income | Other capital income | Adjustment to income | Adjusted gross income | Schedule A interest deductions |
|---|---|---|---|---|---|---|---|---|
| <10K | 34,169,012 . | 152,956 . | 23,644 . | −12,022 . | 6,361 . | −23,494 . | 147,408 . | 2,817 . |
| 10–20K | 24,369,204 . | 329,295 . | 33,720 . | −5,845 . | 8,041 . | −10,254 . | 354,948 . | 9,905 . |
| 20–30K | 16,501,132 . | 388,579 . | 26,540 . | −6,609 . | 9,907 . | −13,337 . | 405,034 . | 22,449 . |
| 30–40K | 10,436,080 . | 345,695 . | 20,762 . | −5,093 . | 10,564 . | −13,317 . | 358,584 . | 27,162 . |
| 40–75K | 8,699,724 . | 419,120 . | 28,004 . | −8,731 . | 20,377 . | −19,247 . | 439,488 . | 40,346 . |
| 75–100K | 803,716 . | 59,538 . | 6,250 . | −2,941 . | 8,190 . | −2,731 . | 68,304 . | 5,997 . |
| >100K | 827,632 . | 115,540 . | 16,761 . | −10,440 . | 52,986 . | −2,806 . | 172,022 . | 13,151 . |
| Total | 95,806,464 . | 1,810,723 . | 155,681 . | −51,680 . | 116,427 . | −85,185 . | 1,945,786 . | 121,827 . |

| AGI group | Other excess deductions | Standard deduc. + exemptions | Taxable income | Tax on taxable income | Surtaxes and credits | Investment tax credit | Total tax liability |
|---|---|---|---|---|---|---|---|
| <10 K | 2,834 . | 147,446 . | 104,987 . | 6,539 . | 518 . | −54 . | 7,003 . |
| 10–20K | 5,763 . | 126,017 . | 280,999 . | 32,048 . | 927 . | −379 . | 32,596 . |
| 20–30K | 8,709 . | 96,772 . | 327,156 . | 47,478 . | 930 . | −650 . | 47,758 . |
| 30–40K | 11,350 . | 66,658 . | 287,073 . | 48,393 . | 697 . | −497 . | 48,593 . |
| 40–75K | 24,979 . | 57,360 . | 345,642 . | 73,775 . | 1,744 . | −871 . | 74,648 . |
| 75–100K | 6,331 . | 5,283 . | 53,402 . | 15,290 . | 508 . | −350 . | 15,448 . |
| >100K | 20,609 . | 5,563 . | 135,554 . | 54,625 . | 1,721 . | −1,513 . | 54,833 . |
| Total | 80,575 . | 505,099 . | 1,534,812 . | 278,147 . | 7,045 . | −4,314 . | 280,879 . |

1. Returns are classified by adjusted gross income, as reported in column 7.

## TABLE 2

*Statistics on Average Income and Tax Payments Per Return by Labor Income Group*
*1983 Individual Income Tax Returns (millions of 1983 dollars)*

| Labor income group | Returns | Estimated labor income | Schedule B interest income | Other interest income | Other capital income | Adjustment to income | Adjusted gross income | Schedule A interest deductions |
|---|---|---|---|---|---|---|---|---|
| <20K | 50,105,872 . | 8,671 . | 702 . | −282 . | 540 . | −423 . | 9,206 . | 294 . |
| 20K–40K | 23,816,452 . | 28,578 . | 793 . | −424 . | 434 . | −1,082 . | 28,296 . | 1,947 . |
| 40K–70K | 8,114,064 . | 49,599 . | 1,459 . | −1,112 . | 1,376 . | −2,702 . | 48,617 . | 4,637 . |
| 70K–100K | 1,028,676 . | 81,153 . | 2,821 . | −3,340 . | 5,196 . | −6,294 . | 79,527 . | 8,166 . |
| >100K | 588,128 . | 174,249 . | 8,314 . | −14,167 . | 28,659 . | −11,046 . | 186,014 . | 16,963 . |
| >Age 65 | 11,239,388 . | 9,471 . | 7,105 . | −593 . | 3,963 . | −295 . | 19,652 . | 420 . |
| Depend. | 913,920 . | 857 . | 2,346 . | 7 . | 1,214 . | −7 . | 4,417 . | 0 . |
| Total | 95,806,480 . | 18,900 . | 1,625 . | −539 . | 1,215 . | −889 . | 20,310 . | 1,272 . |

| Labor income group | Other excess deductions | Standard deduc. + exemptions | Taxable income | Tax on taxable income | Surtaxes and credits | Investment tax credit | Total tax liability |
|---|---|---|---|---|---|---|---|
| <20K | 174 . | 4,532 . | 7,194 . | 821 . | 45 . | −14 . | 851 . |
| 20K–40K | 673 . | 6,085 . | 22,740 . | 3,585 . | 56 . | −40 . | 3,601 . |
| 40K–70K | 2,397 . | 6,670 . | 38,284 . | 8,008 . | 157 . | −112 . | 8,053 . |
| 70K–100K | 6,626 . | 6,640 . | 61,793 . | 17,257 . | 549 . | −341 . | 17,465 . |
| >100K | 19,135 . | 6,904 . | 147,630 . | 58,253 . | 910 . | −1,858 . | 57,306 . |
| >Age 65 | 1,630 . | 5,790 . | 14,872 . | 3,048 . | 97 . | −27 . | 3,118 . |
| Depend. | 0 . | 3,300 . | 5,042 . | 456 . | 1 . | −3 . | 454 . |
| Total | 841 . | 5,272 . | 16,020 . | 2,903 . | 74 . | −45 . | 2,932 . |

1. Returns are classified by labor income, as reported in column 2.

## TABLE 2*a*

*Statistics on Average Income and Tax Payments Per Return by Adjusted Gross Income*
*1983 Individual Income Tax Returns (millions of 1983 dollars)*

| AGI Group | Returns | Estimated labor income | Schedule B interest income | Other interest income | Other capital income | Adjust-ment to income | Adjusted Gross income | Schedule A interest deduc-tions |
|---|---|---|---|---|---|---|---|---|
| <10K | 34,169,012 . | 4,476 . | 692 . | −352 . | 186 . | −688 . | 4,314 . | 82 . |
| 10–20K | 24,369,204 . | 13,513 . | 1,384 . | −240 . | 330 . | −421 . | 14,565 . | 406 . |
| 20–30K | 16,501,132 . | 23,549 . | 1,608 . | −400 . | 600 . | −808 . | 24,546 . | 1,360 . |
| 30–40K | 10,436,080 . | 33,125 . | 1,989 . | −488 . | 1,012 . | −1,276 . | 34,360 . | 2,603 . |
| 40–75K | 8,699,724 . | 48,176 . | 3,219 . | −1,004 . | 2,342 . | −2,212 . | 50,517 . | 4,638 . |
| 75–100K | 803,716 . | 74,079 . | 7,776 . | −3,659 . | 10,190 . | −3,398 . | 84,985 . | 7,462 . |
| >100K | 827,632 . | 139,603 . | 20,252 . | −12,614 . | 64,021 . | −3,391 . | 207,848 . | 15,890 . |
| Total | 95,806,464 . | 18,900 . | 1,625 . | −539 . | 1,215 . | −889 . | 20,310 . | 1,272 . |

| AGI group | Other excess deduc-tions | Standard deduc. + exemptions | Taxable income | Tax on taxable income | Surtaxes and credits | Investment tax credit | Total tax liability |
|---|---|---|---|---|---|---|---|
| <10K | 83 . | 4,315 . | 3,073 . | 191 . | 15 . | −2 . | 205 . |
| 10–20K | 236 . | 5,171 . | 11,531 . | 1,315 . | 38 . | −16 . | 1,338 . |
| 20–30K | 528 . | 5,865 . | 19,826 . | 2,877 . | 56 . | −39 . | 2,894 . |
| 30–40K | 1,088 . | 6,387 . | 27,508 . | 4,637 . | 67 . | −48 . | 4,656 . |
| 40–75K | 2,871 . | 6,593 . | 39,730 . | 8,480 . | 200 . | −100 . | 8,580 . |
| 75–100K | 7,877 . | 6,573 . | 66,443 . | 19,024 . | 632 . | −435 . | 19,221 . |
| >100K | 24,901 . | 6,721 . | 163,786 . | 66,002 . | 2,080 . | −1,828 . | 66,253 . |
| Total | 841 . | 5,272 . | 16,020 . | 2,903 . | 74 . | −45 . | 2,932 . |

1. Returns are classified by adjusted gross income, as reported in column 7.

**TABLE 3**
*Changes in Aggregate Income and Taxes*
*(millions of 1983 dollars)*

| Labor income group | Net interest income | Net capital + interest income | Policy 1: Change in taxable income | Policy 1: Change in total tax liability | Policy 2: Change in taxable income | Policy 2: Change in total tax liability |
|---|---|---|---|---|---|---|
| <20K | 6,287 | 33,351 | −3,036 | −1,038 | −30,037 | −7,156 |
| 20K–40K | −37,574 | −27,231 | 17,048 | 3,570 | 26,649 | 6,150 |
| 40K–70K | −34,812 | −23,644 | 14,334 | 4,392 | 23,569 | 7,755 |
| 70K–100K | −8,934 | −3,589 | 3,517 | 1,393 | 3,539 | 1,465 |
| >100K | −13,420 | 3,435 | 5,326 | 2,401 | −3,254 | −1,044 |
| >Age 65 | 68,475 | 113,017 | −27,361 | −5,924 | −104,778 | −22,086 |
| Depend. | 2,151 | 3,261 | −1,278 | −113 | −4,729 | −329 |
| Total | −17,825 | 98,602 | 8,549 | 4,683 | −89,042 | −15,245 |

1. Policy 1 involves reducing all interest income and deductions by 40 percent.

2. Policy 2 involves eliminating all interest and capital income and deductions (columns 3,4,5,8, and 14 in Table 1 are zeroed out).

appendix. Table 3 reports the aggregate figures, and Table 4 reports the average of these values per return. As can be seen looking at the last row of Table 3, allowing interest payments to be deducted and making interest income taxable results in a drop in aggregate personal taxable income of $17.8 billion. Only individuals in the lowest labor income group, the elderly and dependents, have higher taxable income due to the existing tax treatment of interest income and interest payments.

In fact, we estimate that individuals on their tax returns report $30.0 billion more in interest payments than they report in interest income.[10] If the economy were closed and all interest income and payments were reported on tax returns, then this figure should equal the sum of net corporate and federal government interest payments. In 1983, according to the data in the *Economic report of the president*, net interest payments by the federal government were $94.3 billion, whereas the *1983 statistics of income for corporations* indicates that corporations (including financial institutions) on net received $19.5 billion in interest income. Therefore, net interest payments by the government and corporations together equaled $74.8 billion. Yet we estimate that individuals on net report making interest

[10] Their taxable income falls by only $17.8 billion, however, since those who itemize so as to claim personal interest deductions lose use of the standard deduction.

**TABLE 4**
***Changes in Income and Taxes Per Return***
***(1983 dollars)***

| Labor income group | Net interest income | Net capital + interest income | Policy 1: Change in taxable income | Policy 1: Change in total tax liability | Policy 2: Change in taxable income | Policy 2: Change in total tax liability |
|---|---|---|---|---|---|---|
| <20K | 126 | 666 | −61 | −21 | −600 | −143 |
| 20K–40K | −1,579 | −1,144 | 716 | 150 | 1,119 | 258 |
| 40K–70K | −4,290 | −2,914 | 1,766 | 542 | 2,904 | 956 |
| 70K–100K | −8,685 | −3,489 | 3,419 | 1,355 | 3,441 | 1,424 |
| >100K | −22,816 | 5,843 | 9,055 | 4,082 | −5,534 | −1,775 |
| >Age 65 | 6,092 | 10,055 | −2,435 | −527 | −9,323 | −1,965 |
| Depend. | 2,339 | 3,553 | −1,398 | −123 | −5,174 | −360 |
| Total | −186 | 1,029 | 89 | 49 | −929 | −159 |

1. Policy 1 involves reducing all interest income and deductions by 40 percent.

2. Policy 2 involves eliminating all interest and capital income and deductions (columns 3,4,5,8, and 14 in Table 1 are zeroed out).

payments of $30.0 billion. On net, therefore, interest income of $104.8 billion should be received by a variety of nontaxpaying institutions and individuals, such as pension funds, IRAs, company savings plans, nonprofit organizations, and state and local governments, as well as individuals who do not report interest income or payments because their income is too low, they do not itemize, or they simply evade taxes. These data make clear that a significant amount of tax arbitrage is taking place between taxable and tax exempt entities, perhaps even more than between taxpayers in high and low tax brackets.

In contrast, net capital income of individuals as a group, as reported on their tax returns, is $98.6 billion. As is made clear by Steuerle (1985), this figure is much smaller than the actual real income individuals receive from capital due to a wide variety of provisions in the tax code affecting the definition of taxable income.

### *3.1 The Impact of Taxing Only Real Interest*

We then use these data to forecast the revenue and distributional effects of taxing only real interest payments. As a first step, we ignore any impact of this tax change on the reported capital income figures. We assume that the ratio of the real interest rate to the nominal interest rate is 60 percent, which

was approximately true in 1983.[11] We therefore recalculated tax liabilities under 1983 law, including only 60 percent of reported interest income in taxable income and allowing only 60 percent of reported interest payments as a deduction.[12] The results are reported in columns 3–4 in Tables 3–4. Here, we find that aggregate personal income tax revenue goes up by $4.7 billion, with the extra tax payments being made by the nonelderly in the higher tax brackets.

If such a tax change is imposed throughout the tax code, there would also be a change in corporate tax liabilities. According to the *1983 statistics of income for corporations*, net interest payments by nonfinancial corporations as a whole, excluding Subchapter S corporations, were $96.6 billion.[13] Unfortunately, data on individual corporate tax returns are not available for the calculation of how tax liabilities would change, even ignoring behavioral responses, if the interest deduction were scaled back. Doing so is complicated by the importance of loss carryforwards and carrybacks during this period, which imply that an accurate calculation of the change in a company's income due to some tax change must take into account not only the revenue change in 1983 but also the effects on previous and later tax returns arising from carrybacks or carryforwards of 1983 tax losses. Altshuler and Auerbach (1987), in a careful study using internal data at the Treasury, calculated the effective marginal tax rate on interest deductions during the early 1980s to be 31.8 percent. Therefore, if only 60 percent of interest deductions were allowed, the resulting rise in corporate tax payments, ignoring any changes in prices or behavior, would be $0.4(0.318)(96.6) = \$12.3$ billion. Combining this with the estimated increase

[11] In 1983, the various nominal interest rates ranged from 8.63 percent for Treasury bills to 13.55 percent for Baa corporate bonds, and the inflation rate in the CPI was 3.8 percent.

[12] This procedure used the tax law simulator developed at the Office of Tax Policy Research at the University of Michigan. In recalculating tax liabilities, numerous minor assumptions had to be made to compensate for inadequate data in the tax file. Details concerning our procedure are available from the authors.

[13] One important assumption we make in trying to model such a tax change is that the tax treatment of banks and insurance companies would be left unaffected. The current tax treatment of these institutions involves a variety of specially designed provisions, with the net result being very little tax payments by these companies. We presume that the amount of taxes paid by financial institutions would not be allowed to fall further as part of a tax change that would appear to raise the tax liabilities of the rest of the corporate sector substantially. In modeling this tax change, we therefore make the simplifying assumption that the tax payments by banks and insurance companies would not change, and we focus only on nonfinancial corporations, including real estate.

of $4.7 billion in personal tax payments yields an initial estimate of a $17.0 billion increase in tax revenue from taxing only real interest income.[14]

### *3.2 The Impact of Eliminating All Taxation of Capital Income*

Our next task is to forecast the effects of shifting to a tax system that does not distort savings and capital investment decisions. This can be done either by exempting capital income from tax entirely or by allowing new investments to be expensed and then taxing at ordinary rates any resulting cash flow from the investments, including the sales price if the assets are sold.[15] We implement this tax by first exempting from taxation all financial income from investments (e.g., dividends and capital gains, as well as interest income). For all other real investments, we replace interest deductions, depreciation deductions, and the investment tax credit with a deduction for expenditures on new capital in that year.[16] The details of this procedure are available in the appendix; it is the same procedure used in separating labor income from capital income. Therefore, in forecasting the effects of this tax change, we zero out net capital income, as reported in column 2 of Tables 3–4 or in the sum of columns 3–5 minus column 7 in Tables 1–2, from taxable income and eliminate the investment tax credit. The resulting change in tax payments is shown in column 6 in Tables 3–4. Here, we find that personal tax payments fall by $15.2 billion. On a per-capita basis, the elderly and the highest income group gain considerably. In contrast, those with labor incomes between $20,000 and $100,000 pay more in taxes, since as a group they had negative taxable capital income.

In implementing this tax, we assume that the same shift to a modified cash-flow tax, requiring expensing of new investment, is made under the corporate tax as well.[17] Our basic strategy was to replace depreciation

[14] Attempting a similar calculation for 1982, Steuerle (1985) found that revenue would rise by $29 billion if all interest income and deductions were eliminated from taxation. Steuerle did not provide sufficient information about his procedures to reconcile the differences.

[15] The Treasury's *Blueprints for tax reform*, in describing how a tax that would not distort savings and investment decisions might be implemented, recommended using a combination of these two procedures, giving taxpayers the discretion in most cases concerning the procedure to be used.

[16] In addition, we eliminate the depletion deduction, as would occur under a cash-flow tax.

[17] Under our approach, real assets would be taxed based on their cash flow, but any cash flow from financial assets would be tax exempt. This approach corresponded to the R-base described in the Meade Committee report. Under this type of tax change, there is no important windfall to owners of existing capital, since they continue to face the same tax rate on future income, and there is no change in the taxation of pure profits or any important change in the allocation of risk between investors and the government.

deductions and interest deductions by a deduction equal to the amount of new corporate investment that occurred in 1983 and to eliminate the investment tax credit. A variety of other changes would also be called for in shifting to a cash-flow tax. In particular, expenditures that are amortized should be expensed the same as for depreciable assets. Expenditures on inventories should also be expensed rather than having a deduction made when goods are taken out of inventory. In addition, the depletion deduction should be eliminated. Finally, we eliminate the tax on dividend income and capital gains received by corporations.[18]

On net, we find that under a cash-flow corporate tax, taxable corporate income of nonfinancial corporations would *increase* by $26.8 billion—interest deductions of $96.6 billion would be eliminated, but this change would be mostly offset by allowing expensing rather than depreciation of new investments and by eliminating any tax on financial income. Based on an effective marginal corporate tax rate of 0.318, tax payments by these companies would rise by $8.5 billion. When we also eliminate the investment tax credit and take into account likely changes in foreign tax credits,[19] tax revenue from nonfinancial corporations goes up by $20.8 billion. We further assume that when income from all financial assets is made tax exempt, financial institutions would no longer owe any tax. In 1983, financial institutions paid $7.1 billion in taxes. Therefore, when we take into account the loss of this tax revenue from financial institutions, we forecast that aggregate corporate tax payments would rise by $13.7 billion.

Considering both the corporate and individual taxes, adopting this modified consumption tax leads to a fall in tax revenue of $1.5 billion. This is in contrast to a revenue rise of $17.0 billion if the only change enacted were to tax real rather than nominal interest, a change pushing the tax system much closer to a comprehensive income tax. Note, though, that these calculations assume that the figures reported on the tax returns do not change, whether due to behavioral responses, price changes, or changes in individual income from equity reflecting the corporate tax changes; the calculations also ignore the effect of a drop in the market

[18] A detailed description of our procedure is provided in the appendix.

[19] Historically, U.S. operations abroad have paid little or no taxes upon the repatriation of earnings because enough foreign taxes had been paid on these earnings that the foreign tax credit virtually completely offset any taxes due. We make the conservative assumption that this would continue to be true, even after these tax changes are made, implying that the foreign tax credit should increase to offset any extra taxes due on foreign source income. Since we have no direct data on the size of foreign source income, we assume simply that the foreign tax credit offsets the same percentage of the forecasted change in tax revenue that it does of aggregate tax revenue (precredits) prior to the tax change. Taking this correction into account, we find that corporate tax revenue (precredits) would change by only $6.7 billion rather than by $8.5 billion.

interest rate on government interest payments. Addressing these issues is the objective of the next section.

## 4. IMPLICATIONS OF PRICE AND BEHAVIORAL RESPONSES TO TAX CHANGES

Contrary to the maintained assumption of the previous section, we believe that if either policy were implemented there would be important shifts in portfolios and in rates of return. Furthermore, we have not yet taken into account the losses to individuals arising from the change in corporate tax payments. In this section, we briefly discuss and present some preliminary estimates of how the results in section 3 would change when some of these complications are taken into account.

### *4.1 Incidence of the Increase in Corporate Tax Payments*

In our analysis in section 3 of the distributional impact of these two tax changes, we ignored any impact of changes in corporate tax payments on individuals' pretax income, and the secondary implications of any changes in pretax income on individual tax payments. Since the incidence of the corporate tax is heavily debated, there is no single agreed way to proceed. We adopted the natural starting point of assuming that the losses from these extra corporate taxes are borne by individuals in proportion to their ownership of equity. Since we do not observe asset holdings in the Treasury's file of income tax returns, we also assume that the value of the corporate equity owned by an individual is proportional to his or her dividend income.[20,21]

These changes in equity income are taxable only to the extent that they are received by individuals directly and take the form of dividends or realized capital gains. When we allocate the drop in corporate after-tax income to individuals in proportion to their dividends, we assume that the fraction of this drop in after-tax income that is reflected directly in lower-dividend receipts equals the observed aggregate ratio of dividend income

[20] To the extent that the dividend-price ratio is lower on the equity owned by higher-tax-bracket individuals, our procedure attributes too little of the burden of the increased corporate tax payments to these higher-tax-bracket individuals.

[21] Not all dividends are received by individuals and reported on their tax returns. Pension funds, in particular, are large holders of corporate equity. We assume for simplicity that these pension funds are entirely defined-benefit plans, so any changes in their income are borne by corporations, and so by equity owners, rather than by pension recipients. In attributing all the increased corporate taxes to individual equity holders, however, we ignore other nontaxable owners of equity, for example, foreigners and nonprofit institutions.

**TABLE 5**

***Changes in Aggregate Income and Taxes due to Personal and Corporate Tax Changes (millions of 1983 dollars)***

| Labor income group | Policy 1 | | | Policy 2 | | |
|---|---|---|---|---|---|---|
| | Change in total tax liability | Change in pretax income | Change in after-tax income | Change in total tax liability | Change in pretax income | Change in after-tax income |
| <20K | −1,278 | −2,223 | −945 | −7,156 | −2,475 | 4,681 |
| 20K–40K | 3,430 | −1,046 | −4,476 | 6,150 | −1,165 | −7,315 |
| 40K–70K | 4,235 | −979 | −5,214 | 7,755 | −1,090 | −8,845 |
| 70K–100K | 1,309 | −442 | −1,751 | 1,465 | −492 | −1,957 |
| >100K | 2,194 | −1,012 | −3,206 | −1,044 | −1,127 | −83 |
| >Age 65 | −6,832 | −6,517 | 315 | −22,086 | −7,256 | 14,830 |
| Depend. | −119 | −90 | 29 | −329 | −100 | 229 |
| Total | 2,938 | −12,309 | −15,247 | −15,245 | −13,705 | 1,540 |

1. Policy 1 involves reducing all interest income and deductions by 40 percent.

2. Policy 2 involves eliminating all interest and capital income and deductions (columns 3,4,5,8, and 14 in Table 1 are zeroed out).

of individuals to corporate after-tax profits.[22] The remaining extra corporate tax payments should show up as reduced capital gains to shareholders. We assume arbitrarily that the ratio of realized capital gains to accrued capital gains is 1/4, resulting in an effective accrual-equivalent tax rate on capital gains of 10 percent of the individual's ordinary tax rate.[23]

Tables 5 and 6 take account of our attempt to allocate the changes in corporate tax payments to individuals. Here, we report not only the changes in individual tax payments, which now reflect the changes in dividend income and realized capital gains caused by the higher corporate

[22] According to the *1986 economic report of the president*, 1983 corporate profits after tax, with inventory valuation and capital consumption adjustments, were $136.8 billion, and dividend receipts reported on individual income tax returns totaled $50.4 billion. We assumed that the drop in taxable dividends equaled 36.8 percent (=100×50.4/136.8) of any extra corporate tax payments.

[23] The 1/4 ratio could be obtained, for example, by assuming that half of capital gains escapes taxation by being passed along upon the death of the recipient, and that the effective realization rate is further halved by the discretion shareholders have to postpone realizing capital gains, perhaps to years with lower tax rates, and to hasten realizing capital losses. Because only 40 percent of long-term capital gains were taxable upon realization in 1983, the accrual-equivalent tax rate is (0.25)(0.40), or one-tenth of the ordinary tax rate.

**TABLE 6**
***Changes in Income and Taxes Per Return due to Personal and Corporate Tax Changes (1983 dollars)***

| Labor income group | *Policy 1* | | | *Policy 2* | | |
|---|---|---|---|---|---|---|
| | Change in total tax liability | Change in pretax income | Change in after-tax income | Change in total tax liability | Change in pretax income | Change in after-tax income |
| <20K | −25 | −44 | −19 | −143 | −49 | 94 |
| 20K–40K | 144 | −44 | −188 | 258 | −49 | −307 |
| 40K–70K | 522 | −121 | −643 | 956 | −135 | −1,091 |
| 70K–100K | 1,273 | −430 | −1,703 | 1,424 | −479 | −1,903 |
| >100K | 3,731 | −1,721 | −5,452 | −1,775 | −1,916 | −141 |
| >Age 65 | −608 | −580 | 28 | −1,965 | −646 | 1,319 |
| Depend. | −130 | −99 | 31 | −360 | −110 | 250 |
| Total | 30 | −128 | −158 | −159 | −143 | 16 |

1. Policy 1 involves reducing all interest income and deductions by 40 percent.

2. Policy 2 involves eliminating all interest and capital income and deductions (columns 3,4,5,8, and 14 in Table 1 are zeroed out).

tax payments, but also the changes in pretax income of individuals arising from the drop in their dividend income and capital gains, whether realized or unrealized. The net changes in their after-tax income under the two policy experiments are reported in columns 3 and 6, respectively. Under the tax on real rather than nominal interest income, tax payments fall relative to what was reported in Tables 3–4, since dividend and capital gains income has dropped for all income groups. In aggregate, tax revenue is now forecasted to go up by $2.9 billion rather than by $4.7 billion, as reported earlier. Since, pretax income has fallen in aggregate by the $12.3 billion more that would be paid in corporate taxes, however, we now find that all income groups except the elderly and dependents suffer a drop in after-tax income, with the size of the drop increasing with income.

Under the modified cash-flow tax, the fall in dividend and capital gains income has no effect on tax payments since, under this tax, dividend and capital gains are not taxable anyway. But pretax income falls by the $13.7 billion more paid in corporate taxes. In aggregate, individuals now gain only $1.5 billion. But this aggregate gain is divided very unevenly. In particular, the elderly gain $14.8 billion, dependents and the lowest income group gain, but the intermediate income groups lose.

### 4.2 The Effects of Changes in the Market Interest Rate

Implementing these policies will undoubtedly affect the equilibrium pretax rates of return earned on various assets and result in changes in individual behavior. Any serious attempt to forecast these effects would require an elaborate general equilibrium model, which we do not attempt to construct here.[24] Both types of complications must be considered when estimating the revenue effects of a tax change, but when focusing on the gains or losses to individuals from a tax change, behavioral changes can be ignored, at least when the tax change is small.[25] For example, before the tax change, the individual might borrow to buy more lightly taxed equity until the implicit cost of bearing yet more risk from such a highly leveraged position just offsets the tax savings from further arbitrage. After a small tax change, the individual may modify his or her portfolio slightly, but the gains and losses from doing so still almost exactly offset each other. We therefore focus on the effects of price changes, particularly on the implications of changes in the market interest rate.[26]

What would be a plausible response of the market interest rate if only real interest income were subject to tax? In the new equilibrium, the magnitude of the fall in the interest rate would just balance the decreased demand for loans by investors with above-average tax rates (whose after-tax cost of borrowing rises) and the decreased demand for bonds by foreigners and by investors with below-average tax rates (for both of whom the lower rate of tax does not fully compensate for the fall in the interest rate.) We assume, arbitrarily, that an investor in the 20 percent tax bracket will be left indifferent to the combined effects of the change in the market interest rate and the change in the tax law—those in higher tax brackets will then face higher net borrowing costs, and those in lower tax brackets will face a lower net return on bonds. This implies that if the initial nominal

[24] See Slemrod (1983) for a general equilibrium model with endogenous portfolio decisions. In the construction of such a model, it would be important to take into account the effects of these tax changes on international capital flows. In particular, when interest is taxed less heavily, domestic investors would tend to buy more bonds from foreigners in exchange for other assets.

[25] This useful result from economic theory is often referred to as the envelope condition.

[26] In general, all rates of return will change in response to either policy change. However, it would be difficult to forecast the direction of change in other rates of return, let alone come up with a reasonable guess of the size of the change. For example, it is difficult to forecast the effects of either policy change on aggregate savings, since incentives to save go up for those in high tax brackets, but down for those in low tax brackets, so it is unclear whether aggregate investment goes up or down. Similarly, changes in the relative rates of return earned by different types of capital depend on differences in the degree to which different types of capital are affected by these tax changes. We have chosen in this study to focus only on the effects of changes in interest rates.

interest rate is $r$, the interest rate that must prevail when real interest is taxable, which we denote by $r^1$, will satisfy $(1-0.2)r = [1-(0.2)(0.6)]r^1$. Hence $r^1/r = 0.909$, implying a fall in the nominal interest rate of 9.1 percent. Similarly, if a modified cash-flow tax were introduced, under this assumption the new market interest rate, $r^2$, would satisfy $(1-0.2)r = r^2$, implying a 20 percent fall in the market interest rate.

To the degree that the interest rate falls, the government will pay less in interest on its debt. In particular, according to the *1986 economic report of the president*, the federal government paid on net $94.3 billion in interest. If the nominal interest rate were to fall by 9.1 percent, the government would save $8.6 billion in interest payments; if it fell 20 percent, the savings would be $18.9 billion.[27]

In addition, however, interest income and deductions shrink further on individual and corporate tax forms. Under the first tax proposal, this fall in the market interest rate would cause tax revenue to rise just as it did when we lowered taxable interest income and deductions by statute. In particular, the interest deductions of nonfinancial corporations would shrink by 9.1 percent pretax. Since only 60 percent of these payments are deductible, the tax payments of these corporations would rise by $(0.318)[96.6 - (0.6)(0.909)(96.6)] = \$14.0$ billion, instead of by $12.3 billion. Since these corporations save $(0.091)(96.6) = \$8.8$ billion in interest payments, however, the net drop in their after-tax income is only $5.2 billion.[28] However, financial corporations receive on net $116.5 billion in interest income. If the interest rate falls by 9.1 percent while, by assumption, their tax payments remain unchanged, then their after-tax income falls by $10.6 billion. Therefore, the after-tax income of the corporate sector as a whole falls by $15.8 billion.

Under the modified cash-flow tax, this fall in the market interest rate would not affect corporate tax payments since interest payments are not deductible. However, interest payments by nonfinancial corporations would fall by $(0.2)(\$96.6) = \$19.3$ billion. Since their taxes are still forecasted to rise by $20.8 billion, their after-tax income should fall by $1.5 billion. Applying this same procedure to financial corporations would imply that

[27] We ignore here the fact that some of the existing government debt is noncallable long-term debt, implying that the fall in the market interest rate will not immediately save the government money on this part of its existing debt. Our intention is to capture the effect of the tax change in a representative future year rather than to measure the impact of the tax change in the year of enactment.

[28] As with government debt, some corporation debt is long term, implying to that extent that a fall in the market interest rate may not affect interest payments. However, since much of corporate long-term debt is either at a floating interest rate or callable, the fall in the interest rate should reduce corporate interest payments on all its existing debt very quickly.

**TABLE 7**
***Changes in Aggregate Income and Taxes Due to Personal Tax, Corporate Tax, and Interest Rate Changes (millions of 1983 dollars)***

| | *Policy 1* | | | *Policy 2* | | |
|---|---|---|---|---|---|---|
| Labor income group | Change in total tax liability | Change in pretax income | Change in after-tax income | Change in total tax liability | Change in pretax income | Change in after-tax income |
| <20K | −1,508 | −5,208 | −3,700 | −7,156 | −8,353 | −1,197 |
| 20K–40K | 3,870 | 548 | −3,322 | 6,150 | 2,655 | −3,495 |
| 40K–70K | 4,788 | 735 | −4,053 | 7,755 | 2,976 | −4,779 |
| 70K–100K | 1,462 | −83 | −1,545 | 1,465 | 432 | −1,033 |
| >100K | 2,431 | −630 | −3,061 | −1,044 | 26 | 1,070 |
| >Age 65 | −7,991 | −18,218 | −10,227 | −22,086 | −30,958 | −8,872 |
| Depend. | −135 | −380 | −245 | −329 | −710 | −381 |
| Total | 2,917 | −23,237 | −26,154 | −15,245 | −33,932 | −18,687 |

1. Policy 1 involves reducing all interest income and deductions by 40 percent.

2. Policy 2 involves eliminating all interest and capital income and deductions (columns 3,4,5,8, and 14 in Table 1 are zeroed out).

their before-tax profits would fall by 20 percent of their net interest income of $116.5 billion, or by $23.3 billion. Since their tax payments of $7.1 billion are eliminated under this tax change, the after-tax income of financial corporations falls by $16.2 billion, implying that the after-tax income of the corporate sector as a whole falls by $17.7 billion.

Finally, we calculate how individual tax payments and after-tax income change, now taking into account the drop in the market interest rate. To do this, we take into account the drop in interest receipts and payments reported on individual income tax returns, the change in income from equity due to the increase in corporate taxes, and the implications for individuals of the drop in interest income on any nontaxable holdings of bonds in corporate and state and local pension funds, Keogh and IRA accounts, and the drop in interest income on taxable bonds held directly by state and local governments. The assumptions we make in allocating these changes in interest income to individuals are described in the appendix.

The resulting changes in individual tax payments and after-tax income are reported in Tables 7–8. Here, we find that under the first policy, as a result of the fall in dividends and the increase in state and local taxes, to cover the fall in interest earnings on taxable bonds held by state and local governments, personal tax payments rise by only $2.9 billion. However,

**TABLE 7*a***
***Changes in Aggregate Income and Taxes Due to Personal Tax, Corporate Tax, and Interest Rate Changes (millions of 1983 dollars)***

| Adjusted gross income | *Policy 1* | | | *Policy 2* | | |
|---|---|---|---|---|---|---|
| | Change in total tax liability | Change in pretax income | Change in after-tax income | Change in total tax liability | Change in pretax income | Change in after-tax income |
| <10K | −500 | −2,596 | −2,096 | −625 | −4,631 | −4,006 |
| 10K–20K | −1,239 | −4,591 | −3,352 | −2,123 | −8,394 | −6,271 |
| 20K–30K | 264 | −2,656 | −2,920 | 360 | −4,198 | −4,558 |
| 30K–40K | 1,389 | −2,007 | −3,396 | 2,393 | −2,496 | −4,889 |
| 40K–75K | 2,641 | −3,237 | −5,878 | 3,324 | −3,669 | −6,993 |
| 75K–100K | 279 | −1,438 | −1,717 | −1,128 | −1,866 | −738 |
| >100K | 83 | −6,713 | −6,796 | −17,444 | −8,678 | 8,766 |
| Total | 2,917 | −23,237 | −26,154 | −15,245 | −33,932 | −18,687 |

1. Policy 1 involves reducing all interest income and deductions by 40 percent.

2. Policy 2 involves eliminating all interest and capital income and deductions (columns 3,4,5,8, and 14 in Table 1 are zeroed out).

**TABLE 8**
***Changes in Income and Taxes Per Return Due to Personal Tax, Corporate Tax, and Interest Rate Changes (1983 dollars)***

| Labor income group | *Policy 1* | | | *Policy 2* | | |
|---|---|---|---|---|---|---|
| | Change in total tax liability | Change in pretax income | Change in after-tax income | Change in total tax liability | Change in pretax income | Change in after-tax income |
| <20K | −30 | −104 | −74 | −143 | −166 | −23 |
| 20K–40K | 162 | 23 | −139 | 258 | 111 | −147 |
| 40K–70K | 590 | 90 | −500 | 956 | 366 | −590 |
| 70K–100K | 1,421 | −81 | −1,502 | 1,424 | 420 | −1,004 |
| >100K | 4,133 | −1,071 | −5,204 | −1,775 | 43 | 1,818 |
| >Age 65 | −711 | −1,621 | −910 | −1,965 | −2,755 | −790 |
| Depend. | −148 | −417 | −269 | −360 | −778 | −418 |
| Total | 30 | −242 | −272 | −159 | −354 | −195 |

1. Policy 1 involves reducing all interest income and deductions by 40 percent.

2. Policy 2 involves eliminating all interest and capital income and deductions (columns 3,4,5,8, and 14 in Table 1 are zeroed out).

**TABLE 8*a***
***Changes in Income and Taxes Per Return Due to Personal Tax, Corporate Tax, and Interest Rate Changes (1983 dollars)***

| Adjusted gross income | *Policy 1* | | | *Policy 2* | | |
|---|---|---|---|---|---|---|
| | Change in total tax liability | Change in pretax income | Change in after-tax income | Change in total tax liability | Change in pretax income | Change in after-tax income |
| <10K | −15 | −76 | −61 | −18 | −136 | −118 |
| 10K–20K | −51 | −188 | −137 | −88 | −344 | −256 |
| 20K–30K | 16 | −161 | −177 | 22 | −255 | −277 |
| 30K–40K | 133 | −192 | −325 | 230 | −239 | −469 |
| 40K–75K | 304 | −372 | −676 | 383 | −422 | −805 |
| 75K–100K | 347 | −1,789 | −2,136 | −1,404 | −2,322 | 918 |
| >100K | 100 | −8,111 | −8,211 | −21,077 | −10,486 | 10,591 |
| Total | 30 | −242 | −272 | −159 | −354 | −195 |

1. Policy 1 involves reducing all interest income and deductions by 40 percent.

2. Policy 2 involves eliminating all interest and capital income and deductions (columns 3,4,5,8, and 14 in Table 1 are zeroed out).

individuals also suffer a fall of $23.2 in pretax income, implying that their after-tax income falls by $26.1 billion. By construction, this loss equals the gains to the government and to foreigners—the government now receives $14.0 billion more in corporate tax revenue, $2.9 billion more in personal tax revenue, and saves $8.6 billion in interest payments on its debt, for a total revenue gain of $25.5 billion; foreigners now pay $0.5 billion less in interest on their net debt to U.S. residents.[29] (To the extent that behavioral changes result in an efficiency gain, ignored in deriving these numbers, the losses to individuals would be less than the revenue gains to the government and foreigners.) We still find that all income groups share in this loss, with the burden increasing quickly across labor income groups.

Under the modified cash-flow tax, personal tax payments still fall by $15.2 billion—the change in interest or dividend income does not affect tax liabilities under this tax, though there is a minor change in state and local tax deductions for itemizers. However, pretax income falls by $33.9 billion, and after-tax income falls by $18.7 billion. As in the previous case, this fall reflects the gains to the government and foreigners. The government now receives $13.7 billion in extra corporate taxes, loses $15.2 billion in personal

[29] In each of the examples, rounding error leads to minor variation in the figures.

taxes, but saves $18.9 billion in interest payments, for a net revenue gain of $17.4 billion; foreigners save $1.2 billion in interest payments to U.S. residents. Our figures suggest that all income groups share in this loss except for the highest income group, which gains substantially from the tax change since it has high capital income that is now exempt from tax. Many writers have forecast large efficiency gains from a move to a cash-flow tax, however, and these figures ignore such efficiency gains.

Tables 7*a* and 8*a* provide the same information but are divided among income groups based on initial AGI. These figures are closely consistent with those in Tables 7–8.

### *4.3 Behavioral Responses*

Either of these tax changes should also result in a variety of behavioral responses of both individuals and corporations. When forecasting the revenue effects of these tax changes, one must take these behavioral responses into account.[30]

Under our modified cash-flow tax, however, these behavioral responses will have little or no effect on tax revenue. Under this tax, financial assets are tax exempt, so who owns how much in financial assets has no implications directly for tax revenue. In addition, investments in real assets may change the timing of tax payments, but at least marginal investments should have no impact on the present value of tax revenue under a cash-flow tax. Any capital deepening should raise the wage rate and, therefore, taxable labor income and tax revenue, but only after enough time has passed to allow for significant capital accumulation.

When real rather than nominal interest income is taxed, behavioral responses would likely cause a further rise in tax revenue. To begin with, under this tax change, the portfolio composition of investors should change so as to raise tax revenue. Higher-tax-bracket individuals would reduce their debt to both foreigners and low-tax-bracket investors, and would sell in exchange less heavily taxed assets to these other investors. By domestic investors as a group owning more heavily taxed bonds, shifting some lightly taxed assets to foreigners, tax revenue rises.[31] In addition, rearranging the portfolios of domestic investors, shifting heavily taxed bonds to high-tax-bracket investors and less taxed assets to low-tax-bracket investors, causes tax revenue to rise further.

[30] Although we have argued above that, at least to a first approximation, the welfare implications of behavioral responses can be ignored, their revenue implications need to be taken into account.

[31] This type of international portfolio response to a domestic tax change is examined at greater length in Gordon (1986).

The composition of the capital stock should also change so as to raise tax revenue. Capital should shift out of housing and other lightly taxed assets (including tax shelters) purchased by those in high tax brackets, due to the rise in their opportunity cost of funds, and into a broader range of more heavily taxed assets preferred by those in lower tax brackets, causing a further rise in tax revenue.

The effects of this tax change on the aggregate rate of savings and capital accumulation is less clear. Higher-tax-bracket individuals would now earn a higher after-tax rate of return on bonds, so they would have an increased incentive to save; conversely lower-tax-bracket individuals would face a reduced incentive to save. Aggregate effects are unclear. If the interest rate falls by only 9.1 percent, as we have arbitrarily assumed, then investment incentives of corporations and other higher-tax-bracket investors would fall slightly, but this inference would reverse if the fall in the interest rate were slightly larger.

In addition, the effects of given changes in savings and investment on tax revenue may be small, at least in the short run. We find here that a modified cash-flow tax, in which savings and investment decisions are totally tax exempt at the margin, would collect $17.4 billion more revenue than the existing tax system, thus suggesting that savings and investment are now on average slightly subsidized. If we were to modify the existing tax system by taxing real rather than nominal interest income, then under this revised tax system savings and investment may on average be very slightly taxed; we forecast slightly higher tax revenue when this policy is enacted than when the modified cash-flow tax is enacted. However, since the average tax rate on savings and investment seems to be so small, changes in savings and investment rates should have little effect on tax revenue.

## 5. EFFICIENCY EFFECTS OF CHANGES IN CAPITAL TAXATION

Either of the policy changes we consider will result in behavioral changes that are likely to have a beneficial effect on the efficiency of the economy. By design, the second policy change eliminates all distortions to savings and investment decisions, whereas the first change reduces the tax rate on the most heavily taxed asset toward the effective tax rates on other assets. These efficiency gains would either improve government revenue further or reduce the net loss to individuals. We do not attempt, however, to estimate the size or incidence of these efficiency gains.

Either policy change should cause an improvement in how risk is

allocated among individuals. The current tax system causes the portfolios of high-tax individuals to feature relatively risky claims on real capital and causes the portfolios of low-tax individuals to contain mostly relatively riskless interest-bearing securities. The result is that market risk is borne more heavily by upper-income individuals than is efficient. Taxing only real interest will induce a more efficient spreading of risk by lessening the tax distortions to portfolio composition. Abolishing all taxation of capital income will completely eliminate tax-induced distortions in risk-bearing.

Either policy change would also probably improve the sectoral allocation of real capital. Although our shift to a tax on real rather than nominal interest income still leaves in place various distortions to the composition of capital, it lowers the attractiveness of various tax-sheltered activities. The shift to a modified cash-flow tax eliminates any distortions to the allocation of capital.[32]

Assessing the intertemporal efficiency implications of these tax policies requires two steps: first, to understand how they affect the incentive to postpone consumption until the future; second, to understand whether such incentive changes are desirable. We leave the second step, which has been central to the academic debate on the comprehensive versus consumption tax, aside to focus on the first.

Both policy changes reduce the tax rates on various forms of capital income, suggesting that at the initial interest rate there is an increased incentive to save by individuals but a decrease in the incentive to invest due to the rise in the opportunity cost of funds. As a result, the interest rate has to fall to bring investment and savings (plus net capital inflows from abroad) back into equality. Since in equilibrium the after-tax interest rate will fall for those in low tax brackets and rise for those in high tax brackets, effects on savings and direct investments, in owner-occupied housing, for example, will differ across income groups. Whether, in aggregate, investment rises or falls depends on the interest elasticity of savings plus international capital flows relative to that of investment. At this point, the empirical evidence is not adequate to allow any good forecast.

How might savings and investment increase as a result of changes in the tax treatment of capital income that raise government revenue? One part of the answer lies in distinguishing the average return on a taxpayer's portfolio from the marginal return to an additional dollar of savings. That these measures may be different is best illustrated by an example. Consider

[32] We have argued that under a cash-flow tax, the present value of tax revenue from a marginal investment is zero. As a result, a cash-flow tax should not distort savings or investment decisions. This result assumes, however, that the individual's tax rate is constant over time. When the individual's tax rate changes over time, there will still be some distortion to savings and investment decisions.

a high-tax-bracket taxpayer in an inflationary environment. The real after-tax return on bonds, and therefore the real cost of borrowing, may very well be negative. Suppose the taxpayer can borrow to buy equity until, at the margin, the higher expected return on equity is just offset by the implicit extra cost of holding an even riskier portfolio. Then, when this individual considers saving more, the available return on equity, taking into account the extra risk-bearing cost, just equals the available after-tax real rate of return on bonds. Given taxes on nominal interest income, this net return can be very low even though the average return on the individual's portfolio, ignoring the costs of risk bearing, can be very high. Through borrowing to buy equity, this taxpayer gains on inframarginal arbitrage and is left indifferent at the margin, whereas the arbitrage results in a loss of tax revenue. In this context, cutting the tax rate on interest income increases the cost of borrowing and causes a reduction in the amount of such arbitrage and a gain in tax revenue from this individual. However, in spite of these higher tax payments, the individual faces an increased marginal incentive to save.

The after-tax return on bonds does not reflect the marginal return to saving if arbitrage gains are limited by a borrowing constraint that is tied to wealth. In this case, saving an additional dollar relaxes the borrowing constraint by some amount. The value to the individual of this relaxation of the borrowing constraint should be included in the marginal return to saving.

## 6. TRANSITION LOSSES

Our calculations of the revenue effects of shifting to a modified cash-flow tax involve replacing depreciation, amortization, depletion, and inventory deductions that took place under the 1983 law with those that would take place under a cash-flow tax. If a cash-flow tax had first been introduced in 1983, however, presumably businesses would have been allowed to continue to take deductions on existing assets, even as they expense new purchases of assets. Only when the allowed deductions on existing assets are fully exhausted, therefore, would tax revenue equal the figure we report. During the transition period, it would be lower as businesses continue to depreciate and amortize old capital at the same time as they expense new capital.

To calculate the net revenue effects of shifting to a cash-flow tax, we therefore should take into account these likely revenue losses during the transition period as well as the revenue gains that occur later. The size of these transition losses would depend on the transition rules built into any piece of legislation. Measuring their importance relative to the long-run

revenue gain also depends on assumptions about discount rates and growth rates that determine the relative importance of the one-time revenue loss and the permanent revenue gain.

In the appendix, we provide a rough calculation of the present value of these transition losses compared with the present value of the long-run revenue gains. In doing so, we assume that depreciation and amortization deductions continue on existing capital under the previous formulae and that depletion deductions cease with the enactment of the new law. We also presume that existing stocks of inventories can eventually be written off even as deductions are taken for new additions to inventories, but that the transition rules will delay these write-offs on average for five years.

Under these assumptions, we find that the long-run revenue gains in present value are more than double the revenue losses that occur due to plausible transition rules, though the exact relation will be quite sensitive to a variety of the assumed parameter values. On average, therefore, new savings and investment are slightly subsidized during the time period even if they were taxed at the margin.[33]

## 7. THE TAX REFORM ACT OF 1986

All of our results describe the effects of possible changes to the tax law of 1983. Of course, since 1983 major changes in the tax law have been enacted. Several features of the Tax Reform Act of 1986 move the tax law in the direction suggested by this study. The findings of this chapter indicate that the gains from the move in this direction may be substantial, and that further moves in that direction are likely to be beneficial as well.

Among the changes made in the tax law that reduce the revenue loss from tax arbitrage are the following:

1. Flattening the dispersion of individual's marginal tax rates and lowering the statutory corporate tax rate.
2. Fully taxing capital gains.[34]
3. Reducing the dispersion in the effective tax rates on real capital by eliminating the investment tax credit and decelerating depreciation allowances for real estate.

[33] Although we forecast that tax revenue increases in present value with this shift to a modified cash-flow tax, even taking plausible transition rules into account, however, tax revenue would drop substantially initially as new investments are expensed and old assets continue to be depreciated.

[34] This change in the capital gains tax also reduces the attractiveness of churning assets to increase depreciation deductions. See Gordon, Hines, and Summers (1986) for further discussion.

4. Directly reducing arbitrage opportunities for state and local governments.

In addition, the drop in the nominal interest rate through the reduction in the inflation rate makes tax arbitrage less valuable and less important.

## 8. CONCLUSIONS

By 1983 the arbitrage possibilities inherent in our system of differentially taxing different individuals and different forms of capital income had grown so large that abandoning entirely any attempt to tax capital income while leaving the tax law otherwise unchanged would have resulted in a slight rise in government revenue. Many have argued that this change would provide an important improvement in efficiency. Here, we find that the main beneficiaries of such a tax change would be those in the highest income group who have very large capital incomes. Our estimates do not take into account, however, the distributional effects of either the increased government revenue or the efficiency gains.

A more modest change in the system of capital income taxation, subjecting real rather than nominal interest to taxation, would lead to an even larger increase in revenue and should also provide an efficiency gain, all at the expense mainly of those in upper tax brackets. (Again, however, our figures ignore the incidence of the extra government revenue or the efficiency gains.) Although our data do not allow us to test it, we also believe that a move to a comprehensive income tax, where all real capital income and not just real interest income is fully taxed, would have similar beneficial effects.

Arbitrage opportunities disappear whenever all forms of capital income are taxed uniformly,[35] whether they are all tax exempt, as under a cash-flow tax, or all subject to the same tax rate as labor income, as under a comprehensive income tax. Our results suggest that, given the tax system that existed in 1983, *any* move toward more uniform tax rates on real capital income would raise revenue and improve efficiency, whether the uniform tax rate is zero, as under a consumption tax, or equal to each individual's tax rate on labor income, as would occur under a comprehensive income tax.

[35] Arbitrage opportunities also disappear if everyone is in the same tax bracket—in this case, the relative before-tax rates of return on different assets adjust to equalize all after-tax rates of return.

## *Appendix*

The data available to us on the Treasury's file of individual tax returns did not include all the information necessary to calculate interest income and payments, to calculate cash flow from corporations, to separately identify labor versus capital income, to calculate the ownership pattern of nontaxed interest-bearing assets, and to calculate the likely transition losses were a cash-flow tax enacted. To circumvent these problems with missing data, we used the following procedures.

***Calculation of Interest Income and Payments.*** The tax file includes interest income reported on form 1040 or Schedule B and itemized interest deductions reported on Schedule A. However, individuals can also report interest deductions or receipts in a variety of other places in their tax returns. In each case, we used information from the published *Statistics of income* data to estimate the likely size of these figures for each tax return. The procedures used varied by tax form.

For example, net partnership income is reported on the tax file data set, but there is no detail provided about the various sources of income or deductions used in calculating net income. However, in the *1983 statistics of income* are reported aggregate figures for interest income, interest deductions, and net income for partnerships in that year. The data are reported separately for partnerships with positive net income and negative net income. To estimate net interest, we first calculated the ratio of aggregate net interest received to aggregate net income separately for partnerships with net profits and losses; we then multiplied the reported net partnership income by the appropriate ratio. Because the data for 1983 report only the sum of interest and dividend income, and not interest separately, we calculated interest income as a fraction of total interest and dividends in 1981 (when they were reported separately), then multiplied the 1983 figure by this ratio to produce an estimate of interest income in that year.

In addition, net income reported for partnerships from rental property and from farming are themselves taken from separate schedules filed by the partnership. Underlying these net income figures are various income and deduction figures, including interest deductions, which are not reported in the *Statistics of income* data. In these cases, we assume that these interest deductions are the same fraction of net income that we estimate for rental property and farms using the procedures described below.

Finally, partnerships report some net income and losses from other partnerships and fiduciaries. We assumed that the ratio of net interest payments to net income was the same for this income as for other partnership income, and we solved algebraically for the appropriate ratios.

The same method was used for estates and trusts, which received income from partnerships and real estate.

The same basic procedure was followed for Subchapter S corporations, using the *1983 statistics of income* data on corporate returns of active small business corporations, and the 1982 data on the breakdown of interest versus dividend income; here, however, we had one ratio for all Subchapter S corporations rather than separate ratios for those with profits versus losses. For Schedule C income, the same procedure was employed, using data reported in the *1981 statistics of income for sole proprietorship returns* for nonfarm sole proprietorships. For Schedule E rental income, we used the data on interest payments and net income in 1983 from partnerships in a subset of the real estate industry including "operators and lessors of buildings" and "lessors, other than buildings." For estates and trusts, we used information from the *Statistics of income* data for 1982 on the fraction of estate and trust income coming from interest income. Finally, for Schedule F income, we used information from the *1980 Statistics of income* for sole proprietorships in farming.

***Calculation of Labor Income.*** The text uses labor income as a classifier for presenting the distributional impact of taxation and as the tax base for policy simulation. Our procedure for calculating labor income with the data base available to us is described below.

We defined labor income to equal the sum of wages and salaries, unemployment compensation, and pension income (since this is a fringe benefit omitted from the wage and salary figures) minus employee business expenses. The principal conceptual problem arises in the case of self-employed individuals, where the reported income from self-employment includes a return to both labor and capital. Income from self-employment could be reported on Schedules C, E, or F. In these cases, we calculated the income from self-employment as it would be under a cash-flow tax. In particular, we estimated the amount of new investment that year and allowed this amount as an expense, but disallowed depreciation and net interest deductions.

This approach provides a tax base that does not distort new investment decisions. However, it provides only a rough measure of labor income. To measure labor income directly, we would like to subtract an estimate of capital income from total income. If the complicated tax treatment of a particular type of capital in 1983 can be summarized by an equivalent tax on economic income at some rate $\tau$, then (by construction) the gross income earned by that capital would equal $[r/(1 - \tau) + \delta]K$, where $\delta$ is the economic depreciation rate, $r$ is the real opportunity cost of funds, and $K$ is the real

capital stock.[36] In contrast, if the real capital stock is growing at some constant rate $g$, then new investment expenditures would equal $(g + \delta)K$. Our approach therefore provides a good approximation of labor income to the degree that $g \approx r/(1 - \tau)$. Given the widely varying approaches used in estimating the real opportunity cost of funds, and the widely varying estimates of the effective tax rate on capital, it is difficult to judge the quality of this approximation.[37]

The only data in the tax file helpful for estimating cash flow is net income from each of these schedules. We proceeded by estimating from aggregate data the ratio of the cash flow to the net income for each type of business; we then multiplied each net income figure in the tax files by the appropriate aggregate ratio. In measuring cash flow, we started with net income, then eliminated interest, depletion, and depreciation deductions, and replaced them with a deduction for the estimated value of new investments.

The key problem is estimating new investment expenditures. The best procedure we came up with was to assume that the ratio for corporations of new investment expenditures to depreciation deductions would have the same value for noncorporate firms. The general strategy was to estimate investment expenditures for each group of noncorporate firms by the depreciation deductions taken by this group of firms multiplied by the ratio in the previous sentence. In fact, we constructed two ratios: one for corporations as a whole, and one for corporations in the real estate industry. We used the second ratio to estimate the investment expenditures for noncorporate real estate firms and for partnerships with losses, since most of these losses arose from firms in the real estate industry. The first ratio was used in all other cases.

This procedure should slightly overestimate investment expenditures to the degree that noncorporate firms expense investment expenditures more frequently under section 176, or overestimate their depreciation deductions, as suggested by the figure for misreporting appearing in Table 8.10 in the July 1987 *Survey of current business*. When we used our procedure to forecast total new noncorporate investment from the net income figures reported in the tax returns, our estimate was about 20 percent larger than the investment figure reported by NIPA for noncorporate and farm capital expenditures. Therefore, our procedure should slightly overestimate the

[36] See, for example, Auerbach (1983) for a use of this approach in defining the effective income tax rate.

[37] A clear difference arises in the case of land, since there is no new investment in land, but investments in land earn a return.

revenue loss from shifting to taxing cash flow under the personal income tax.

In defining labor income for partnerships, we then constructed ratios of cash flow to net income from the aggregate data, doing this separately for partnerships with profits or losses, and we multiplied the net income figures reported in the individual tax returns by the appropriate ratio to estimate the labor income from these partnerships. One problem encountered was that the *1983 statistics of income for partnerships* reported depreciation deductions only for all partnerships, for all real estate partnerships, and for all farm partnerships without differentiating between partnerships with profits or losses. We therefore used balance sheet data from 1982 for firms with profits and losses,[38] along with this information on total depreciation deductions, to estimate the depreciation deductions separately for firms with profits and losses.[39]

For rental income from Schedule E, we used the same procedure described earlier to calculate the ratio of new investment expenditures minus depreciation and depletion deductions to net income, but we restricted the procedure to data on real estate partnerships. For Subchapter S corporations, the equivalent procedure was used based on the data reported in the *1983 statistics of income for corporations*. For Schedule C, we used the ratios of new investment expenditures minus depreciation to net income found for partnerships. Finally, for farms we used the ratios of new investment expenditures minus depreciation to net income found for farm partnerships.

These estimates of labor and capital income for 1983 may not be representative of their normal values, given the severe recession that was occurring in 1983. Under our procedure for dividing observed net income between labor and capital components, any drop in new investment in capital or in inventories in 1983 relative to their normal values will result in an unusually low estimate of capital income, whereas any drop in sales revenue relative to other expenses will result in an unusually low estimate of labor income. It is difficult to judge whether our procedure provides a

[38] Balance sheet data were not available for 1983.

[39] In particular, for partnerships in farming and real estate, we assumed that the depreciation deductions in 1983 for firms with profits versus losses would be proportional to the book capital stocks in 1982 for firms with profits versus losses. For partnerships as a whole, we formed an initial forecast for the depreciation deductions for firms with profits versus losses, then divided the observed total depreciation deduction in 1983 in proportion to these two estimates. For firms with losses, our initial forecast equaled the product of the book capital stock in 1982 for these firms and the ratio of depreciation deductions to book value for real estate firms in 1982. (The real estate industry generated a large fraction of total partnership losses.) For firms with profits, our initial estimate equaled the remaining depreciation deductions taken by all firms in 1982.

misleading estimate of the normal percentage breakdown between labor and capital income.

***Calculation of the Cash Flow from Corporations.*** Under the version of a cash-flow tax we consider, real assets are taxed based on their cash flow, but cash flow from financial assets is made tax exempt. In calculating the resulting cash-flow tax base for corporations, we proceeded as follows.

To begin with, we eliminated net interest payments, and net capital gains, from net taxable income. Here, capital gains are measured by capital gains taxable at ordinary rates plus 28/46 percent of capital gains taxable at the alternative rate of 28 percent.[40] In addition, we eliminated net dividend income from taxable income, where net dividend income is defined to equal domestic dividends minus the dividends received deduction minus the public utility dividend paid deduction.[41] We also eliminated depletion allowances from taxable income, since they are not justified by any cash flow.

Next, we replaced depreciation and amortization deductions by a deduction for investment expenditures. Note, however, that, under a cash-flow tax, when used capital is sold from one firm to another, the purchasing firm would deduct the purchase cost of the acquired capital, but the selling firm would be taxed on the entire proceeds from the sale of the capital. As long as both firms faced the same tax rate, the net tax effects would exactly offset. Therefore the cash-flow tax base can be measured either by deducting expenditures on *new* capital and exempting all capital gains or by deducting all investment expenditures but adding the entire proceeds from the sale of used assets into the tax base. We adopted the first approach.

Our measure of new investment expenditures was based on the figure for nonfarm nonfinancial corporate capital expenditures in 1983 reported in the July 1987 *Survey of current business*. However, we eliminated the inventory investment component of this figure, since we deal with inventories separately. In addition, our industry definition included farms but not Subchapter S corporations, so we estimated new investment within our industry definition by multiplying the reported figure by the ratio of depreciation deductions taken within our set of industries to depreciation deductions reported in nonfarm nonfinancial industries. Finally, the set of capital investments included in the published figure differs slightly from

[40] Capital gains from the sale of financial assets but not real assets would be eliminated under our definition of the tax base. However, as we describe later, since we measure investment expenditures by expenditures only on *new* investment, we need to eliminate capital gains from the sale of real assets from the tax base as well.

[41] Under a cash-flow tax, either this income is tax exempt or it is taxable but the firm paying the dividend gets to deduct this payment; we adopted the first approach.

**TABLE A1**
*Changes in Corporate Taxable Income in 1983 under a Cash-Flow Tax (billions of 1983 dollars)*

| | |
|---|---|
| + Net interest payments | 96.6 |
| + Depletion allowances | 7.4 |
| + Depreciation deductions | 218.0 |
| + Amortization | 3.4 |
| − New investment expenditures | 259.0 |
| − Net dividend income | 7.7 |
| − Net capital gains | 17.3 |
| − Inventory expend. − deduct. | 14.6 |
| = Net change in taxable income | 26.8 |
| + Investment tax credit (ITC) | 15.2 |
| − Tax on recapture of ITC | 1.1 |
| = Net ITC payments | 14.1 |

the set that is depreciated on the tax forms. For example, investments in foreign branches are depreciated but are omitted from the NIPA figure, whereas various mining expenditures are not depreciated but do appear in the NIPA figure. To make this correction, we multiplied the published figure by the ratio of corporate depreciation deductions on the tax forms to the NIPA figure for depreciation, before adjustment, as reported in Table 8.10 in the July 1987 *Survey of current business*. This yielded an estimate of new investment of $259.0, compared with the published figure of $274.9.

Our final step in developing a measure of cash flow dealt with the treatment of inventories. Under a cash-flow tax, expenditures on inventories would be deductible, but under the existing tax some valuation of withdrawals from inventory is deductible. These two differ on average because withdrawals from inventory are priced using older prices, and because of any growth in the size of inventories, due to purchases exceeding withdrawals. The difference between expenditures on inventories and accounting withdrawals in a year equals the change in the inventory balance sheet during that year. We therefore allowed the difference between the balance sheet inventory in 1983 and 1982 as a further deduction.

The resulting changes in taxable income are listed in Table A1. We estimate that net taxable income under a cash-flow tax would be $41.3 billion dollars higher than net taxable income under the 1983 law. In addition, under a cash-flow tax the investment tax credit would be eliminated. Investment tax credits taken in 1983 minus the taxes collected

from the recapture of previous tax credit payments equaled $14.1 billion dollars.[42]

***Calculation of Implicit Ownership of Nontaxable Interest-Bearing Assets.*** In the text, we found that the net interest payments of the government and of individuals and corporations as reported in their tax returns totaled $104.8 billion. Since foreigners paid on net $5.9 billion in interest to U.S. residents, U.S. residents must have received in total $110.7 in interest income in one of a variety of forms that do not directly show up as taxable income of individuals or corporations. When analyzing the distributional effects of the two tax changes, taking into account the effects of the resulting drop in the market interest rate, we therefore face the problem of calculating the incidence among different types of individuals of the drop in this nontaxable interest income.

To do this, we first estimate the interest receipts of corporate pensions by extrapolating from 1980 to 1983 the information about the bond holdings of pensions reported in Kotlikoff-Smith (1983), and applying the market interest rate for Aaa bonds in 1983. We forecast that these pension plans received $45.0 billion in interest income in 1983. Of that total, we assume that three-quarters of the income accrues to defined benefit plans and one-quarter to defined contribution plans. (According to Kotlikoff-Smith, participants in defined benefit plans outnumber participants in defined contribution plans by 3 to 1.) For defined benefit plans, we assume that the benefits are indeed defined by the plan, so any change in the earnings received by these plans accrues to corporate shareholders. This change is assigned to individuals in proportion to their dividend receipts and changes their taxable income in the same way as described when we allocated changes in corporate tax payments. The change in interest receipts of defined contribution plans is assumed to be borne by individuals in proportion to their wage and salary income, but does not affect their taxable income.

State and local governments owned $271.8 billion of taxable debt securities in 1983. By assigning market interest rates separately to their holdings of time deposits, government bonds, and mortgages, we estimate their interest income to be $30.0 billion. We assume that a decline in the interest income of state and local governments will be reflected in increased tax levies on individuals. Thus, we increased the state and local tax payments of itemizers proportionately, assuming that the fraction of the tax increase

[42] To the degree that firms are unusually constrained by low profits in 1983 from receiving a credit on all qualified investments, this figure will be too low—more unused credits available from 1983 investments will be carried backward or forward and eventually received than have been carried forward into 1983 from past years.

borne by itemizers equals the ratio of the AGI of itemizers to aggregate AGI, which in our sample is 60 percent. The pretax income of nonitemizers is assumed to change in proportion to their federal tax liability, the proportion being chosen to total in aggregate 40 percent of the change in state and local interest income.

The remaining $35.7 billion of net interest income represents a variety of situations, including underreported receipts, receipts of nonfilers, dividends of interest-receiving mutual funds, receipts of nonprofit organizations, and receipts through IRA and Keogh plans. Rather than attempt a detailed assignment of the effects of interest rate changes in each situation, we assumed that the change in interest receipts earned through these sources is borne in proportion to individuals' Schedule B interest receipts and will not be part of taxable income.

***Transition Tax Losses under a Cash-Flow Tax versus Long-Run Revenue Gains.*** We assume that upon enactment of a cash-flow tax, businesses would be allowed to continue to depreciate and amortize existing capital. We therefore attempt to calculate the present value of the tax loss due to these deductions. In addition, we need to calculate the tax loss from the write-off of existing stocks of inventories.

First consider depreciation deductions. Corporate depreciation deductions on existing capital in 1982 were $194.7 billion. We assume for simplicity that nominal investment has been growing smoothly at rate $g$, a constant percent $s$ of new investment is in structures, the tax depreciation rate on equipment can be approximated by exponential depreciation of 40 percent per year, and tax depreciation of structures can be approximated by exponential depreciation at 10 percent per year.[43] If new investment in 1982 is $I$, then depreciation deductions that year should satisfy

$$0.1 \int_0^\infty sIe^{-(g+0.1)t}\,dt + 0.4 \int_0^\infty (1 - s)Ie^{-(g+0.4)t}\,dt = 194.7.$$

Given estimates of the various parameters, we then solved this equation for $I$. We set $g$ equal to the nominal growth rate in investment expenditures between 1962 and 1982, which equaled 0.102, and we set $s$ equal to the average fraction of new investment that went into structures during the previous 10 years, which came out to 0.361; together these parameters imply an estimate of $I$ of $283.0 billion, which is quite close to the value of

[43] This assumes that the actual law can be well approximated by double declining balance depreciation with lifetimes of five years for equipment and twenty years for structures. Allowed depreciation rates were somewhat slower, but there was a compensating switch to straight-line depreciation.

$259.0 observed in the data. The discounted present value of future depreciation deductions equals[44]

$$0.1 \int_0^\infty e^{-(i+0.1)\tau} \left[ e^{-0.05} \int_0^\infty sIe^{-(g+0.1)t}\, dt \right] d\tau$$

$$+ 0.4 \int_0^\infty e^{-(i+0.4)\tau} \left[ e^{-0.2} \int_0^\infty (1 - s)Ie^{-(g+0.4)t}\, dt \right] d\tau,$$

where $i$ is the nominal discount rate. We set this rate equal to 0.088, using a before-tax nominal longer-term interest rate in 1983 of 0.11 and a tax rate of 0.2. Given this rate, the present value of future depreciation deductions equals $497.6 billion.

In 1982, partnerships and Subchapter S corporations together took depreciation deductions of $38.9 billion, whereas in 1980 proprietorships took $25.8 billion in depreciation. Ignoring changes between 1980 and 1982, we found that total noncorporate depreciation deductions in 1982 were $64.7 billion. Using the same procedure, we forecast that the present value of depreciation deductions on the existing noncorporate capital would be $165.4 billion.

In 1982, corporations claimed $3.3 billion in amortization deductions. If these intangible assets are all depreciated using a straight-line formula over five years, and investment in these assets was equal in the previous five years, then the present value of future amortization deductions on existing intangible capital would be $\sum_0^4 (0.8 - 0.2t)3.3/(1 + i)^t$. If $i = 0.88$, this expression equals $6.1 billion. Amortization by noncorporate firms was trivial, so we ignore it.

The stock of corporate inventories at the end of 1982 was $538.1 billion. After a shift to a cash-flow tax, we assume that corporations will be allowed to gradually write off existing inventories at the same time that they are deducting all new purchases of inventories. In particular, we assume that 20 percent of the remaining stock of inventories will be deducted each year, implying that the present value of inventory deductions from existing stocks will be $0.2 \int_0^\infty 538.1e^{-(0.2+i)t}\, dt$. Given $i = 0.088$, this comes out to $373.7 billion. Similarly, partnerships had an inventory stock of $100.7 billion in 1982. Using the same procedure, we find that the present value of their inventory deductions would be $69.9 billion.

[44] The depreciation taken in 1982 equals approximately the integrated amount during the time interval −.5 to .5. In calculating later depreciation, we therefore start at time .5, so aged the capital stock half a year using the terms $e^{-.05}$ and $e^{-.2}$.

Therefore, the transitory tax losses from depreciation, amortization, and inventory deductions would equal $0.318(497.6 + 6.1 + 373.7) + m(165.4 + 69.9)$, where $m$ equals the average marginal tax rate faced by noncorporate firms. Estimating $m$ to be 0.219, we obtain a one-time revenue loss of $329.8 billion.

In contrast, ignoring these transitory losses, we forecast that the revenue gain from this tax change would be $17.4 billion in 1983, and in future years would be larger in nominal terms due to real growth in the economy as well as due to inflation. The discounted present value of these revenue gains would therefore be $\int_0^\infty 17.4e^{-(i-\pi-\theta)t}\,dt$, where $\pi$ is the inflation rate and $\theta$ is the growth rate of the economy. In 1983, the inflation rate was 0.038 while the average growth rate in real GNP from 1963 to 1983 was 0.028. Together, these figures imply that the present value of revenue gains equals $790.9 billion, which substantially exceeds the one-time revenue loss in the transition to a cash-flow tax.

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