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ABSTRACT

Model simulations are run to obtain a range of realistic estimates of the long-run revenue impact of a capital-gains tax-rate cut to a maximum of 15 percent. The basic vehicle for the simulations is a slightly modified version of the Galper-Lucke-Toder (GLT) general equilibrium model. The key behavioral assumptions affecting the estimates are: (1) the portfolio and tangible capital reallocations implicit in the structure of the GLT model, (2) corporate payouts responses based on recent empirical estimates, and (3) illustrative noncorporate recharacterizations of regular income as capital gains.

The essential message of this paper is that the strong emphasis in the literation on the realization response to a capital gains tax rate cut has been appropriate. The payout/recharacterization and portfolio redistribution/reallocation effects do not appear to be large. Moreover, the portfolio responses, within the context of the GLT model, act to raise tax revenues (substitution of taxable business capital for taxfree household and state and local capital), not lower them as has been conjectured. Thus these responses offset the payout/recharacterization effects, leaving the realization response as basically the total response. Future research could, of course, modify this finding.

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The Long-Run Impact on Federal Tax Revenues and Capital Allocation of a Cut in the Capital Gains Tax Rate*

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How a capital gains tax rate cut affects federal tax revenues has dominated recent discussion of capital gains taxation. No matter how appropriate a cut might be in terms of increasing economic efficiency, if a cut decreases tax revenues, it is unlikely to be implemented. Conversely, no matter how inappropriate a cut might be from an equity perspective, if a cut increases tax revenues, it is likely to be adopted. The issue is whether behavioral responses are sufficient to offset the direct reduction in revenues caused by the rate cut. The existing literature provides no clear answer (see Auerbach, 1988, Cook and O'Hare, 1987, and Toder and Ozanne, 1988, for reviews).

The empirical literature concentrates on the realizations response (Lindsey, 1987ab and the above references), which is certainly the most important if one is concerned with the impact of capital gains tax rate changes on capital gains tax revenues only. However, other responses must be considered if one is concerned with the wider impact on total federal capital income tax revenues. While capital gains will be realized more quickly if the gains rate is cut, less corporate income will be paid as "dividends" and more as capital gains (Poterba, 1987). Moreover, owners of noncorporate enterprises may characterize less of capital income (or of their personal labor income) as current income and more as capital gains. These responses further increase capital gains revenues but decrease total tax revenues from capital income. In addition, a lower gains rate will lead households to realign their asset portfolios and will induce a reallocation

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of the underlying tangible capital stock. While these indirect responses have usually been viewed as lowering total capital income tax revenues (Cook and O'Hare, 1987, and Toder and Ozanne, 1988), the responses can just as well raise revenues and, in fact, do so in our simulations.

In the short run, a capital gains tax cut will almost certainly raise tax revenues. The two revenue-losing or potentially losing responses, the redirection of income from dividends to capital gains and the reallocations of portfolios and tangible capital stocks, will occur gradually. Thus the dominant response will be an increase in realizations. More important, the initial increase in realizations will vastly exceed the long-run increase, owing to the one-time unlocking of existing capital gains, if the previous higher rate had been in place for a lengthy period. Our concern, however, is solely with the long-run impact on federal capital income tax revenues. The specific capital gains tax cut analyzed is the reduction to a maximum rate of 15 percent.

Unfortunately, we know little about any of the relevant behavioral responses. While many studies have measured realization responses to capital gains tax rate changes, the variation in these estimates is wide and the interpretation of them is uncertain. Some studies have examined corporate payout behavior, but these studies do not have a strong theoretical base, and no one, not surprisingly, has measured noncorporate recharacterization responses. Some work exists on portfolio shifts, but it is insufficiently comprehensive or precise to be useful in this context.

We employ a portfolio choice model to compute tax revenue effects. This model incorporates assumptions regarding household portfolio and firm investment decisions based on utility maximizing behavior. Thus, portfolio shifts and existing capital stock reallocations are a fundamental part of the model. Optimizing realization and payout responses are not, however, part of the model. Instead, we simulate revenue effects under alternative assumptions regarding these responses, based on existing empirical estimates. The important features of the portfolio model are described in Section I, and the method of incorporating the capital gains tax rate cut is discussed in Section II. Section III presents the results, and Section IV summarizes them.

I. The Simulation Model

The basic vehicle for the analysis is a slightly modified version of the GEMDAT model of Galper, Lucke and Toder (1988). GEMDAT stands for General Equilibrium Model of Differential Asset Taxation. As its name implies, GEMDAT is designed to capture the interaction between differential tax treatment of assets and marginal tax rates of taxpayers and the impact of this interaction on the long-run allocation of tangible capital in the economy. The model is thus well suited to analyze the long-run impact of capital-gains tax changes. We begin with a general overview of the sectors in the model, and then we provide some additional detail on households.

The Sectors

GEMDAT describes a model with three fundamental sectors (those endogenously investing in tangible capital): state and local governments, corporations, and households. The first two sectors have limited behavior. The corporate sector demands capital (K_{COR}) and finances it by issuing debt and equity (EQU). The optimal debt-equity ratio, f, is chosen; as much tax-exempt debt is issued as is legally possible ($EXCOR = gK_{COR}$); and taxable debt (TAX) is issued residually. The state and local sector demands capital (K_{STL}) and finances it with tax-exempt debt (EX). The federal government sector is totally exogenous. For both government sectors, tangible capital is assumed to equal debt. The balance sheets for these three sectors are shown at the top of Table 1.

The household sector is far more complex. First, noncorporate businesses are folded in with "households." That is, it is as though each household directly holds its share of noncorporate capital, all of which earns the same pretax rate of return. Because the same pretax return is earned, only one demand for capital exists, although numerous households account for different shares of it. Second, direct household capital (owner-occupied housing and consumer durables) is also folded in, but this capital pays different pre-tax returns (imputed rent plus expected appreciation) to different households. Thus, each household is a separate production unit, supplying varying amounts of owner housing and consumer durable services.

In addition to these classes of tangible capital, households hold corporate equity, taxable and tax-exempt bonds, and retirement accounts (private pensions, $\overline{PEN}$, and federal pensions, $\overline{PENFED}$, and $\overline{IRA}$s). The pension accounts are treated as exogenously determined, and taxable bonds can be held in positive or negative (debt) amounts. The balance sheet for this sector is pictured on the lower left in Table 1, where the capital stock demands are denoted by K's and the capital types by subscripts (OH for owner-occupied housing, CD for consumer durables, and NC for noncorporate business capital). The balance sheets for individual households have the same form as the aggregate balance sheet.

In general, households are assumed to see through financial intermediaries (to act as though they hold the financial assets, rather than the liabilities, of the intermediaries). More specifically, households view themselves as holding the underlying corporate equity ($e\overline{PEN}$) and taxable debt $[(1-e)\overline{PEN} + \overline{PENFED} + \overline{IRA}]$ of retirement entities. (Pensions determine e endogenously, but the pension asset holdings are treated as exogenous to households.) However, all households may not be able entirely to offset exogenous retirement holdings by their personal portfolio choices.

If a household held more corporate equities in retirement accounts than it wished to hold in its total portfolio, the household portfolio would be "out of balance" on the assumption that equities cannot be sold short. Because taxable borrowing is allowed, no such problem arises with IRA and pension taxable bond holdings. The holdings matter in the overall model, however, owing to the different taxation of retirement and regular accounts.

All other financial intermediaries and the rest of the world are treated as exogenous. On net, this exogenous sector holds tax exempts (largely commercial banks and property insurers) and taxables, matched by outstanding equities. The full division of financial institutions into pensions and exogenous, shown at the lower right in Table 1, differs from the Galper, Lucke and Toder (GLT) treatment. Because GLT combined the sectors, netted the exogenous sector's net equity outstanding from equities held by pensions and did not distinguish between federal government and private pensions (the former hold no equities), GLT greatly understated the equity share of pensions (set it at 0.14 instead of 0.33).

Household Demands

There are 400 representative households (taxpayers) in the model, differentiated by labor income, capital income, tax-filer status (married versus single), and itemization status under pre1986 tax law and weighted to represent the entire population. Under any given tax regime, each unit simultaneously determines whether to itemize or not and how much of each of six assets to hold: owner housing, consumer durables, taxable bonds, corporate equity, noncorporate capital, and tax-exempt bonds. The first three assets are presumed riskless, the first two are not taxed and the third is fully taxed, and the second three have varying degrees of risk and taxation. Table 2 lists these assets, the sectors supplying them, the nominal pretax returns on them (the i_k's), and the effective tax rates applied to the returns: t^j is the statutory marginal tax rate of household j, and a_k is the effective proportion of the return included in the tax base.

All demands for tangible capital are unit elastic functions of the net (of depreciation) cost of capital. For consumer durables and owner housing demanded by households j

$$K_k^j = \bar{K}_k^j/[(1-b_k^j t^j)i_t - INFL], \tag{1.1)-(1.2}$$

where the $\bar{K}_k^j$ are constants and INFL is inflation (actual and expected). For owner housing, b equals unity if either the household itemizes or doesn't itemize but doesn't have debt, and, if not unity, b equals zero. For consumer durables, b equals unity if the household's owner housing b is unity and the household doesn't have any disallowed interest deductions, and, if not unity, b equals zero.

Household j's utility-maximizing shares of wealth in the three risky assets (s_k^j) can be expressed as

$$s_k^j = \frac{Exp(i_k)(1-a_k t^j) - i_t(1-b^j t^j) - TRANS_k^j}{m^j m_k^j var(i_k)(1-a_k^* t^j)^2 W^j}, \tag{1.3)-(1.5}$$

where m^j is household j's utility per dollar of expected income, m_k^j is the degree of household j's risk aversion on risky asset k, a_k^* is the share of variance included in the tax base, and $TRANS_k^j$ reflects the impact of the variance in government tax revenues owing to the variance in revenues from asset k on household j's demand for asset k.

Holdings of the risk-free taxable bond are derived residually from the household balance sheet identity:

$$TAX^j + \overline{IRA}^j + \overline{PENFED}^j + (1-e)\overline{PEN}^j + EQU^j + e\overline{PEN}^j + EX^j + NC^j +$$

$$OH^j + K^j_{CD} = W^j. \qquad (1.6)$$

(An equation like (1.3) determines the share of pension wealth in corporate equities (e), where a_k and a^*_k are zero, and an equation like (1.6) gives pension holdings of taxables.)

Four market-clearing equations for fully taxable bonds (TAX), tax-exempts, corporate equity and noncorporate equity close the model (and can be thought of as determining the pretax returns on these assets):

$$\Sigma W^j s^j_{TAX} h^j + (1-e)\Sigma\overline{PEN}^j h^j + \Sigma\overline{IRA}^j h^j + \Sigma\overline{PENFED}^j h^j + \overline{TAXEXO}$$

$$= (f-g)K_{COR} + \overline{TAXG} \qquad (1.7)$$

$$\Sigma W^j s^j_{EX} h^j + \overline{EXEXO} = K_{STL} + \overline{EXCOR} \qquad (1.8)$$

$$\Sigma W^j s^j_{EQU} h^j + e\Sigma\overline{PEN}^j h^j = (1-f)K_{COR} + \overline{EQUEXO} \qquad (1.9)$$

$$\Sigma W^j s^j_{NC} h^j = K_{NC}, \qquad (1.10)$$

where the h^j are the number of households in representative cell j. For owner housing and consumer durables, demand and supply are defined as equal for each household.

II. Modeling the Impact of the Tax Cut

Capital gains taxation works through the inclusion factors, the a_k and a^*_k in the portfolio share demand equations. For an asset whose entire return is received as current income and is fully taxed, such as risk-free taxable bonds, $a = 1$. For other assets, the greater the proportion of the return that takes the capital gains form, the longer the gains are deferred, and the lower is the capital gains tax rate, the lower are a_k and a_k^*. In the GLT model, taxable returns with favorable capital gains tax treatment are those on equity investments in corporate and noncorporate business. The taxable variances with favorable capital gains treatment are those on equity investments and tax-exempt bonds.

The inclusion factors can be related to the fraction of true income that accrues directly to households (p), the proportion of variance in income that is attributable to this accrual (v), the effective realization rate (the concurrent equivalent realization of currently nonaccruing income -- capital gains, rr), and the fraction of realized gains that are excluded from taxes (x). With these definitions,

$$a_k = p + (1-p)(1-x)rr \quad (2.1)$$

$$a_k^* = v + (1-v)(1-x)rr. \quad (2.2)$$

For corporations, p is simply the payout ratio. For noncorporate business, all recorded earnings are paid out by definition. However, not all earnings are recorded concurrently, but rather get deferred owing to the generally favorable taxation of business activity (investment tax credit, favorable accounting treatment, accelerated tax depreciation -- but at historic cost, etc.), as well as illegal tax avoidance, before someday showing up as capital gains (for corporations, these business tax advantages are incorporated in the model at the corporate level). Thus p and v for noncorporate business reflect these phenomena. For state and local bonds, GLT set $a_k = 0$ and $v = 0$.

Examination of how Galper, Lucke and Toder (GLT) altered the a_k's and a_k^*'s in response to the Tax Reform Act of 1986 is instructive both in setting parameter values and in determining how to alter them in response to a capital gains tax cut. Because the variance of returns on tax-exempt bonds was presumed to be in the capital gains component only, the inclusion rate on this variance was specified as the fraction of annual capital gains included in the tax base. Under pre-1986 law, this fraction was 0.2, reflecting a 60 percent exclusion (x = 0.6) and an assumed 50 percent effective realization rate (rr = 0.5). Thus, $a_k^* = (1 - 0.6)0.5 = 0.2$. With the removal of the exclusion in the 1986 law, the inclusion rate rose to the full 0.5 effective realization rate. For corporate equity, the variance inclusion rate was slightly higher, 0.25 under old law and 0.55 under the 1986 Act, because some of the variance in the total return was attributed to variance in dividends as well as in capital gains. These parameters are consistent with v = 0.0625 under pre1986 law and 0.1 under the 1986 Tax Act.

GLT set the inclusion rate on the expected return from corporate equity far higher because dividends are an important component of the return. With dividends equal to three-eighths of total return (p = 0.375) and capital gains equal to five-eighths, the corporate income inclusion rate was 0.5 [= 0.375 + 0.2(0.625)]. With removal of the exclusion in the 1986 Tax Act, the rate rose to 0.7, assuming a slight increase to 0.4 in the dividend payout ratio [0.7 = 0.4 + 0.5(0.6)]. The v fraction was one-sixth the p fraction under pre1986 law but one-quarter under the 1986 Tax Act.

The GLT treatment of the noncorporate income and variance inclusion rates is less helpful; they set v and p equal to zero. That is, their $a_k^* = a_k = (1-x)rr$ rise from 0.2 to 0.5 because x declines from 0.6 to 0.0. Zero values for v and p seem inconsistent with their overall analysis (clearly the 1986 Tax Act increased these parameters, i.e., reduced the deferral of noncorporate income). In no case did GLT explicitly change the realization rate for either corporate or noncorporate capital gains.

Table 3 contains four sets of parameter values for the corporate and noncorporate equity inclusion rates. The first two are those of GLT for pre1986 and 1986 tax laws. The second two are our adjustments to their calculations. For corporate equity, our numbers are identical to theirs for pre1986 law and only slightly lower for 1986 law. By maintaining v and p at their pre1986 law values, a_k^* rises to 0.5313, not 0.55, and a_k rises to 0.6875, not 0.7. The changes for noncorporate equity are greater. While the a_k and a_k^* values are maintained, the parameters leading to these values are altered. The realization rate is lowered to 0.3, three-fifths that for corporate equity, and p and v are raised to 0.0909 under pre1986 law and 0.2857 under 1986 law, values which, from equations 2.1 and 2.2, are consistent with the GLT a_k and a_k^*.

Setting the inclusion rates for the returns and variances under the proposed capital gains tax cut is straightforward. Because the new 15 percent rate constitutes a gains exclusion that varies with the regular income tax rate of the household, the inclusion rates are also household specific. More precisely, the rates are those described by the a_k and a_k^* expressions with x replaced by $1-0.15/t^j$. Our base simulation, then, is one in which the parameter values are those in the lower right corner of Table 3 but with x shifted from 0.0 to $1-0.15/t^j$.

The impact of inclusion-rate changes on portfolio demands for corporate and noncorporate equities is complicated by the fact that the changes increase both the numerator (the return inclusion rate) and denominator (the variance inclusion rate) in the share demand equations. Only if the percentage increase in the numerator, generated by the increased after-tax return, is greater than the percentage increase in the denominator, induced by the increased after-tax variance, will the share demand tend to increase. This is not the case for some households in the simulations reported below. However, because the after-tax variance on tax-exempt bonds, but not the return, is increased, households in the 28 and 33 percent tax brackets will tend to shift out of tax exempts. Another complication is that m^j, the utility per dollar of expected income, is endogenous, depending on the prices of goods in the model. As a result, intuitive explanations of portfolio changes are often not easily provided.

III. Results

Portfolios After Full Adjustment to the 1986 Tax Act

The first step in the analysis is to replicate the GLT's simulation of the Tax Reform Act of 1986. Our results differ in only minor respects from theirs. These results are taken as the base from which the capital-gains tax-rate reduction is presumed to shift the economy under the assumption of constant realization and payout rates. These results are also the basis upon which the 400 sample households are combined into classes to present the portfolio responses in a meaningful fashion.

Households have been divided into seven classes based on their tax bracket. Under the 1986 Tax Act, the tax schedule rises as taxable income increases to 0.15, 0.28, 0.33, and then falls to 0.28. Taxpayers with marginal tax rates of zero, 0.33 and the highest 0.28 form three classes, while the 0.15 and lower 0.28 classes are divided roughly in half to form the other four classes: 0.15L, 0.15H, 0.28L and 0.28H. The 0.15L bracket includes taxpayers with a marginal tax rate of 0.15 and income under $16,000 (singles) or $32,000 (joint); the 0.28L bracket includes taxpayers with a tax rate of 0.28 and income under $35,000 (single) or $70,000 (joint). Income is the GLT concept: approximately before-tax cash income, including that of corporations owned by the households.

Table 4 lists the hypothetical percentage distribution of total U.S. wealth among these seven household classes in the new equilibrium following passage of the 1986 Tax Act (assuming no realization, payout or recharacterization responses) and the percentage distribution of each class's wealth among three risky assets and total riskless assets (taxable bonds and household capital -- housing and durables). The zero-tax class holds only 3 percent of total wealth, the next five income classes hold about 15 percent each, and the highest income class holds 20 percent of the economy's wealth. Ignoring the zero tax bracket class for the moment, the next three classes hold about 30 percent of their wealth in equities (corporate and noncorporate) and this percentage rises monotonically to 40, 48 and 59 for the remaining classes. The highest five income classes all have 4 to 7 percent of their wealth in tax exempts, while the lowest two have none. The portfolio share in taxable bonds and housing capital declines (almost) monotonically as income rises from 73 percent to 34 percent, largely reflecting a smaller proportion of income being spent on housing and durables as income rises. Surprisingly, the fourth income class, households just above the 15 percent tax bracket, hold portfolios quite similar to those of households in the 15 percent bracket rather than those of higher income households in in the 28 percent bracket.

The lowest income class is a substantial outlier with respect to holdings of noncorporate equity and household capital, having at least a 20 percentage point greater share of their wealth in noncorporate equity than one might expect and an equal lesser share in household capital. We suspect these data are dominated by small family-farm households, who would have large noncorporate equity by definition and might have some discretion in classifying household capital as business capital.

Gains Tax Cut, No Realization, Payout or Recharacterization Responses

Federal taxes paid on household j's capital income are computed as

$$Tax^j = \sum_k a_k t^j Exp(i_k) s_k^j W^j . \qquad (3.1)$$

Total federal taxes are the sum of Tax^j over all j. The tax revenues lost from a tax rate cut must be made up in some manner for the model to be internally consistent. In order to avoid altering marginal tax rates and thus introducing other tax effects into the simulation, we assume a proportional tax on consumption of sufficient magnitude to leave the federal budget unchanged.

Table 5 contains the results of the base case simulation with no realization or payout changes, i.e., these results follow solely from the structure of the model. The top left indicates the percentage changes in tax liabilities for each income class and the total economy, both without portfolio or capital allocation effects and with them. The top right reports percentage changes in the portfolio holdings of each income class. The lower left indicates the capital stock reallocations, including those financed by debt and equity, and the lower right shows the changes in pretax interest rates. These figures have been computed on 1985 asset stocks and income flows.

In the static case, tax cuts occur only for those in the 28 and 33 percent tax brackets and the percentage reduction rises with income because higher income households hold proportionately greater quantities of the assets that receive the more favorable tax treatment. In the dynamic case, tax changes depend on changes in pretax interest rates and in portfolio and capital stock redistributions. As can be seen, business capital increases, largely at the expense of household capital. The former is induced by 10 and 6 basis point declines, respectively, in the pretax yields on corporate and noncorporate equity and is accompanied by a reduction in the corporate debt-capital ratio; the latter is largely attributable to a decrease in marginal tax rates, which raises the after-tax debt rate. The reduction in zero-taxed assets by the 28 and 33 percent tax rate households reflects this reduction in marginal tax rate and thus in household capital demands (the marginal tax rate of the highest income household class rises slightly because some of these households shift down into the 33 percent bracket). In all cases, the capital stock changes are a half to one percent of the base level.

Alternative Realization, Payout, and Recharacterization Assumptions

We now consider the impact of alternative realization, payout, and recharacterization assumptions. Table 6 lists the alternatives for both the 1986 Tax Act and the cut in the capital gains tax rate. The former are needed because the simulated impact of the 1986 Tax Act itself varies when changes in realizations et cetera are incorporated, and it is from these new equilibria that the capital gains tax rate is presumed to shift the economy. For small increases in realizations, an elasticity of -0.5 with respect to a change in the statutory capital gains tax rate is posited for corporate equity, i.e., a rough halving of the gains rate (from 0.28 or 0.33 to 0.15) is assumed to raise realizations by 50 percent, and -0.3 is posited for noncorporate equity. For moderate increases in realizations, elasticities of -1.0 and -0.6 are assumed; for large increases, -1.5 and -0.9 are assumed.

The assumed corporate payout response is based on Poterba's recent study. In his framework, dividends depend on both earnings and a tax preference parameter, θ, which is a weighted average across shareholders of the ratio of the current-equivalent after-tax income from a dollar of dividend payout to that from the capital gains he assumes would result from a dollar of retained earnings:

$$\theta = \Sigma w_i \frac{1-\tau_{div}^{i}}{1-\tau_{cg}^{i}}$$

where τ_{div} is the marginal tax rate on dividends, τ_{cg} is the concurrent-equivalent capital gains tax rate, and i varies over a number of household income classes and financial institutions each with a weight w_i. Poterba finds that $\theta = 0.78$ prior to the 1986 Tax Act and would equal 0.88 in the new equilibrium after tax reform, owing largely to a cut in the weighted average marginal tax rate on household dividend income from 33.4 percent to 25.3 percent. As a result of this $12\frac{1}{2}$ percent increase, Poterba projects a 20 percent increase in dividends. We simulate a 20 percent increase in corporate p (raise it to 0.45) in response to the 1986 Tax Act.

The proposed reduction in the capital gains tax rate should have a far smaller impact on the payout ratio. Consider investors as being in two classes only, households and others. Concentrating on households, we write

$$\theta = w_h \frac{1-t_h}{1-t_h(1-x)rr} + \text{others}$$

where w_h is the proportion of equities held by households (0.634 in 1986), t_h is the household marginal tax rate (0.253 post tax reform), rr is the realization rate (which Poterba assumes equals 0.25 for all years) and "others" is the contribution of other investors. To determine the value of others, we set all parameters equal to their post-reform values ($\theta = 0.88$, $x = 0$ and $t_h = 0.253$) and solve for other $= 0.374$. Raising x from 0 to 0.5

lowers θ to 0.863, a two percent decline that, from Poterba's estimate, translates into a 3.2 percent fall in dividends. We lower p to 0.435.

The last response considered is the potential recharacterization of noncorporate income in response to changes in the relative taxation of capital gains. Precisely how individuals achieve this and how much occurs is unclear, but the possibility would seem to exist. To incorporate recharacterizations in response to the 1986 Tax Act (sharp decrease in regular income tax rates and increase in gains tax rates), we multiply all a_{NC} and a^*_{NC} by 1.1. For the capital gains tax cut, this multiplication factor is reduced to 1.08 but only for those households with marginal regular income tax rates above 0.15. This 20 percent offset to the impact of the 1986 Tax Act (reduction in multiplicative factor from 1.1 to 1.08, after starting at 1.0) is comparable to the 17 percent offset in Poterba's θ (0.88 to 0.863, after starting from 0.78). The recharacterization is simulated in combination with moderate realization and payout responses (case 5 is case 4 with recharacterizations).

The a_k's based upon the new realization and payout rates are clearly the correct a_k's to use in equation (3.1) to calculate taxes paid. However, they cannot be correct for using in equations (1.3)-(1.5) to compute portfolio share demands. To illustrate, assume that the elasticity of realizations with respect to the tax rate change is -1.0 so that a cut in the capital gains tax rate does not alter taxes paid or a_k. With a_k unchanged, there would be no shift in portfolio shares -- a cut in the tax rate on capital gain income would not make the asset more attractive to households.

Presumably households have a desired realization rate in the absence of taxes (and other transactions costs) on capital gains. Decreases in realizations from this rate, in order to lower effective taxation, generate disutility. A cut in the gains rate on an asset lowers this disutility and thus will lead households to demand more of the asset. To ensure that demand will rise, we alter the rr's and p's underlying the a_k's and a_k^*'s in equations (1.3)-(1.5) by only half the differences between the values listed in the lower left corner of Table 3 and those shown in Table 6.

Table 7 contains the static and dynamic revenue losses for all cases considered. We discuss the static results first. The tax cut with no changes in realizations, payouts or recharacterizations would lose $14.5 billion dollars annually. This loss is cut by 40 percent to $8.6 billion with a small increase in realizations and reduced by another 40 percent to only $3.0 billion with a moderate realization response. With a large realization response, revenues actually rise by $2.8 billion. Decreases in payouts and recharacterizations act to offset the impact of increased realizations, but the offsets are small. Comparing cases 4 and 5 with case 2, decreased payouts increase losses by half a billion dollars and decreases in both payouts and recharacterizations increase revenue losses by only $1.3 billion.

The dynamic responses tend to dampen the decline in tax revenues by $1.5 billion when realization responses are low, but by less than $0.5 billion when realizations are high. The dampening occurs largely because capital tends to be reallocated toward taxed assets (corporate and noncorporate capital) and away from non-taxed assets (household and state and local capital). These capital stock shifts and changes in pretax interest rates and corporate structure are shown for all the different cases in Table 8.

The business capital stock increases are caused by the gains rate cut, although the increases are cushioned to the extent that realizations increase and soften the impact of the rate cut (reduce the shift toward the partially taxed equities). The increased demand for equities and decreased demand for tax-exempt securities cause the pretax returns on the former to fall by 2 to 10 basis points and on the latter to rise by 2 to 3 basis points. The quantity of state and local capital falls in response to this rate increase; the demand for household capital falls, in spite of a general minor decline in the fully taxable rate, because of a reduction in the average marginal tax rate of some households and a decrease in the fraction of households that itemize, both of which increase the net-of-tax debt rate.

Table 9 illustrates portfolio shifts in what we view as the most likely case (moderate increase in realizations and decrease in payouts and recharacterizations). The highest income class shifts slightly from partially and zero taxed assets into fully-taxed bonds; the lowest three income classes switch from fully to partially taxed assets; and the middle income class switches from zero taxed assets (largely household capital) to partially taxed equities. The portfolio shifts are not large though. For example, the largest absolute change, the 1.1 percentage point increase in the middle income (.28L) class's holdings of partially taxed other assets, is only a 3 percent portfolio shift (increase from 30 to 31 percent).

Our final experiment is one in which the capital gains tax rate cut is applied to corporate equities only. Limiting the tax cut to corporate equity obviously would substantially lessen the potential revenue loss. Table 10 gives the revenue, capital stock, and pretax interest rate changes for two cases. In the unlikely event of no realization or other responses, the dynamic revenue loss, $5.3 billion, is 35 percent of that when the gains rate is cut on all capital gains. With moderate behavioral responses, a slight $0.3 billion revenue gain is computed. The capital stock reallocations differ from those with the general gains rate cut because noncorporate capital, like household and state and local capital, now decreases.

IV. Conclusions

Our model simulations were designed to obtain a range of realistic estimates of the long-run impact of a capital-gains tax-rate cut on total federal capital income tax revenues. In doing this, a number of assumptions were made regarding behavioral responses. First, the portfolio and tangible capital reallocations follow from the structure of the GLT model. Second, the realization and payout responses grafted onto the model cover the gammut of recent econometric estimates. Third, the noncorporate recharacterizations are illustrative only; we have no evidence on the extent to which such recharacterizations occur. The realism of the revenue estimates is, of course, dependent on these assumptions. The gains cut analyzed is a cut to a maximum capital gains rate of 15 percent.

Four key questions are addressed in our analysis. What is the expected long-run annual revenue loss from a gains rate cut? Do portfolio redistributions and real capital reallocation responses act to raise or lower federal capital income tax revenues? How large is the likely effect of decreased corporate payouts and recharacterizations of noncorporate income as capital gains relative to that of increased realizations? Is there any chance that a gains tax cut would raise capital income (as opposed to capital gains) tax revenues?

Our major conclusions are:

- a cut in the capital gains tax rate on all assets to 15 percent is likely to cause a steady-state annual revenue loss of $2 to $6 billion based on 1985 capital stock and wealth levels.
- while portfolio and tangible capital reallocations could either increase or decrease tax losses in theory, in our simulations the reallocations reduce tax losses by about a billion dollars, largely through an increase in partially-taxed business capital at the expense of zero-taxed housing and state and local capital.

- o while changes in corporate payouts and recharacterizations of noncorporate income act to increase tax losses, neither response is likely as large as the reallocation effect.
- o restricting the gains rate cut to corporate equities would likely reduce the annual loss to under $2 billion and could increase revenue; a rationale for such a restriction is the current double taxation of corporate income (Gravelle and Lindsey, 1988).

The essential message of this paper is that the strong emphasis in the literation on the realization response to a capital gains tax rate cut has been appropriate. The payout/recharacterization and portfolio redistribution/reallocation effects do not appear to be large. Moreover, the portfolio responses, within the context of the GLT model, act to raise tax revenues (substitution of taxable business capital for taxfree household and state and local capital), not lower them as has been conjectured. Thus these responses offset the payout/recharacterization effects, leaving the realization response as basically the total response. Future research could, of course, modify this finding.

As to future research, extension of three financial assets in the model to include a pure capital gains asset (equity in farming and oil and gas production?) would be appropriate in order to better measure portfolio effects. Also, realization and payout responses should be built directly into the model. Utility losses from deviations of realization rates and payout rates from those that would exist if gains weren't taxed could be specified and optimal realization and payout rates could be computed as those that balanced these losses against gains in after-tax income. Further, the tax parameter affecting corporate payouts could be computed internally in the model. A related endeavor would be to recompute historic values of the tax parameter using estimates of the optimal realization rate and to relate historic payout rates to the recomputed tax parameter.

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Table 1: Balance Sheets for the Various Sectors

Corporate

K_{COR}	$EQU = (1-f)K_{COR}$
	$\overline{EXCOR} = gK_{COR}$
	$TAX = (f-g)K_{COR}$

State and Local

K_{STL}	EX

Federal Government

$\overline{K}_{FED}$	$\overline{TAXG}$

Households

TAX	
EX	
EQU	
$\overline{PEN}$	
$\overline{PENFED}$	
$\overline{IRA}$	
$NC = K_{NC}$	
$OH = K_{OH}$	
K_{CD}	W

Pensions

$TAX = (1-e)\overline{PEN} + \overline{IRA} + \overline{PENFED}$	$\overline{PEN}$
$EQU = e\overline{PEN}$	$\overline{IRA}$
	$\overline{PENFED}$

Exogenous

$\overline{EXEXO}$	
$\overline{TAXEXO}$	$\overline{EQUEXO}$

Table 2: Issuers, Pretax Returns and Tax Rates on Household Assets

	Issuers	Nominal Pretax Return	Marginal Tax Rate
Debt			
taxable	COR, EXO, FED, HH	i_{tx}	t^j
exempt	STL, COR	i_{ex}	zero
Equity, general			
corporate	COR	i_{eq}	$a_{eq}t^j$
noncorporate	HH	i_{NC}	$a_{NC}t^j$
Equity, household specific			
owner housing	HH	i^j_{OH}	zero
durables	HH	i^j_{CD}	zero
Retirement (exogenous)			
pension	INT	$(1 - e)i_{tx} + ei_{eq}$	zero
IRA	INT	i_{tx}	zero
federal pension	INT	i_{tx}	zero

Table 3: Specification of Inclusion Rates

	PRE1986 LAW, GLT		1986 LAW, GLT	
	Corporate	Noncorporate	Corporate	Noncorporate
v	0.0625	0.0	0.1000	0.0
p	0.3750	0.0	0.4000	0.0
rr	0.5000	0.5000	0.5000	0.5000
x	0.6000	0.6000	0.0000	0.0000
a*	0.2500	0.2000	0.5500	0.5000
a	0.5000	0.2000	0.7000	0.5000
	PRE1986 LAW, PHH		1986 LAW, PHH	
v	0.0625	0.0909	0.0625	0.2857
p	0.3750	0.0909	0.3750	0.2857
rr	0.5000	0.3000	0.5000	0.3000
x	0.6000	0.6000	0.0000	0.0000
a*	0.2500	0.2000	0.5313	0.5000
a	0.5000	0.2000	0.6875	0.5000

Table 4: Hypothetical Distribution of Total Wealth Across Household Classes and of Household Class Wealth Among Asset Types After Responses to 1986 Tax Act Are Completed

Household Class	Wealth	Equity		Tax	
		Corporate	Noncorporate	Exempts	Other
0.00	3	12	36	0	52
0.15L	16	14	15	0	73
0.15H	17	17	14	5	64
0.28L	14	15	13	5	67
0.28H	14	21	19	4	56
0.33	16	25	23	4	48
0.28	20	31	28	7	34
Total	100	21	20	4	55

Table 5: Impact of Capital Gains Tax Cut, No Changes in Realizations, Payouts, or Recharacterizations

Class(MTR)	%ΔTax Liabilities		Portfolio Redistributions (%Point Shifts)		
	Static	Dynamic	Fully-Taxed Bonds	Partially-Taxed Equities	Zero-Taxed Other Assets
0	0	1.8	-0.5	0.4	0.1
.15L	0	0.7	-0.9	1.0	-0.1
.15H	0	0.4	-0.6	0.6	0.0
.28L	-1.5	-0.1	-0.3	1.6	-1.3
.28H	-3.6	-3.2	-0.1	0.5	-0.4
.33	-6.0	-5.8	0.9	-0.3	-0.6
.28	-6.8	-7.5	0.0	-0.2	0.2
Total	-3.5	-3.1	-0.2	0.5	-0.3

	Quantity Changes (bil. of $)	Pretax Rate Changes (basis points)
Corporate	23	
Equity	50	-10
Debt	-27	-1
Noncorporate	8	-4
State and Local	5	3
Household		
Housing	-19	-1
Consumer Durables	-6	-1

Table 6: Realization and Payout Assumptions

	Corporate			Noncorporate	
	rr	p	a(.30)*	rr	a(.30)*
1. Small Changes in Realizations					
1986 Tax Act	.4167	.375	.6354	.27	.4786
Capital Gains Tax Cut	.5833	.375	.5573	.33	.4036
2. Moderate Changes in Realizations					
1986 Tax Act	.3333	.375	.5833	.24	.4571
Capital Gains Tax Cut	.6667	.375	.5833	.36	.4143
3. Large Changes in Realizations					
1986 Tax Act	.25	.375	.5313	.21	.4357
Capital Gains Tax Cut	.75	.375	.6094	.39	.4250
4. Moderate Real. and Payout Changes					
1986 Tax Act	.3333	.450	.6333	.24	.4571
Capital Gains Tax Cut	.6667	.435	.6233	.36	.4143
5. Case 4 plus Changed Recharacterizations					
1986 Tax Act	.3333	.450	.6333	.24	.4571
Capital Gains Tax Cut	.6667	.435	.6233	.36	.4143

Note: In all calculations we assume $v = p/6$ for corporate equity and $v = p = 0.2857$ for noncorporate equity.

* Income inclusion rates for 30% tax bracket.

Table 7:

Federal Revenue Changes Owing to Capital Gains Tax Rate Cut

	Static	Dynamic
0. Base Case (no change in rr or p)	-14.5	-12.8
1. Small Increase in Realizations	-8.6	-7.4
2. Moderate Increase in Realizations	-3.0	-2.3
3. Large Increase in Realizations	2.8	3.2
4. Moderate Increase in Realizations and Decrease in Payouts	-3.4	-2.7
5. 4 Plus Noncorporate Recharacterizations	-4.3	-3.4

Table 8: Capital Stock and Pretax Interest Rate Changes

Case:	Base	1.	2.	3.	4.	5.
Capital (bil of $)						
Corporate	22.9	17.6	11.3	5.4	10.8	12.4
Noncorporate	7.6	7.9	7.2	6.1	6.7	7.2
State & Local	-4.8	-3.4	-4.1	-3.8	-4.1	-5.0
Household	-25.7	-22.1	-14.5	-6.0	-13.4	-14.5
Pretax Interest Rates (basis points)						
Corporate Equity	-10.5	-8.0	-5.2	-2.5	-5.2	-5.3
Noncorporate Equity	-4.2	-4.3	-4.0	-3.3	-3.7	-3.9
Tax Exempts	2.7	1.9	2.3	2.2	2.3	2.8
Fully Taxable	-0.9	-0.5	-0.3	-0.2	-0.2	-1.0
Corporate Structure (bil. of $)						
Equity	50.0	37.8	23.6	11.9	24.2	24.7
Debt	-27.1	-20.2	-12.3	-6.5	-13.4	-12.3
Δ(Debt/Capital)	-0.011	-0.008	-0.005	-0.003	-0.005	-0.005

Table 9: Household Portfolio Redistributions: Moderate Changes in Realizations, Payouts, and Recharacterizations (Case 5)
(percentage point shifts)

	%Δ in Tax Liabilities	Fully-Taxed Bonds	Partially-Taxed Equities	Zero-Taxed Other Assets
0.00	0.9	-0.4	0.2	0.1
0.15L	0.3	-0.6	0.6	0.0
0.15H	0.3	-0.4	0.4	0.0
0.28L	0.2	0.0	1.1	-1.0
0.28H	-0.9	-0.2	0.2	0.0
0.33	-2.4	0.1	-0.1	0.0
0.28	-1.7	0.5	-0.3	-0.1
Total	-0.9	-0.1	0.3	-0.2

Table 10: Impact of Cut in Capital Gains Tax Rate on Corporate Equities Only

	No Change in Realizations or Payouts	Moderate Increase in Realizations and Decrease in Payouts (case 4)
Change in Federal Revenue (bil of $):		
Static	-6.3	-0.2
Dynamic	-5.3	0.3
Capital Stock Changes (bil of $):		
Corporate	22.8	11.8
Noncorporate	-2.4	-1.0
State and Local	0.6	-0.1
Household	-21.0	-10.6
Pretax Interest Rate Changes (basis points):		
Corporate Equity	-10.5	-5.4
Noncorporate Equity	1.3	0.6
Tax Exempts	-0.3	0.1
Fully Taxable	-0.5	-0.2
Change in Debt/Capital:	-0.011	-0.005

Abstract

Model simulations are run to obtain a range of realistic estimates of the long-run revenue impact of a capital-gains tax-rate cut to a maximum of 15 percent. The basic vehicle for the simulations is a slightly modified version of the Galper-Lucke-Toder (GLT) general equilibrium model. The key behavioral assumptions affecting the estimates are: (1) the portfolio and tangible capital reallocations implicit in the structure of the GLT model, (2) corporate payouts responses based on recent empirical estimates, and (3) illustrative noncorporate recharacterizations of regular income as capital gains.

The essential message of this paper is that the strong emphasis in the literation on the realization response to a capital gains tax rate cut has been appropriate. The payout/recharacterization and portfolio redistribution/reallocation effects do not appear to be large. Moreover, the portfolio responses, within the context of the GLT model, act to raise tax revenues (substitution of taxable business capital for taxfree household and state and local capital), not lower them as has been conjectured. Thus these responses offset the payout/recharacterization effects, leaving the realization response as basically the total response. Future research could, of course, modify this finding.