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TAX REFORM, INTEREST RATES AND CAPITAL ALLOCATION

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ABSTRACT

The impacts of four major tax reform proposals on the level of interest rates and the allocation of the American capital stock are derived. The four plans are Bradley-Gephardt, Kemp-Kasten, Treasury I and Treasury II. The allocation is among seven types of nonresidential capital, rental housing, and owner occupied housing held by households in five different income classes. The inflation-neutrality of the four plans as also deduced.

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Four major tax reform proposals have been advanced recently: the Bradley-Gephardt plan, the Kemp-Kasten proposal, and the Treasury-Department plans I and II. These are comprehensive proposals likely to have significant impacts on investment and real capital allocation. The impacts will reflect both the direct effect of statutory tax changes and the indirect effects elicited by changes in interest rates and incomes. This paper estimates the impacts of tax changes on interest rates and capital allocation, holding income constant.

Supply-siders believe that the lowering of marginal tax rates will increase real income and Treasury tax revenue by inducing greater work effort and saving. While virtually all economists accept this argument in principle, many, if not most, believe the magnitude of these responses to be small. We have not modeled such responses and effectively assume that the tax reforms are revenue neutral and will not alter either the level or distribution of after-tax income.[1] (While households receive a tax cut on average, the tax increase for businesses will result in lower real returns to some factor of production and thus to households who own all factors.)

This paper begins with a general discussion of rental user costs for real capital, the primary determinants of capital allocation, and then presents calculations of the user costs under current law. Section II contains a description of the allocation simulation model, and analyses of the four tax reform proposals, including their inflation neutrality, are reported in Section III. The model contains seven types of nonresidential capital, rental housing and owner-occupied housing. Households in six income classes with endogenous tenure choices are considered. A given capital stock is allocated among the various capital components, with the level of interest rates adjusting to maintain aggregate demand equal to the fixed stock.

We conclude that interest rates would decline significantly in response to all reforms except Kemp-Kasten: three percentage points if Treasury I were enacted, two points in response to Bradley-Gephardt, and one point if Treasury II were passed. A final section suggests that significant positive saving interest rate elasticities, both domestic and foreign, might reduce the declines under Treasury I and Bradley-Gephardt by a percentage point.

I. Investment Hurdle Rates or User Costs

General Considerations

As is well known (Hall and Jorgenson, 1967), the decision to invest depends on whether the present value of the expected revenue from investment exceeds the supply price of capital, and on marginal investments the two will be equal. After allowance for taxation, the equilibrium condition for investment is

$$\rho = \frac{(r+d+\tau_\pi \pi)(1-k-\tau z)}{1-\tau}, \tag{1}$$

where τ is the business tax rate, ρ is the gross marginal product of capital, r is the real after-tax financing rate, d is the economic depreciation rate, τ_π is the concurrent equivalent tax rate on inflationary gains, π is the expected inflation rate, and k is the investment tax credit.[2] In general, z is the present value of the stream of tax depreciation allowances, $TAXDEP_t$, obtained by discounting the stream of depreciation allowances by the required nominal after-tax financing rate:

$$z = \sum_{t=1}^{N} \frac{TAXDEP_t}{[(1+r)(1+\pi)]^t}, \qquad (2)$$

where N is the depreciation period of the asset. The right side of equation (1) is the "investment hurdle rate" or rental user cost for a particular asset. The lower the user cost, the greater will be production of the asset, and the lower will be the productivity of the marginal investment (ρ).

In a "neutral" tax system, the net user and thus net marginal productivities ($\rho - d$) would be the same for all equally-risky assets. This can be achieved in a variety of ways. For example, with $k = 0$, $\tau_\pi = 0$ and either $z = 1$ -- expensing -- or $\tau = 0$, then $\rho - d = r$. Alternatively, with $k = 0$, $\tau_\pi = 0$ and $z = d/(r + d)$ -- tax depreciation equal to economic depreciation, then $\rho - d = r/(1-\tau)$. In either case, if the r's were equal for all assets, the tax system would be neutral across them.[3]

Assuming that firms use a fixed fraction of debt, b, for financing all investments, the real after-tax financing rate can be expressed as

$$r = [b(1-\beta\tau)i + (1-b)(1-\gamma\tau)e - \pi]/(1+\pi), \qquad (3)$$

where β and γ, respectively, are the portions of interest and equity returns that are deductible at the business level, and e is the required nominal return to investors. (Currently $\beta = 1$ and $\gamma = 0$.)

Portfolio equilibrium of investors requires that

$$(1-\tau_e)e = (1-x)i + \delta, \qquad (4)$$

where τ_e is the rate at which equity returns are taxed at the personal level, x is the relevant tax rate for taxable interest (the lower of the personal tax rate and that implicit in tax-exempt yields), and δ is the risk premium required on equity investments. For all investments except owner-occupied housing of low and middle income households, x is the tax rate implicit in tax-exempt yields x_e. Substituting (4) into (3), the real after-tax financing rate for capital other than owner-occupied housing is:

$$r = [b(1-\beta\tau)i + (1-b)(1-\gamma\tau)\frac{(1-x_e)i + \delta}{1 - \tau_e} - \pi]/(1+\pi). \qquad (3')$$

If $\tau\gamma$ were equal to τ_e (which would be true if $\gamma = \tau_e = 0$) and $x_e = \beta\tau$, r would equal $[(1-\beta\tau)i - \pi + \delta(1-b)]/(1+\pi)$ for all assets. Further, if all interest expense were deductible at the same rate and all investments were equally risky, all r's would be equal.

All interest expense is not deductible at the same rate, the clearest example being owner-occupied housing. Because this asset is held by households with a wide range of income subject to the full array of marginal personal tax rates, the tax rates at which interest is deductible (and at which equity the owner has in the house would have been taxed had the household rented) vary across households. More generally, the real after-tax financing rate for the jth household is

$$r_j = [b_j(1-\tau_j)i + (1-b_j)(1-x_j)i - \pi - \delta_j]/(1 + \pi). \qquad (5)$$

The tax rate applicable to own equity investment, x_j, is defined as the minimum of the tax rate paid on the last dollar of taxable interest earned or implicit in tax-exempt yields:

$$x_j = \min\begin{cases}\beta(\tau_j + sur_j) \\ x_e.\end{cases} \qquad (6)$$

The sur_j allows the tax rate on the last dollar of interest earned to exceed the rate at which the last dollar of interest expense is deductible (τ_j), and β reflects the potential only partial taxation of interest income. (Under current law, $sur_j = 0$ and $\beta = 1$.) Finally, loan-to-value ratios will vary, depending on the relative after tax costs of debt and own equity financing. The greater is x_j, the lower will b_j be.

The above r_j's are appropriate for computation of the user cost relevant to the quantity of housing demanded by homeowners, but not to the decision of households whether to own or rent. The τ_j's and x_j's appropriate for the user cost relevant to the tenure decision depend on the average rates at which interest for the entire house purchase is deducted and on which the entire owner-equity investment would have been taxed (Hendershott and Slemrod, 1983).

User Costs Under Current Law

Under current law, net income (imputed rents) from owner-occupied housing is not taxed and no depreciation is deductible [the τ's in equation (1) are zero]. However, property taxes on owner-occupied housing are deductible and thus the tax saving from these taxes on a dollar of housing (assuming a property tax rate of 0.012) is subtracted from the right side of (1). For corporations $\tau = 0.4924$; for noncorporate business (excluding owner occupied housing), τ is taken to be the maximum tax rate on personal interest, $\tau_{im} = 0.53$. Each of these values reflects an assumed maximum state and local tax rate of 0.06 which is deductible at the federal level.

The investment tax credit, k, equals 0.06 for 3 year equipment, 0.10 for longer lived equipment and public utility structures, and zero for other structures; the inflation tax, τ_π, is 0.7τ for inventories, because FIFO accounting is used for 70 percent of inventories, and is close to zero for other assets. Also, equipment is depreciated for tax purposes at 150% of declining balance over tax lives of 3 or 5 years; structures are depreciated at 175% of declining balance over 10, 15 or 18 years; and inventories are effectively depreciated for tax purposes upon sale or one and a half months after purchase, on average.

For corporations, τ_e depends on the taxation of dividends and capital gains and the division of equity raised between new issues and retained earnings (Fullerton, 1985). More generally,

$$\tau_e = n\tau_{div} + (1-n)\tau_{cg}, \qquad (7)$$

where n is the proportion of equity funds raised by new issues, τ_{div} is the tax rate on dividends and τ_{cg} is the tax rate on equity capital gains. We assume n = 0.1; $\tau_{div} = \tau_{im}/2$; and $\tau_{cg} = 0.4\tau_{im}/4$ under current law, where τ_{im} is the maximum tax rate on personal interest. The 0.4 is unity less the statutory sixty percent capital gains exclusion. The divisions by 2 and 4 allow for tax deferral and avoidance activities. Thus $\tau_e = 0.14\tau_{im}$. For noncorporate businesses (including households investing in owner-occupied housing), τ_e equals 0.

Empirically, the tax rate implicit in tax-exempt yields varies with the maturity of the security. For short-term tax exempts, the ratio of prime grade tax-exempt to risk-free taxable yields has not deviated far from unity less the corporate tax rate or roughly 0.5. For ten-year bonds, which are more relevant for the long-term investments being analyzed, the ratio has been closer to 0.7.

The implicit tax rate of 0.3, rather than the federal tax rate of 0.46 (the state and local tax rate is not relevant if corporations invest in their own jurisdictions), reflects a number of factors, but the most important is likely the tax saving from optimally trading bonds (taking capital losses and deferring capital gains).[4] This is especially important because high transactions costs virtually eliminate any gains from trading municipal bonds. The tax rate implicit in long-term tax exempt yields is assumed to be given by:

$$x_e = (\beta - 0.3)\tau_f, \qquad (8)$$

where τ_f is the federal corporate tax rate and the 0.3 measures the gains from optimal trading.

In our analysis of owner-occupied housing, we consider households at five different income levels (column 1 of Table 1) in order to deduce the tax rates that are representative of households in five income ranges: $12,500 to $25,000, $25,000 to $30,000, $30,000 to $50,000, $50,000 to $100,000 and over $100,000. The federal and state and local tax rates relevant to the quantity-demanded decision are listed in columns 2 and 3 (the marginal federal rate jumps near the middle of two ranges), and the total tax rate -- the federal plus the state times one minus the federal -- is shown in column 4. For the highest income class, $x_j = 0.7\tau_f = 0.322$. For the other classes, the x_j equal the τ_j shown in the table. The last column is the tax rate relevant to the tenure choice (a weighted average of the average tax rates applied to debt and equity). These tax rates are discussed in more detail in Hendershott and Ling, 1985.

For all investments other than real estate, $b = 1/3$. For real estate investments other than owner-occupied housing, $b = 2/3$. For owner-occupied housing, we vary b_j depending on the relative attractiveness of debt and equity financing. More specifically,

$$b_j = \begin{cases} 0.5 & \text{if } x_j > \tau_j \\ 0.667 & \text{if } x_j = \tau_j \\ 0.85 & \text{if } x_j < \tau_j. \end{cases} \qquad (9)$$

The minimum 0.5 reflects an assumed average wealth constraint on households; the optimal b_j for unconstrained households is likely zero.

The assumed loan-to-value ratios far exceed the 0.33 to 0.4 average economy-wide ratio observed for owner-occupied housing. Such ratios are heavily influenced by older owning households who have repaid their mortgages.[5] These are relatively insensitive to housing rental costs (see note 11). Households under forty use far more debt (the average loan-to-value ratio for first-time homebuyers in 1984 was 87 percent) and often make quite long-term housing decisions. It is the decisions of such households that we are attempting to capture, and their present-value weighted average loan-to-value ratio is probably near two-thirds.

Based upon Ibbotson-Sinquefield calculations, we assume δ for corporate equities is 0.075, and thus the risk premium for corporate assets, which have a one-third loan-to-value ratio, is $(1-b)\delta = 0.05$. The risk premium for depreciable real estate investors is also about 0.075.[6] Because real-estate assets are presumed to have a loan-to-value ratio of two-thirds, the premium, for these assets is only 0.025. We assume this also to be the premium for owner-occupied housing. This relatively low premium is consistent with owners having certainty with regard to their "vacancy" and "breakage" rates and thus greater certainty with respect to their net operating incomes than is the case with rental properties.

The risk-adjusted net (of depreciation) investment hurdle rates for alternative investments are reported in Table 2 for three different inflation rates. In the base case, $\pi = 0.05$ and $i = 0.11$. We also consider higher (0.10) and lower (0.0) inflation rates. The interest rates associated with these inflation rates were generated by the model described in the next section. As can be seen, $di/d\pi = 1.48$, midway between the nontax (unity) and tax $[di/d\pi = 1/(1-\tau) \sim 2]$ Fisherian values.[7]

Under a neutral tax system, these rates would be the same for all assets. As can be seen, this is not true under current law. At a five percent inflation rate, the tax-favored assets are equipment, with its generous tax credit, and housing, especially that occupied by high-income households. The tax-penalized assets are inventories, whose inflationary gains are not indexed, and corporate structures, especially industrial structures which receive no tax credit. Also, corporate investments are penalized relative to noncorporate, owing to their double taxation, and risky assets are penalized relative to less risky real estate assets (Bulow and Summers, 1984).[8] The difference in hurdle rates for industrial structures and housing, on average, is 4½ percentage points. The difference in the cost of housing for high and low income owners is over 3 percentage points. Moreover, the higher is inflation, the greater are the biases in favor of rental and high-income owner housing and is the penalty against corporate investments.

II. The Capital Allocation Model[9]

An Overview

The basic model allocates a fixed private capital stock among various classes of nonresidential and residential capital. The allocation depends on the rental or user costs for the capital components, the price elasticities of demand with respect to the rental costs, and the elasticities of homeownership with respect to the cost of owning versus renting. The interest rate adjusts in response to tax changes so as to maintain the aggregate demand for capital at its initial level. The fixed capital stock assumption implies zero interest elasticity of saving.

Table 3 lists the distribution of the U.S. capital stock at the end of 1983 by type. A number of simplifying assumptions are made in the construction of the model. Because well over 90 percent of inventories are held by corporations and nearly 90 percent of rental housing is held by noncorporate business, we assume that each of these assets is held totally by corporate and noncorporate business, respectively. While equipment is depreciable over 3 or 5 years, about 95 percent of it is classified as 5-year. We treat all equipment as 5-year.[10] Because public utility structures (which are virtually all corporate) are depreciated over a shorter life that other structures and are eligible for the investment tax credit, they are treated separately. With these assumptions and distinctions, the capital shares are those listed in the percent share column.

Current law treats owner-occupied housing differently depending upon the tax position of the owner, with higher income households paying a lower rental cost owing to their lower after-tax financing rate. Thus it is necessary to distribute the owner-occupied housing stock across households at different income levels. The distribution depends upon the number of owners within each income range as well as the income range and the rental costs for each of the ranges.

For all assets except rental housing, the demand for the asset is determined by the investor in the asset, be it a corporation, unincorporated business or a household. For rental housing, demand is determined by renters, based upon their incomes and the market rent level. Thus, the total quantity of rental housing, like the total quantity of owner housing, is built up as the sum of the demands by households in different income brackets.

Table 4 indicates divisions of the demand for housing across six income classes. The first three columns contain the income classes selected, the division of 80 million households across these classes, and the assumed ownership rates for these classes. Columns 4 and 5 give the distribution of the income of owners and renters across these classes. Column 4 is the product of columns 1, 2 and 3 divided by the sum of the products. In the column 5 calculation, the fraction of households owning is replaced by the fraction renting. Columns 6 and 7 give the distribution of the owned and rented stocks.

These distributions and the ownership rates were calculated from model equations described below. The equations imply an aggregate ownership rate of 0.56, significantly below the current observed rate which is heavily influenced by tenure decisions made during the 1970s when the cost of owning was far lower than today because real after-tax mortgage rates were so much lower. Put another way, if real after-tax mortgage rates remain at the early 1980s level, we would anticipate a significant decline in the aggregate ownership rate over time (holding demographic factors constant).[11] Given that ownership rates do not reflect a long run equilibrium, the distribution of the housing stock between owned and rented also does not. The assumed equilibrium distribution is that shown in Table 4, not that in Table 1. That is, 10 percent of the existing owner-occupied housing stock [(2269-2032)/2269] has been shifted from owner to rental.

<u>Model Equations</u>

The model explains 13 rental costs: seven for the different types of nonresidential capital, five for owner-occupied housing of households in our five income ranges, and one for rental housing. As discussed in the previous section, these costs depend on numerous provisions of the tax law, the depreciation rate of the asset, the expected inflation rate and the level of interest rates in the economy. Moreover, rental costs for household tenure choice decisions ($\hat{\rho}_j$) differ from those for quantity demanded decisions (ρ_j) because the tax rates relevant to the after-tax financing rates differ (see Table 1). We summarize the rental cost equations as

$$\rho_k = \rho_k(tax_k, d_i, \pi, i) \qquad (1)-(7)$$

$$\rho_j = \rho_j(tax_j, d_j \pi, i) \qquad (8)-(12)$$

$$\rho = \rho(tax, d, \pi, i) \qquad (13)$$

$$\hat{\rho}_j = \hat{\rho}_j(ta\hat{x}_j, d_j, \pi, i). \qquad (14)-(18)$$

There are seven demand equations for nonresidential capital (NK): corporate inventories, corporate and noncorporate 5-year equipment, 10- and 15-year public utility structures, and other corporate (industrial) and noncorporate (commercial) structures. Assuming that production functions are Cobb-Douglass [Berndt(1976)], these demand equations can be written as

$$NK_k = Z_k/\rho_k, \qquad (19)-(25)$$

where the Z_k are constants (depending on given outputs) and the ρ_k are the rental costs.

The housing demand and tenure choice equations come from the specification of a translog indirect utility function for households (King, 1980) and the empirical application of it to the ownership decision (Hendershott and Shilling, 1982). The estimated odds of owning equation was

$$\log\left(\frac{o_j}{1-o_j}\right) = -3.846\log(\hat{\rho}_j/\rho) - .383[(\log\hat{\rho}_j)^2 - (\log \rho)^2].$$

Taking antilogs and solving, the ownership rates for the five highest income classes are

$$o_j = e^{L_j}/(1-e^{L_j}), \qquad (26)-(30)$$

where the L_j equal the right-hand side of the log $[o_j/(1-o_j)]$ expression. The ownership rate for the lowest income class is assumed to be zero.

There are also five demand equations for owner housing and six for rental housing based on our six income classes, the lowest of which consists solely of renters. These demands are the products of the demands per owning/renting household and the number of owning/renting households. The specific form of the equations comes from application of Roy's identity to the indirect utility function and substitution from the estimated odds of owning equation. For owner housing (OH), the demand equations are

$$OH_j = o_j HH_j Z_j (3.846 + .766 \log \rho_j)/\rho_j, \qquad (31)-(35)$$

where o_j is the ownership rate for the jth class, HH_j is the number of households in the jth class, and the Z_j are constants which are proportional to the incomes of representative households in the classes. For rental households (RH), the equations are

$$RH_j = (1-o_j)HH_j Z_j (3.846 + .766 \log \rho)/\rho, \qquad (36)-(41)$$

where ρ, the user cost for rental housing, is the rental price facing all households.

Lastly, equality between the sum of the demands and the existing capital stock determines the level of interest rates in the economy:

$$\sum NK_k + \sum OH_j + \sum RH_j = K. \tag{42}$$

Given current tax law and assumed levels of the interest and expected inflation rates, the ρ_k, ρ_j, $\hat{\rho}_j$, and ρ are known (listed, net of the d's in Table 2). The NK_k were listed in Table 3, and the OH_j and RH_j calculations were reported in Table 4. The o_j and HH_j were also listed in Table 4. The Z_k can be calculated under current law from equations (19)-(25); the Z_j are proportional to the incomes of the representative households in the classes and are scaled such that the sum of the demands for owner and rental housing equals the total existing housing stock of 2892 billion dollars.

III. Analysis of Alternative Tax Regimes

The impact of four tax reforms on the level of interest rates, rental costs, and capital shares are calculated in this section. We begin with an analysis of the reforms, consider the impacts on the net user costs (ρ-d's) and the interest rate, and then turn to the capital stock effects. This analysis effectively assumes zero saving response. Other saving assumptions are considered in a final section.

Tax Reform Proposals

Table 5 lists the important business tax parameters for current law and the four tax reform plans. All reforms lower the corporate tax rate (and the maximum personal tax rate, see Table 6) and eliminate the investment tax credit. Proposed capital gains taxation and tax depreciation changes vary widely, however. Bradley-Gephardt treats these items less favorably than current law: capital gains would be taxed at the regular income tax rate which translates into a 30 percent rate vis-a-vis the current 20 percent, and tax depreciation lives would be increased significantly, 40 years for structures rather than the current 18 and 10 years for equipment rather than the current 5. Even with greater acceleration (250%DB versus 175%DB), first year tax deductions for structures would decline from 10 percent to 6 percent and for equipment the decline would be from 30 to 25 percent. Kemp-Kasten would treat capital gains and tax depreciation far more generously than either current law or the other proposals. On capital gains, a choice would exist, the options being nominal gains taxed at 60% of the lowered regular rate or only real gains taxed at regular rates. Moreover, property investments could be effectively written off entirely in the year of purchase. Nonfinancial neutrality would then exist for depreciable properties because ρ-d would equal r for all such assets.

Treasury I attempts to neutralize the tax system for inflation by indexing everything. Only real capital gains, including those in inventories, would be taxed ($\tau_\pi = 0$), depreciation would be on a replacement, rather than historic, cost basis, and only the "real" part of interest expense would be taxed and could be deducted.[12] Treasury I also attempts to tax all assets and business forms (except owner-occupied housing) equally. To this end, tax depreciation for each depreciable asset would equal the Treasury's best estimate of true economic depreciation, the investment tax credit would be dropped, real capital gains would be taxed at the regular income tax rate, and half of corporate dividends would be deductible at the corporate level. The indexation of inventory gains, the removal of the tax credit, and the proposed tax depreciation treatment would result in ρ-d equaling $r/(1-\tau)$ for all properties except owner-occupied housing, and the partial dividend exclusion would reduce discrepancies between the r's for corporate and noncorporate investments.

Treasury II retreats from these principles in significant respects: all interest would continue to be deductible, investors in nondepreciable assets would have the option of paying taxes on nominal capital gains at one-half of the regular income tax rate, tax depreciation would exceed economic depreciation, and only one-tenth of dividends would be deductible. Tax depreciation would be especially generous for equipment that continues to be classified as 3 or 5 years and for public utility structures; allowable depreciation would exceed that under current law even at zero inflation. However, most 5-year equipment would be reclassified as 6,7 and even 10 year equipment. For industrial structures, tax depreciation would be more favorable only at inflation rates of 6 percent or greater.

Table 6 contains tax rates relevant to household behavior. The numbers for the different income levels in the table are the tax rates relevant to the quantity-demanded and tenure-choice (in parentheses) decisions. The maximum rates at the bottom of the table are the assumed marginal rates at which interest income and corporate equity are taxed, and the rates implicitly built into tax-exempt yields. The income tax rates reflect the deductibility of a 0.06 state and local income tax rate under current law and Bradley-Gephardt, but the nondeductibility under Kemp-Kasten and the Treasury plans.

From equation (7) and the surrounding discussion, τ_e is a weighted average of $\tau_{im}/2$ (one-tenth weight) and the capital gains tax rate (nine-tenths weight), $(1\text{-excl})\tau_{im}/4$ where excl is the capital gains exclusion. The exclusions are: 0.6 (current law), 0.0 (Bradley-Gephardt and Treasury I), 0.4 (Kemp-Kasten) and 0.5 (Treasury II). The tax rate implicit in tax-exempt yields is defined by $x_e = (\beta-0.3)\tau_f$.

The own-equity financing rates and loan-to-value ratios for owner-occupied housing are fully specified by equations (6), (7), and (9) and the provisions of the reform proposals. For Bradley-Gephardt, the surtax applies to the three highest income classes; thus own-equity financing (the tax-exempt interest rate being the opportunity cost) is cheaper than debt financing and a 50 percent loan-to-value ratio is assumed. The interest indexation feature of Treasury I ($\beta < 1$) would also have a major impact on the opportunity cost of own equity financing generally (as well as on tax-exempt yields -- see note d to Table 6). Because only 55%/38% of nominal interest income would be taxed in a five/ten percent inflation world, the tax rate relevant to own equity financing would be 55%/38% of the marginal rates shown in Table 6 or the tax-exempt rate, whichever is less.

The partial dividend exclusion is of little import in our model because only 10 percent of equity financing is from new share issues on which dividends are paid. (Dividends are saved initially by the the retention of earnings, offsetting the future payment of dividends.) Thus γ in the model is only 0.05 under Treasury I and 0.01 under Treasury II, 10 percent of the 50 and 10 percent exclusions, respectively.

Impacts on Interest Rates and Capital Allocation, 5% Inflation

Table 7 lists the present value of depreciation allowances (z) for corporate and noncorporate (in parentheses) investments under current law and the various reforms. The values reflect the depreciation rules, the assumed 5% inflation rate (the depreciation base is indexed under the Treasury plans and Kemp-Kasten), and the discount rates listed at the bottom of the table. The differences in discount rates across assets for any given tax regime primarily reflect two factors.[13] For corporate and noncorporate equipment, the differences are largely determined by the extent of taxation of equity returns at the personal level (the differences vary directly with τ_e). For noncorporate equipment and structures, the differences largely reflect the two and a half percentage point difference in risk [$(1-b)\delta$ equals 0.025 for real estate and 0.05 for other assets]. The lower is the discount rate, the greater is the present value of depreciation deductions, ceteris paribus.

Because the discount rates are quite similar across reforms, differences in the z values across reforms are largely due to the generosity of the depreciation allowances. Clearly, Kemp-Kasten is the most generous (its z's are less than unity because the real after-tax discount rate implied by the model, roughly 7 percent, on average, exceeds 3½ percent). Treasury II is close to current law for 18 year structures, but more favorable for equipment and far more favorable for public utilities. Both Treasury I and Bradley-Gephardt are considerably less generous than current law.

Table 8 contains the level of interest rates and the various investment hurdle rates under current law and the reforms. As can be seen, the reform-induced decline in interest rates varies from 3 percentage points under Treasury I, 2 points with Bradley-Gephardt, one point with Treasury II, to zero with Kemp-Kasten. This variation contrasts markedly with the near equality of after-tax discount rates across reforms listed in Table 7. The far higher level of interest rates under Kemp-Kasten than under Treasury I follows directly from their different methods of attempting to achieve tax neutrality across assets with different lives. As was shown above, when neutrality is achieved by expensing (Kemp-Kasten), the real after-tax interest rate equals the net marginal products; when neutrality is obtained by setting tax depreciation equal to true economic depreciation (Treasury I), the real after-tax interest rate equals the net marginal products times one less the business tax rate.

The biases inherent in current law when inflation is five percent were discussed above. Whether the reforms would dampen them is of interest. All reforms do reduce the bias in favor of equipment by removing the investment tax credit, but some bias is still retained under Treasury II and Kemp-Kasten owing to the indexed depreciation schedules in excess of economic depreciation. The Treasury plans and Bradley-Gephardt would also more than remove the bias against inventories, the Treasury plans through their indexation of inventory gains and Bradley-Gephardt by its generally unfavorable treatment of depreciable assets. The bias in favor of utilities tends to shrink in all cases owning to the removal of the investment tax credit, but the rental cost declines nevertheless under Kemp-Kasten and especially Treasury II because of their relatively generous depreciation allowances.

The plans differ the most, however, in their treatment of owner-occupied housing. Under current law, the rental cost of this housing is over 3 percentage points higher for households with adjusted gross income of $17,500 than for households with AGI of $130,000. All reforms would narrow this difference, but the spread is still nearly 2 percentage points under Treasury II and 1½ points under Treasury I. With Bradley-Gephardt and Kemp-Kasten, the spread is only one-third of a point.[14] Treasury I would also sharply increase the bias in favor of all owner-occupied housing by its indexation of interest expense for all investments except owner-occupied housing, and Bradley-Gephardt would increase the bias by its generally unfavorable treatment of depreciable assets.

The data in Table 9 indicate how the capital stock would be reallocated under the various reforms. These reallocations follow fairly directly from the realignment of investment hurdle rates just discussed. Owing to the loss of the investment tax credit, equipment and utilities would shrink under all plans, except utilities would rise in response to the far more generous depreciation allowances in Treasury II. Industrial and commercial structures, in contrast, would grown under all reforms except Treasury I. The Treasury I results are driven by the exemption of home mortgage interest from the interest indexation provision. This exemption, along with the 3 percentage point decline in interest rates, raises the demand for owner-occupied housing by 28 percent, a rise fueled by an 8 percentage point increase in the homeownership rate. While rental housing is curtailed correspondingly, residential structures rise by 9 percent overall, crowding out other real capital. Treasury II and Kemp-Kasten have virtually identical impacts, except for the distribution of corporate structures between utilities and industrials; Bradley-Gephardt is similar to Kemp-Kasten except that it generally favors real estate assets more and corporate assets less.

The homeownership rate declines slightly under Treasury II and Kemp-Kasten, with the declines being concentrated in the higher income classes where the cut in marginal tax rates is greatest. The unchanged rate under Bradley-Gephardt is the net result of significant increase in ownership by households with incomes under $25,000 and decrease by those with incomes over $55,000.

Inflation Neutrality

Only Treasury I and Kemp-Kasten make serious attempts at achieving inflation neutrality, the latter by proposing effective expensing of capital outlays and the former by setting tax depreciation equal to economic depreciation and indexing both depreciation allowances and interest. As can be seen in Table 10, Kemp-Kasten comes close to achieving neutrality: no asset other than inventories changes by more than one percent in response to a ten percentage point increase in expected inflation, and the inventory change is only -3 percent. With indexing of inventories, Kemp-Kasten would be inflation neutral. The interest rate response to inflation is roughly the $1/(1-\tau)$ one would expect (the average τ for Kemp-Kasten is about 0.3).

Treasury I is far less successful in achieving neutrality. This failure follows directly from the exclusion of home mortgage interest expense from the interest indexation provision. As a result, the interest rate response to inflation is greater than the unity one would expect in a fully interest-indexed system, and the demand for business capital, especially double-taxed corporate capital, falls. Because the interest rate increase is not sufficient to maintain the real after-tax interest rate for owner-occupied housing [$di/d\pi$ $1/(1-\tau_h)$, where τ_h is the rate at which nominal home mortgage interest is deductible], a significant increase in both the homeownership rate and the quantity of housing demanded by owning households occurs.

Higher inflation is very negative for owner-occupied housing under current law and would continue to be under Treasury II because the average tax rate at which expenses are deductible is significantly less for owner housing than for other capital. Thus, the real after-tax interest rate paid by owners tends to rise, while that for other capital falls (see Titman, 1982).[15] This negative impact would be dampened under the other reforms because the differential between tax rates at which expenses are deductible would narrow (less by Bradley-Gephardt, which allows mortgage interest deductibility at only the 14 percent rate, than under Kemp-Kasten). Nonetheless, both Treasury II and Bradly-Gephardt are significantly more inflation neutral than current law.

The other major implication of Table 10 is the benefit of inflation for less risky noncorporate depreciable real estate (commercial and rental structures), relative to risky corporate depreciable properties. The double taxation of corporate capital implies a greater increase in its financing rate for a given increase in the interest rate than is the case for noncorporate business. The relatively greater financing rate raises the rental cost both directly and indirectly via reduced depreciation deductions in present value terms.

V. Supply of Capital Responses

The impacts of the reform proposals on interest rates reported above were based upon the assumption of zero interest elasticity of savings or, more accurately, of the supply of capital. Other assumptions are possible. The implications of them are briefly explored here.

Summers (1981) has noted that infinite long-run interest rate elasticity is implied by the pure life-cycle model when households have a strong bequest motive. Under this assumption, the after-tax return to savers is fixed and thus the new interest rate level (i_r) can be expressed in terms of the pre-reform level (i_o) and the tax rates on saving before and after the enactment of the reform (t_o and t_r):

$$i_r = \frac{1-t_o}{1-t_r} i_o.$$

To utilize this relation, the t's must be identified with a tax rate in our model. Higher income households are less likely to be wealth constrained than other households and are thus more likely to behave as the life-cycle model suggests. Higher income households also do most of the saving in the U.S. and hold most of the wealth. The natural counterpart for t in the model is thus x_e, the tax rate implicit in tax-exempt yields. This is the after-tax risk-free return to households with incomes above roughly $70,000 under current law and all the reforms.

Table 11 lists the calculated interest rates under the various reforms for two different methods of calculation. Column 1 summarizes the level of rates provided by our capital allocation model (zero saving or supply of capital response). Column 2 presumes that savings behavior maintains the real 10-year tax-exempt yield. As can be seen, endogenous saving or supply behavior leads to interest rate declines roughly comparable to those obtained with the fixed-capital model for all reforms except Kemp-Kasten. Thus for the Treasury plans and Bradley-Gephardt, the percentage changes in the various capital components would be quite similar in the case of endogenous saving to those presented above.

With Kemp-Kasten, endogenous saving results in a percentage point decline in rates; marginal tax rates are cut significantly and thus before tax interest rates must decline to prevent after-tax interest rates from rising.[16] In contrast, the substantial investment incentives (depreciation and capital gains) prevent the total demand for capital from falling, the quantity demanded would increase in response to the decline in interest rates and thus all capital components would tend to grow.

A further complicating factor in the determination of the impact of tax reform on interest rates is the net foreign demand for U.S. capital. Unless foreign countries cut their marginal tax rates on interest income or move their interest rates pari passu with those in the U.S., a decline in U.S. interest rates would represent a decline in after-tax returns to foreigners. As a result capital would flow out of the U.S. and domestic interest rates would not need to fall as much to bring the demand and supply of capital in the U.S. into balance. In the extreme case of no adjustment in foreign taxes or interest rates and perfectly elastic international capital flows, U.S. interest rates would not fall at all but the U.S. capital stock would, the fall being greater the larger is the decline in interest rates computed from the fixed-capital stock model. A more balanced view would incorporate less than perfectly elastic capital flows and significant changes in foreign interest rates in response to movements in U.S. rates. Thus a fall in foreign demand for U.S. capital would tend to dampen the decline in U.S. rates, but not eliminate it.

For Treasury II and Kemp-Kasten, the domestic and foreign supply of capital responses are offsetting. Because the decline in interest rates necessary to maintain real after-tax interest returns to domestic savers is greater than that generated by the fixed-capital model, interest rates will tend to fall by more than the latter calculation and the U.S. capital stock would tend to grow. On the other hand, any decline in U.S. rates induces a movement of capital abroad which tends to limit the decline. Thus, the direction of bias in the rate declines computed from the fixed-capital stock model is uncertain.

For Treasury I and Bradley-Gephardt, the domestic saving response (weakly) reinforces the dampening influence of the foreign response, i.e., the level of taxable interest rates necessary to maintain tax-exempt yields is higher than that generated by the fixed capital stock model. We ran alternative simulations for rate declines equal to two-thirds those produced by the fixed-capital model. In these, the aggregate capital stock was determined endogenously as that consistent with the imposed rates. The total capital stock fell by 7 percent in the Treasury I simulation, where the interest rate was raised one percentage point above the model determined level, and by 5 percent in the Bradley-Gephardt simulation, where the interest rate was raised by two-thirds of a percentage point. As a result, all capital components fell relative to the fixed-capital simulations. Because the higher level of interest rates lowers the present value of tax depreciation on longer-lived capital more than on shorter-lived capital, the allocations of the lower capital stocks are tilted slightly more toward shorter lived capital than are the allocations of the fixed capital stock.

VI. Summary

The paper begins with presentation of a methodology for computing rental costs of capital under any tax regime. Current tax law is then specified and rental costs are calculated. At a five percent inflation rate, the tax-favored assets under current law are equipment, with its generous tax credit, and housing, especially that occupied by high-income households. The tax-penalized assets are inventories, whose inflationary gains are not indexed, and corporate structures, especially industrial structures that receive no tax credit. Also, corporate investments are penalized relative to noncorporate, owing to their double taxation, and risky assets are penalized relative to less risky real estate assets. The difference in hurdle rates for industrial structures and housing, on average, is 4½ percentage points. The difference in the cost of housing for high and low income owners is over 3 percentage points.

A model is then constructed to allow calculation of the impact of changes in tax regimes and/or expected inflation on interest rates and the allocation of real capital. The model allocates a fixed private capital stock amoung various classes of nonresidential and residential capital, depending upon the rental costs for the capital components, the price elasticities of demand with respect to the rental costs, and the elasticities of homeownership with respect to the cost of owning versus renting. The interest rate adjusts in response to tax changes so as to maintain the aggregate demand for capital at this initial level. The fixed capital stock assumption implies zero interest elasticity of saving.

The impacts of four tax reforms are then analyzed: Treasury I (TI), Treasury II (TII), Bradley-Gephardt (BG) and Kemp-Kasten (KK). The greater are the investment incentives of a tax plan, the higher is the level of interest rates computed by the model. Accordingly, interest rates are unchanged in response to KK with its near expensing of depreciable capital, but decline by a percentage point under TI, two points under BG and three points under TII with indexation of interest income and expense (except home mortgage interest).

All reforms reduce the current bias in favor of equipment by removing the investment tax credit, but some bias is still retained under Treasury II and Kemp-Kasten owing to the indexed depreciation schedules in excess of economic depreciation. The Treasury plans and Bradley-Gephardt would also more than remove the bias against inventories, the Treasury plans through their indexation of inventory gains and Bradley-Gephardt by its generally unfavorable treatment of depreciable assets. The bias in favor of utilities tends to shrink in all cases owning to the removal of the investment tax credit, but the rental cost declines nevertheless under Treasury II, especially, Kemp-Kasten because of their exceptionally generous depreciation allowances.

The plans differ the most, however, in their treatment of owner-occupied housing. Under current law, the rental cost of this housing is over 3 percentage points higher for households with adjusted gross income of $17,500 than for households with AGI of $130,000. All reforms would narrow this difference, but the spread is still nearly 2 percentage points under Treasury II and 1½ points under Treasury I. With Bradley-Gephardt and Kemp-Kasten, the spread is only one-third point. Treasury I would also sharply increase the bias in favor of all owner-occupied housing by its indexation of interest expense for all investments except owner-occupied housing, and Bradley-Gephardt would increase the bias by its generally unfavorable treatment of depreciable assets.

We next examined the sensitivity of the tax regimes to inflation by computing the changes in asset categories when the expected inflation rate increases from zero to ten percent. Kemp-Kasten is close to inflation neutral; only inventories change by more than one percent and there the change is only 3 percent. Treasury I is even less neutral than current law, owing to its exclusion of home mortgage interest expense from the interest indexation provision. Treasury II and Bradley-Gephardt are significantly more neutral than current law, but each contains a strong bias against owner-occupied housing, because interest is deducted at a much lower tax rate by owners than by other business, and in favor of depreciable real estate.

Lastly, we considered endogenous supply of capital responses -- a positive elasticity of domestic and net foreign saving to increases in the relevant real after-tax interest rates. The domestic and foreign responses are offsetting under Treasury II and Kemp-Kasten, leading us to believe that the computed interest rate effects are appropriate. The expected interest rate declines in response to Treasury I and Bradley-Gephardt could be smaller than those computed with the fixed-capital stock model.

FOOTNOTES

1.This does not mean we believe the plans to be revenue-neutral. In particular, Kemp-Kasten clearly is not. We analyze it nonetheless because its proinvestment features are unique among the reforms.

2.We do not consider the impact of imperfect loss offsets. For an analysis of these and other details of corporate taxation, see Auerbach (1983).

3.This is only true, of course, if the τ's in equation (1) are the same for all assets. In fact, the τ's are zero for owner-occupied housing. Given this fact, expensing for depreciable assets and the nondeductibility of property taxes on owner-occupied housing would lead to tax neutrality -- $\rho - d = r$ for both depreciable assets and owner-occupied housing -- but setting tax depreciation equal to economic depreciation would not.

4.Optimal bond trading is discussed in Constantinides and Ingersoll (1984). Other sources of the low implicit yield in longer-term tax exempts are the greater risk of losses due to default and call on municipals relative to Treasuries and the 80 percent limitation of the portion of interest on indebtedness to carry tax exempts that commercial banks can deduct.

5.Sixty percent of owning households with incomes under $15,000 in 1983 had house-to-income ratios exceeding 4, suggesting that the households were retired, and did not have a mortgage. In contrast, eighty percent of owning households with incomes over $25,000 had mortgages and only five percent with incomes above $25,000 had house-to-income ratios above 4.

6. The National Association of Homebuilders (1985, p.51) assumes a 14 percent value for e when π is six percent. This inflation rate translates into a tax-exempt rate just above 8 percent in our model and thus a risk premium of about 6 percent. Price-Waterhouse has used an e of 16 percent in their calculations.

7. Hendershott (1981) discusses why midway values would be expected.

8. The impact of $(1-b)\delta$ on ρ is $(1-\tau z)/(1-\tau)(1+\pi)$, ignoring the effect on z. The impact on $\rho-\delta$, the risk-adjusted hurdle rate, is thus $[\tau(1-z)-\pi(1-\tau)]/(1-\tau)(1+\pi)$. With $z = \tau = 0.5$, the two and a half percentage point greater $(1-b)\delta$ for risky assets raises $\rho-\delta$ by just over a percentage point.

9. The model is both an extension and simplification of that used by Hendershott and Shilling (1982) to analyze the Economic Recovery Tax Act of 1981. The extension is a more detailed treatment of nonresidential capital; the simplification is an exogenous specification of risk premia. Gravelle (1985) uses a somewhat similar model to analyze Treasury I.

10. The rental costs for 3- and 5-year equipment were seen in Table 2 to be quite similar.

11. The decline has already shown up in younger, more mobile households. For married households under 40, the decline in ownership rates between 1980 and 1983 were, by five year age category: 14-19 (.273 to .168), 20-24 (.361 to .319) 25-29 (.586 to .522), 30-34 (.752 to .697) and 35-39 (.826 to .786). (The .273 for the 14-19 category is for 1978, when this ownership rate peaked.) For older married households, ownership rates have been constant or have risen.

12.The Treasury would assume a real interest rate of 6 percent and allow the deduction of (or would tax) only $6/(6+\pi)$ of interest paid (or earned), where π is the actual inflation rate in a tax year. Thus if inflation were 5 percent, only 55 percent of interest would be taxed and deducted. With zero inflation, all interest would be taxed and deducted; with 10% inflation only 38 percent would. (However, mortgage interest outlays on one's principal residence would be fully deductible.)

13.The differences are also somewhat sensitive to b if $\tau - x$ is large and to $\tau - \tau_{im}$, which is over 0.1 for Kemp-Kasten.

14.Deductibility of home mortgage interest (and state and local taxes?) at the lowest 15 percent rate, a la Bradley-Gephardt, would enhance the efficiency aspects of the Treasury plans.

15.This statement would seem to be at variance with the sharp shift to homeownership in the 1970s. The latter occurred because interest rates did not fully reflect expected general inflation and expected house price inflation likely far exceeded expected general inflation.

16.If Kemp-Kasten were made revenue neutral by increasing tax rates (marginal and average) on capital income, the decline in interest rates would be less.

REFERENCES

Auerbach, A.J., "Corporate Taxation in the United States," Brookings Papers on Economic Activity, 2, 1983, 451-505.

Berndt, E.R., "Reconciling Alternative Estimates of the Elasticity of Substitution," Review of Economics and Statistics, February 1976, 59-68.

Board of Governors of the Federal Reserve System, Balance Sheets for the U.S. Economy, April 1984.

Bulow, J.I., and L.H. Summers, "The Taxation of Risky Assets," Journal of Political Economy, 92, 1984, 20-39.

Constantinides, G.M., and J.E. Ingersoll, Jr., "Optimal Bond Trading with Personal Taxes," Journal of Financial Economics, 13, September 1984, 299-335.

Fullerton, D., "The Indexation of Interest, Depreciation, and Capital Gains: A Model of Investment Incentives," NBER Working Paper 1655, June 1985.

Gravelle, Jane G., "Effects of the 1981 Depreciation Revisions on the Taxation of Income from Business Capital," National Tax Journal, 35, March 1982, 1-20.

_______, "Assessing Structural Tax Revision with Economic Models: The Treasury Tax Proposals and the Allocation of Investment," Congressional Research Service, The Library of Congress, April 8, 1985.

Hall, R.E. and D.W. Jorgenson, "Tax Policy and Investment Behavior," American Economic Review, June 1967, 56, 391-414.

Hendershott, P.H., "The Decline in Aggregate Share Values: Taxation, Valuation Errors, Risk and Profitability," American Economic Review, December 1981, 909-922.

Hendershott, P.H. and D.C. Ling, "Tax Reform, Homeownership, and the Demand for Housing," mimeo, August 1985.

Hendershott, P.H., and J.D. Shilling, "The Impacts on Capital Allocation of Some Aspects of the Economic Recovery Tax Act of 1981," Public Finance Quarterly, April 1982, 242-273.

Hendershott, P.H., and J. Slemrod, "Taxes and User Cost of Capital for Owner-Occupied Housing," Journal of the American Real Estate and Urban Economics Association, Winter 1983, 375-393.

King, M.A., "An Econometric Model of Tenure Choice and the Demand for Housing as a Joint Decision," Journal of Public Economics, 14, 137-159.

Musgrave, J.C., "Fixed Reproducible Tangible Wealth in the United States, 1980-83," Survey of Current Business August 1984, 54-59.

National Association of Home Builders, "Impacts of the President's Tax Proposal on Housing," July 1985.

Summers, L.H., "Capital Taxation and Accumulation in a Life Cycle Growth Model," American Economic Review, 71, September 1981, 533-544.

Titman, S.D., "The Effect of Anticipated Inflation on Housing Market Equilibrium," Journal of Finance, 37, 1982, 827-842.

Table 1

Tax Rates Relevant to Housing Decisions Under Current Law

Income	Quantity Demanded			Tenure Choice
	Federal	State	Total	
17,500	.14	.03	.166	.147
27,500	.16	.035	.189	.210
40,000	.18/.22	.04	.232	.279
70,000	.28/.33	.05	.340	.390
130,000	.42	.06	.455	.450

Table 2

Net (of Depreciation) Risk-Adjusted
Rental Costs Under Current Law

	Tax Credit	Depr. Rate	π=.00 i=.0381	π=.05 i=.11	π=.10 i=.1859
Inventories	–	–	.0640	.0806	.1003
Equipment					
3-year	.06	.32	.0411 (.0284)	.0518 (.0436)	.0639 (.0462)
5-year	.10	.15	.0421 (.0301)	.0510 (.0428)	.0606 (.0429)
Structures					
10-year	.10	.08	.0648	.0737	.0818
15-year	.10	.05	.0751	.0822	.0879
Industrial	–	.03	.0961	.0992	.1022
Real Estate	–	.03	(.0685)	(.0618)	(.0537)
Owner-Occupied Housing					
17,500	–	.015	.0548	.0616	.0708
27,500	–	.015	.0536	.0589	.0666
40,000	–	.015	.0529	.0539	.0588
70,000	–	.015	.0462	.0415	.0397
130,000	–	.015	.0411	.0299	.0219

*Measured as ρ-d, less 0.025 for corporate assets and noncorporate equipment to adjust for their assumed greater risk. Data for noncorporate business investments are in parentheses.

Table 3
Private Capital Stock in the U.S. at the End of 1983

	Dollar Value (billions)		Percent Share
Inventories		814	12.0
Corporate	769		
Noncorporate	45		
Equipment		1451	
Corporate	1183		17.4
Noncorporate	269		4.0
Nonresidential Structures		1634	
10-Year Public Utilities	138		2.0
15-Year Public Utilities	322		4.7
Other Corporate	546		7.9
Noncorporate	628		9.2
Rental Housing		624	9.2
Corporate	70		
Noncorporate	553		
Owner-Occupied Housing		2269	33.4
		6793	100.0

Sources: Data for all assets except inventories and public utilities are from Musgrave (1984). The inventory data are from the Federal Reserve (1984) and the public utility data are based on the fractions given in Gravelle (1982), i.e., 28 percent of nonresidential structures are public utilities and 33 percent of these have a 10-year tax life.

Table 4
Assumed Distribution of Owner and Rental Housing
Across Six Income Classes

Income Range (thousands)	Households (millions)	Fraction that Own	% of Income of Owners	% of Income of Renters	Owner-Occupied Housing	Rental Housing
less than 12½	9.6	0	0	10	-	79
12½-25	24	.578	14	19	248	162
25-30	12	.614	12	13	211	116
30-50	22.4	.657	33	32	639	281
50-100	9.6	.739	28	19	601	161
over 100	2.4	.785	13	7	333	61
	80		100	100	2032	860

Table 5

Important Tax Parameters for Business Investment

	Current Law	Bradley-Gephardt	Kemp-Kasten	Treasury I	Treasury II
Maximum Corporate Tax Rate					
Federal	.46	.30	.35	.33	.33
Total	.4924	.342	.389	.37	.37
Investment Tax Credit	yes	no	no	no	no
Capital Gains	Nominal gains at 40% of regular rate	Nominal gains at regular rate	Nominal gains at 60% of regular rate or real gains at regular rate	Real gains at regular rate	Nominal gains at 50% of regular rate or real gains at regular rate
Depreciation Tax Deductions*	175%/150% DB or SL over 18/5 years	250% DB over 40/10 years	Near Expensing**	3% per year, SL, indexed	DB/SL over 28/6 years indexed
First year:					
Structures	10%	6%	6%	3%	4%
Equipment	30%	25%	20%	18%	27%
Tax on Inventory Gains	70% of regular rate	70% of regular rate	70% of regular rate	0	0
Interest Indexation	no	no	no	yes	no
Partial Dividend Exclusion	no	no	no	yes (50%)	yes (10%)

*All tax reforms have multiple maturity equipment classes. The first (full) years depreciation rates are for an "average" piece of equipment and for a current 18 year industrial structure.

**More than 100 percent, indexed for inflation, of the original value is written off at straight line rate over 25 years. With a low 3½ percent real discount rate, this is equivalent to expensing.

Table 6
Tax Rates Related to Households

Income Level	Current Law	Bradley-Gephardt	Kemp-Kasten	Treasury I	Treasury II
17,500	.166 (.147)	.166 (.068)	.27 (.159)	.18 (.115)	.18 (.120)
27,500	.189 (.210)	.170 (.099)	.275 (.222)	.185 (.138)	.185 (.149)
40,000	.232[a] (.279)	.174 (.139)	.28 (.265)	.19 (.166)	.19 (.204)
70,000	.340[b] (.383)	.183 (.204)	.29 (.286)	.30 (.274)	.30 (.292)
130,000	.455 (.450)	.192 (.208)	.30 (.294)	.41 (.367)	.41 (.386)
Maximum Rates					
Interest Income (τ_{im})[c]	.53	.342	.30	.41	.41
Real Equity (τ_e)	.0742	.0941	.0555	.1128	.0667
Tax Exempts (x_e)	.322	.210	.245	.081[d]	.231
Deductibility of Property Taxes	Yes	Yes	Yes	No	No

a) Average of 0.213 and 0.251 used for the $30,000 to $50,000 income range; the rate jumps around $38,000.

b) Average of 0.316 and 0.364 used for the $50,000 to $100,000 income range; the rate jumps around $66,000.

c) These are the rates at which interest income is taxed (real interest under Treasury I). The rate at which business (noncorporate) interest expense would be deducted is lower under Kemp-Kasten and the Treasury plans, 0.2856 and 0.389 respectively, owing to the state and local offset at the Federal level.

d) This rate varies with the expected inflation rate because $x_e = (\beta-0.3)\tau_f$ and $\beta = .06/(.06+\pi)$. The value shown is for $\pi = 0.05$. For $\pi = 0.0$, $x_e = 0.231$; for $\pi = 0.1$, $x_e = 0.0248$.

Table 7
Present Value of Depreciation Deductions
for Corporate and Noncorporate Assets*
(Inflation Rate Equals 5%)

	Current Law	Treasury I	Treasury II	Bradley-Gephardt	Kemp-Kasten
Equipment					
3 year	.868	.853	.915	.885	.933
	(.876)	(.870)	(.922)	(.893)	(.936)
5 year	.782	.705	.836	.711	.898
	(.795)	(.734)	(.850)	(.728)	(.902)
Structures					
10 year	.622	.542	.807	.560	.770
15 year	.507	.415	.749	.440	.710
18 year	.483	.292	.428	.350	.669
	(.587)	(.448)	(.609)	(.434)	(.845)
Nominal After-Tax Discount Rate					
Corporate	.1264	.1308	.1301	.1281	.1345
Noncor. Equ.	.1170	.1200	.1226	.1180	.1321
Real Estate	.0843	.0915	.0922	.0889	.1055

*Noncorporate values are in parentheses.

Table 8
Interest Rates and Risk-Adjusted Net Rental User Costs*
(Expected Inflation Rate of 5%)

	Current Law	Treasury I	Treasury II	Bradley-Gephardt	Kemp-Kasten
Level of Interest Rates	.11	.0800	.1012	.0911	.1106
Inventories	.0806	.0616	.0609	.0698	.0800
Equipment					
Corporate	.0510	.0914	.0731	.0831	.0705
Noncorporate	.0428	.0784	.0651	.0701	.0620
Structures					
Utilities (15 yrs)	.0822	.0957	.0699	.0856	.0795
Industrials	.0992	.0965	.0870	.0847	.0787
Commercial and Rental (Noncorp.)	.0618	.0640	.0577	.0568	.0580
Owner-Occupied Housing					
17,500	.0616	.0398	.0548	.0466	.0503
27,500	.0589	.0395	.0544	.0461	.0498
40,000	.0539	.0391	.0539	.0442	.0492
70,000	.0415	.0320	.0443	.0437	.0482
130,000	.0299	.0249	.0357	.0432	.0472

*Measured as ρ-d, less 0.025 for corporate assets and noncorporate equipment to adjust for their assumed greater risk.

Table 9
Reallocation of Capital When Inflation is 5 Percent
(Percentage Change)

	Treasury I	Treasury II	Bradley-Gephardt	Kemp-Kasten
Inventories	2	2	1	0
Equipment	-15	-9	-12	-8
Utility Structures	-9	7	-3	0
Industrial Structures	2	9	10	15
Commercial Structures	-2	5	6	4
Residential Structures	9	0	3	0
Detail on Housing:				
Change in Home Ownership Rate	.078	-.025	-.001	-.026
Percentage Change in				
Rental	-33	7	2	8
Owner	28	-3	4	-4

Table 10
Percentage Changes in Capital in Response to an Increase in Expected Inflation from Zero to Ten Percent

	Current Law	Treasury I	Treasury II	Bradley Gephardt	Kemp-Kasten
Inventories	-3	-2	-1	-2	-3
Equipment	-8	-6	-1	-5	1
Utility Structures	-8	-11	-3	-6	1
Industrial Structures	-4	-12	-3	-3	1
Commercial Structures	18	-6	12	9	0
Housing	4	8	-1	2	0
$di/d\pi$	1.48	1.16	1.47	1.28	1.45
Change in Home Ownership Rate	-.100	.049	-.113	-.058	-.029

Table 11
Interest Rates Under Alternative Saving Assumptions
(Rate assumed to be 0.11 in absence of reforms)

	Fixed Capital Stock Allocation Model	Constant Real Tax-Exempt Yield (10 Yr.)
Treasury I	.0800	.0812
Treasury II	.1012	.0970
Bradley-Gephardt	.0911	.0944
Kemp-Kasten	.1106	.0988