

NBER WORKING PAPER SERIES

THE ADMINISTRATION TAX REFORM
PROPOSAL AND HOUSING

Patric H. Hendershott

David C. Ling

Working Paper No. 1740

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
October 1985

The research reported here is part of the NBER's research program in Taxation and project in Taxation and Capital Formation. Any opinions expressed are those of the authors and not those of the National Bureau of Economic Research.

The Administration Tax Reform Proposal and Housing

ABSTRACT

This paper estimates the likely impact of the Administration tax reform plan on housing. Our analysis incorporates two general equilibrium impacts -- a one percentage point decline in the level of interest rates and a decrease in the property tax rate on principal residences -- and corrects errors regarding discount rates and refinancing in the basic rental model.

A 7 percent increase in market rents (11 percent without the decline in interest rates) is projected. Consideration of the individual components of the Administration plan suggests that the only significant negative provision is the cut in the personal tax rate from 0.53 (including a 6 percent state and local rate deductible at the Federal level) to 0.41. Without this cut (and the decline in interest rates which is largely attributable to the cut), market rents would fall by 6 percent. Rents rise only because rental housing is a negatively taxed asset in the sense that a tax cut lowers the supply of the asset.

The general-equilibrium effects will offset the negative direct effects-- the cut in marginal tax rates and loss of deductibility of property taxes -- on owner-occupied housing in the aggregate. However, this housing will generally be cheaper for households with incomes below \$40,000 -- especially below \$25,000 -- but will be more expensive for those with incomes above \$60,000. This constitutes an improvement in both efficiency and equity because under current law the price of owner housing services is far lower for high income households than for low income households. Homeownership rates should increase by 2 to 3 percentage points for households with incomes below \$40,000 and 1 to 2 percentage points in the aggregate.

Patric H. Hendershott
321 Hagerty Hall
The Ohio State University
1775 College Road
Columbus, Ohio 43210

David C. Ling
Cox School of Business
Southern Methodist University
Dallas, Texas 75275

The Administration Tax Reform Proposal and Housing

Patric H. Hendershott and David C. Ling

In May 1985, the Administration finally endorsed a specific tax reform proposal. This was at least the fifth major proposal advanced, following Hall-Rabuska, Bradley-Gephardt, Kemp-Kasten and the Treasury Department.¹ Analyses of the Administration plan by Downs, Follain, the Homebuilders (NAHB, 1985b), and Maisel and Quigley have already appeared; however, little agreement exists among them. To illustrate, both Downs and Follain expect a 7 percent increase in rents, but the NAHB anticipates increases of 20 to 25 percent or more. None of these incorporates a change in the level of interest rates. Maisel and Quigley agree with NAHB if interest rates do not change, but because they anticipate a 2.6 percentage point rate decline, they expect a mere 3 percent rise in rents.

The wide range of estimated impacts alone suggests value in further analysis. In addition, several features of the underlying models commonly employed seem inappropriate, and neither zero nor the 2.6 percentage point decline in interest rates is reasonable. Correcting these features and incorporating a plausible decline in rates will lead to a better understanding of the Administration plan and its likely impact on housing.

The basic rental model has two shortcomings. First, the stream of tax depreciation allowances is discounted by the same rate used to discount the risky net operating income stream. Finance theory suggests that near-certain cash flows should be discounted by a near risk-free rate and risky cash flows by a risky rate. Second, additional borrowing to prevent the debt ratio from falling below its optimal level is not allowed. Prohibition against additional borrowing creates artificial gains from trading. Analyses of owner-occupied housing have one common deficiency. Elimination of the deductibility of

property taxes will not reduce demand to the extent implied in existing models because property tax rates (and the supply of local services) will be reduced to some extent in response to the loss of deductibility.

All the major tax reform proposals advanced to date will lower interest rates, although the magnitude of the decline will vary with the specific proposal (Hendershott, 1985). Reductions in investment incentives, such as elimination of the investment tax credit and decreases in tax rates at which households deduct interest expense, will lower real capital outlays and thus the demand for funds; reduced taxation of returns to savers will increase the supply of funds. On both accounts, interest rates will decline.² The NAHB recognized this in their analysis of Bradley-Gephardt, Kemp-Kasten and the original Treasury plan (1985a, p. 30) but not in their more recent study. Maisel and Quigley have recently joined us (1984c, 1985) in contending that rates will fall, but they threaten to give the position a bad name with the enormity of their assumed decline. A single percentage point decline is plausible (Hendershott, 1985) and is assumed in the calculations reported below.

The paper is divided into three sections and a summary. The first two deal with the measurement of equilibrium rents, for owner and rental housing respectively, under both current law and the proposed reform. A tax reform can alter asset prices, investor rates of return, and/or equilibrium rents (explicit for rental housing, implicit for owner housing). While all three variables might be expected to change, the primary adjustment will come in rents because capital market equilibrium and production costs, respectively, drive rates of return and asset values.³ The third section reports the estimated impact of the reforms on these rents and on the homeownership rate.

I. Owner-Occupied Housing

Three "prices" of owner-occupied housing services are relevant: the average price which influences the tenure-choice decision, the marginal price which determines the quantity demanded assuming the household chooses to own, and the "constrained" price for households that find owner housing unaffordable in the sense that they cannot purchase the optimal amount dictated by the marginal price. How these prices would be measured under both current law and the Administration plan is the subject of this section.

A. The Price of Owner-Occupied Housing Services

Households will purchase sufficient housing so that the rents from the last dollar spent plus the expected capital gains on that dollar equals the costs of obtaining the rents and gains. The costs included financing, upkeep and property taxes. Put another way, households will purchase sufficient housing so that the present value of all the after-tax cash flows, including the implicit rents, generated by the last dollar of house equals the equity the household supplies to obtain that dollar of house. If the rents and house price are expected to grow at rate $\pi-d$ (inflation less depreciation), v portion of the house is debt financed at rate i and the outstanding loan balance in period t is L_t , the annual maintenance and property tax rates are m and τ_p , the household is in the τ marginal tax bracket and has a required after-tax return on equity invested in the house of e , and the household expects to hold the house for N years, the rental cost of owner-occupied housing services from one dollar of housing can be deduced by solving equation (1) for R :

$$1-v = \sum_{t=1}^N \frac{R(1+\pi-d)^{t-1}}{(1+e)^t} - (1-\tau)i \sum_{t=1}^N \frac{L_{t-1}}{(1+e)^t} + \sum_{t=1}^N \frac{\Delta L_t}{(1+e)^t} - [(1-\tau)\tau_p + m] \sum_{t=1}^N \frac{(1+\pi-d)^{t-1}}{(1+e)^t} + \frac{(1+\pi-d)^N - L_N}{(1+e)^N}. \quad (1)$$

For the first dollars of house purchased, the right side of the equation exceeds the left because R is initially high. However, R declines as more dollars are purchased; eventually equality holds and the demand of the household is determined.

Equation (1) can be simplified in a number of illuminating ways. First, assume all-equity financing (v and all L's equal zero). The equation reduces to

$$R_j = e_j^a - \pi + d + m + (1-\tau)\tau_p,$$

where e^a is the required return on all-equity financed houses. The j subscripts, which were not included in equation (1) for simplicity, allow for e^a and τ , and thus R, to vary across households (the other variables also likely vary, but not in a systematic way). Next, allow for debt financing in which the loan-to-value ratio is continuously maintained at v. In this case, $L_t = v(1+\pi-d)^{t-1}$, $\Delta L_t = v(\pi-d)(1+\pi-d)^{t-1}$ and

$$R_j = r_j - \pi + d + m + (1-\tau)\tau_p, \quad (2)$$

where $r_j = v(1-\tau_j)i + (1-v)e_j$ is the "weighted average cost of capital."

In general, i is interpreted as the risk-free debt rate of maturity N. This is less than the commonly employed home mortgage rate because the latter includes premiums to compensate lenders for the prepayment and default options that households will, in an expected value sense, exercise systematically to the detriment of lenders. If one were to include these premiums as negative

cash flows in equation (1), then one should also include the present value of these probable gains from exercising the options as positive cash flows. We assume fair premiums in the sense that the cost and value of the options cancel.

The equity rate can be expressed as the after-tax debt rate plus a risk premium, ρ , which we assume for simplicity to be constant across households:

$$e_j = (1-\tau_j)i + \rho. \quad (3)$$

Because the risk per dollar of equity investment is less on all-equity financed investments than on partially debt-financed investments,

$$e_j^a = (1-\tau_j)i + \rho^a,$$

where $\rho^a < \rho$. Note that if $\rho = \rho^a / (1-v)$, then $r_j = e_j^a$. In our analysis, we follow the weighted-average cost of capital approach, but we modify (3) to reflect the attractiveness of tax-exempt securities to high-income households:³

$$e_j = \max \left\{ \begin{array}{l} (1-\tau_j)i + \rho, \\ i_e \end{array} \right. \quad (3')$$

where i_e , the exempt rate, is assumed to equal 0.7i under current law and 0.78i under the Administration plan (Hendershott, 1985).

In our empirical work, equation (1) is solved for R, after applying a 6 percent selling cost. We assume $N = 8$ (years), $\pi = 0.05$, a 0.012 depreciation rate on the structure which is 0.83 of the total investment so $d = .01$, $\tau_p = 0.012$, $m = 0.035$, and a 30-year amortizing debt-instrument initially financing 80 percent of the house at an 11 percent rate. The risk premium, ρ , for this equity investment which rises from 20 percent of the initial property value to, under our other assumptions, 45 percent of the value after 8 years is assumed to be 0.075.

Equation (1) presumes that households can purchase the optimal quantity of housing. More specifically, the household is presumed to be able to make a down payment of 20 percent of the value of the economically optimal house and to have sufficient income to qualify for a loan for the remaining 80 percent. Other combinations of equity and debt would not appreciably alter the results, but what about households that cannot achieve any combination (households that find housing "unaffordable")? These households could be renters or they could own a smaller house than the optimal, in which case the left side of equation (1) is less than the right and the calculation of R is not meaningful. To account for such households, initial monthly mortgage and property tax payments, net of tax savings, are also computed. In these calculations, the current 0.12 mortgage rate is used, not the 0.11 risk-free rate.

The tenure decision of households involves a comparison of the cost of obtaining housing services from owner-occupied housing relative to the cost of obtaining the same services from rental housing. One might be tempted to simply take the R_j from equation (1) and compare it with the equilibrium rents in the rental market. However, the cost of obtaining the average dollar's worth of owner-occupied housing services, not the marginal dollar, is required here. Thus the τ_j for this calculation must be redefined as the average tax rate at which housing related expenditures, including forgone interest on invested equity, are deducted (Hendershott and Slemrod, 1983).

B. The Administration Plan and Owner-Occupied Housing

The Administration plan would alter the rental cost of owner-occupied housing in three ways. First, property taxes would no longer be deductible at the federal level; the $1-\tau$ multiplying τ_p in equation (1) becomes unity. Second, marginal federal taxes are cut -- from a maximum of 0.50 to 0.35 or by 0.15 -- generally lowering the tax rate at which interest is deductible in (1)

and raising e in (3). However, the loss of the deductibility of state and local taxes partially offsets this decline; with an assumed maximum state and local rate of 0.06 deductible against federal taxes under current law but not under the reform, the decline in the maximum r in equation (1) is only 0.12. Third, interest rates will decrease by a percentage point, and e will also decline via (3).

Because the tax rates relevant to both the quantity-demanded and tenure-choice decisions vary widely across households, the rental costs are computed for three types of households at five income levels. The households considered are: married filing jointly with one earner and two dependents, married filing jointly with two earners and no dependents, and single with no dependents. A variety of income tax rates have been computed for these households assuming adjusted gross income (AGI) of \$17,500, \$27,500, \$40,000, \$70,000 and \$130,000. To hold resources constant, owning households with AGIs, assuming they rented, are compared to renting households with the same AGIs. Separate data are calculated for renting and owning households. The calculations assume:

- (1) the nonsingle households have average fringe benefits and nonhousing itemized deductions (excluding state and local income taxes) of their income classes (based on 1982 Statistics of Income data); single households are assumed to differ in that their other miscellaneous deductions are only half of their income classes and they have no excess medical deductions,
- (2) owning households purchase houses of dollar value equal to twice their AGIs and pay property taxes equal to 1.2 percent of their house values,
- (3) the second spouse income in two earner households is assumed to account for 40 percent of total income,

- (4) the average loan-to-value ratio over the assumed 8-year holding period is 70 percent (the calculations are not sensitive to this assumption), and
- (5) marginal state and local income tax rates are 3.0, 3.5, 4.0, 5.0, and 6.0 percent of state taxable income for households with AGIs of \$17,500 through \$130,000 respectively, and states allow the same deductions for computing AGI and the same itemized deductions from AGI to calculate state taxable income as the federal government does.

The first section of each panel in Table 1 provides the renter and owner marginal tax rates and the tenure choice tax rate at different income levels under current law.⁴ The total marginal rate for both owners and renters is the marginal federal rate plus the assumed state and local rate marked down to reflect its deductibility at the federal level.⁵ The second sections provide comparable data for the Administration plan. This plan would modestly raise AGIs by counting the first \$120 of health insurance benefits as income and significantly increase taxable income by eliminating deductions for state and local income, sales and property taxes. On the other hand, the exemption for self, spouse, and dependents would be almost doubled to \$2,000, and marginal federal tax rates would be lowered generally.

The marginal tax rates relevant to the quantity of owner-occupied housing demanded range from 18 to 41 percent for married households with one wage earner and two dependents (HH1). These rates are slightly higher than the corresponding current law marginal rate at the lowest income level considered, reflecting the initially higher 15 percent federal rate and the lack of deductibility of state and local income taxes at the federal level. At income levels above approximately \$25,000, the marginal rates for owners under the reform are roughly a sixth lower than current law.

Married households with two wage earners and no dependents (HH2) are typical of many first-time home buyers. While the average tax burden of these households differs from HH1 under both current law and the reform, the second panel of Table 1 reveals that marginal rates are identical for the two household types under current law and nearly so under the reform. The loss of two exemptions at the \$40,000 AGI level is just enough to leave HH2 owners in the 29 percent marginal bracket (versus 19 percent for HH1 owners).

Marginal rates are quite different for single households with no dependents (HH3), ranging from 22 to 53 percent for owners under current law. These rates are nearly half again as high (except at the highest income level) as the current law rates for HH1 owners. The Administration plan would reduce these marginal rates approximately 20 percent at all income levels.

Next consider the tax rate relevant to the tenure choice decision: the average rate at which housing related expenses are deducted. For all households but those at the lowest income level considered, the tenure choice tax rate lies between the marginal tax rates for owners and renters under current law. Tenure choice tax rates that are below the owner marginal rate would be the rule, rather than the exception at low to moderate incomes under the reform proposal because deductions for excess medical expenses and other "miscellaneous" items would be effectively eliminated or greatly reduced. No state and local tax deductions would be allowed and consumer interest expense would be limited for high income households. Moreover, the zero bracket amount would be raised to \$4,000. These changes would typically result in wasted housing-related deductions (because the zero bracket amount exceeds nonhousing itemized deductions) except at higher incomes, and thus the tenure-choice rate, a weighted average of zero and the marginal tax rates, would be less than the marginal rate. The average cost of owner housing will therefore tend to rise.

II. Rental Housing

Analysts generally assess the impact of tax reforms on rental housing by asking how the reforms would alter the required initial rents on a prototype residential project. The answer is obtained by manipulating an equality between the equity investment in the project and the present value of the cash flows the project is expected to generate. This procedure is described below with particular care being given to the choice of discount rates employed and financing assumptions made.

A. The Equilibrium Level of Rents

Equation (1) must be modified in a number of ways to make it applicable to rental housing. First, the rent and maintenance terms must be multiplied by $1-\tau$, the former being taxed and the latter deductible. Second, tax depreciation allowances can be deducted so τz must be added, where z , the present value of the deductions, is defined by

$$z = \sum_{t=1}^N \frac{dx_t}{(1+x)^t},$$

dx_t is the deduction on a dollar initial investment in structures, and x is the appropriate discount rate. Third, a tax is due upon sale so $TAXC/(1+e)^N$ must be subtracted, where

$$TAXC = \tau(\sum dx_t - N'/N^*) + \tau_{cg} [(1-\beta)(1+\pi-d)^N - (1-N'/N^*)] \quad (4)$$

under current law, and β is the selling cost as a proportion of asset value. The first term is the recapture of accelerated depreciation (N^* is the minimum number of years over which the property can be depreciated and N' is the minimum of N and N^*), and the second term is the gains tax applied to the sale price net of the adjusted basis. Finally, construction period interest and

property taxes (CPIT) must be accounted for and all the terms must be discounted additional periods to account for the lag between construction and operation. Hendershott and Shilling (1982a) provide a discussion of the nitty-gritty on most of these points.

Our methodology for computing rent levels under current law and the Administration proposal differs from that typically employed by real estate analysts in two key respects. First is the discount rate (x) used in calculating the present value of tax depreciation allowances. Financial economists argue that the relatively certain depreciation deductions should be discounted at a lower (less risky) discount rate than the relatively risky operating incomes (Brealey and Myers, 1984, p. 559). By a lower discount rate, we mean something less than the weighted-average cost of capital, say the 8-year tax-exempt rate, and far less than the required equity return, e . Of course, one could discount all cash flows by the same rate, call it d , that lies between e and i_e and gives the same V value.

What difference does it make whether one discounts all cash flows by d or some by e and some by i_e ? As long as tax reforms don't alter the pattern and relative importance of tax depreciation allowances, it doesn't make any difference. But the Administration proposal would substantially change the depreciation write off pattern, shifting from the front-loaded ACRS to back-loaded systems (but with more than 100 percent writeoff owing to the indexation of the depreciable base). Whether the present value of the new tax depreciation schedule is better or worse (or how much worse) than ACRS depends crucially on which discount rate is used. Too high a discount rate would discriminate against the later Administration deductions, while too low a rate would favor them. Real estate analysts have been using the highest possible rate, the required return on equity.

Another issue is the treatment of debt and equity in the model. At the margin (or at the optimal loan-to-value ratio), the after-tax cost of debt equals the cost of equity. The "average" cost of debt is, of course, "cheaper" because the debt is on average less risky. By using a two-tiered pricing approach, a low cost for debt and high cost for equity, the models are very sensitive to the loan-to-value ratio. In the models, the initial loan-to-value ratio is generally set at a plausible 70 to 80 percent level, but the loan is then presumed to amortize. Given that the asset value is generally assumed to inflate, the actual loan-to-value ratio falls significantly over time. After five years, the ratio on a property inflating at 4 percent per year financed with a 12½%, 25-year, 75% loan-to-value, fixed-rate mortgage would be 59%; after ten years the ratio would be 45%. Holding the equity rate constant, when it should be falling because the risk on the average equity dollar is falling, results in discounting distant cash flows, especially near-certain tax depreciation allowances, at too high a rate.

If a loan-to-value ratio of, say, two-thirds is optimal, letting the loan-to-value ratio decline to 59 percent after 5 years and 45 percent after 10 years could cause a significant economic loss to equity investors. Their obvious response would be to renegotiate a higher loan -- to refinance. But this response is not allowed in the typical real estate valuation model. The only way to reestablish a high loan-to-value ratio is to trade the property. Thus the "gains from trading" properties in these models include gains from reestablishing the optimal loan-to-value ratio, as well as from establishing a higher depreciable base. These gains must, of course, be weighed against sales costs and capital gains taxes at the time of sale.

Under the Administration plan, trading would be far less rewarding than under current law. There are fewer gains from establishing a higher base because the base is already indexed and depreciation is not frontloaded. As a

result, "optimal" expected future trading is minimal. If, however, trading is the only way to reestablish the desired loan-to-value ratio, trading will occur even if pure trading is unprofitable. Thus prohibition of refinancing, like the single discount rate assumption, could discriminate against the Administration reform proposal.

Many of the empirical assumptions were stated above. The depreciation rates differ slightly from owner-occupied housing owing to different land-to-value ratios and expected behavior of tenants. The depreciation rate for the asset price is set at 0.025 and for the rent stream is 0.0175. Also $r_p + m$ is 0.045. The holding period is determined endogenously as that which minimizes the rental price (Hendershott and Ling, 1984b).

B. The Administration Plan and Rental Housing

A comparison of the depreciable-real-estate provisions of current law and the Administration proposal is given in Table 2. Whether the individual changes would be beneficial or harmful to real estate is of interest. The Administration plan lowers the assumed tax rate from 0.53 to 0.41. Most industries (and households) benefit from tax cuts. Only if an industry is currently negatively taxed (would be less profitable if it weren't taxed at all), would a tax cut be harmful.

The proposed capital gains treatment is almost certainly more favorable than that under current law. Consider land first. Fifty percent of the lowered regular rate ($.5 \times .41 = .205$) is marginally less than forty percent of the current rate ($.4 \times .53 = .212$). Moreover, unless land increases in real value, no tax would be paid. Thus capital gains on land are certain to be taxed at a lower rate. Capital gains taxes on structures will also probably be lower. Approximating dx as constant over time, the tax will be

$$\text{TAXA} = \tau_{cg} [(1-\beta)(1+\pi-d)^N - (1+\pi^*-dx)^N], \quad (5)$$

where π^* is the general CPI appreciation rate. Compare this expression with the tax liability under current law as measured in equation (4). If depreciation allowances were not accelerated [the first sum in (4) is zero and $dx = d$] and real estate appreciates at the general inflation rate ($\pi = \pi^*$), then a significant tax liability exists under current law because the depreciation basis is not indexed, but no liability would be incurred under the Administration plan. If accelerated depreciation does exist ($dx > d$), a liability will be incurred under the reform, but a far greater liability would exist under current law owing to recapture at regular rates. Only if real-estate inflation far exceeds general inflation would a greater capital gains tax exist under the reform than under current law.

Turning to the timing of deductions, the present value of tax depreciation allowances under the Administration plan in a five percent inflation world, using a 9 percent nominal after-tax discount rate, is the same 0.61 per dollar of property that the value is under current law. That is, with five percent inflation, the Administration plan is as generous as current law. Because other analysts apply a much higher discount rate, they find the depreciation change to be negative for real estate. We have argued against use of a higher discount rate for the near riskless depreciation deductions and believe the correct rate currently is just under 9 percent.

The altered treatment of CPIT is a slight negative; rather than being written off over 10 years, these expenses would be capitalized under the Administration plan and written off over 28 years. Again using a 9 percent discount rate, the present value would fall from 0.036 per dollar of property to 0.030.

Under current tax regulations, all investments of individuals and partnerships, other than investments in real estate, are subject to "at-risk" limitations, i.e., a taxpayer's loss for any taxable year is limited to the amount the taxpayer has invested or has at-risk in the investment. Generally, the amount at-risk is the sum of the taxpayer's cash contributions to the activity and amounts borrowed for which the taxpayer has personal liability for repayment (recourse debt only). The amount at-risk is increased by the taxpayer's share of taxable income and subsequent cash contributions and is decreased by his share of tax losses and cash distributions.

The Administration plan would make income-producing real estate subject to at-risk rules. Because most real-estate investments are highly leveraged with nonrecourse mortgage debt and have generous depreciation allowances, significant losses can be incurred in the initial years of the investment. If interest rates (and loan-to-value ratios) are high enough, these losses will cumulate to more than the investor's equity contributions, in the absence of altered investor behavior, and some tax losses will not be deductible in the year in which they are incurred.⁷

Current law limits investment interest expense to \$10,000 plus net investment income⁸, but most real estate related interest expense (net leased property and land being the primary exceptions) is exempt from this limitation. The Administration plan would decrease the maximum current deduction for investment interest expense to \$5,000 plus net investment income and would include both consumer interest expense and interest expense on limited partnerships in the interest limitation. The impact of including the latter would be partially offset by the expansion of net investment income to include the taxpayer's share of income from limited partnerships (and his distributive share of income from Subchapter S corporations in which the taxpayer does not actively participate in management). The plan would be phased-in beginning in

1986, with only 10 percent of newly limited investment interest initially subject to the limitation. In each of the subsequent nine taxable years, the percentage would be increased by 10 percentage points.

With a 12% mortgage interest rate and a 75% loan-to-value ratio, the Administration's at risk and investment interest provisions would not bind on investors and thus could not impact on rents. Even with an 85% loan-to-value ratio, the provisions would not bind if interest rates declined by a percentage point. Moreover, while the provisions would clearly bind in a higher inflation and interest rate environment (in which case the depreciation and capital gains provisions of the Administration plan would become even more attractive relative to current law), behavioral responses by investors would virtually eliminate any negative impact.

The most likely behavioral response of investors to a binding at-risk provision would be to assume some personal liability for mortgage indebtedness, either at purchase or subsequently as needed, to ensure full deductibility of tax losses when they are incurred. The assumption of personal liability for losses beyond the actual equity does transfer some risk from the lender to the investor. However, the lender would presumably be charging for this risk: an 85 percent loan costs more than a 75 percent loan. Thus, the increased risk of the investor and the resultant higher required return on equity is roughly balanced by a lower loan rate; equilibrium rents would not rise noticeably. Because the investment interest limitation applies only to limited partnerships (and passive interests in Subchapter S corporations), the likely response to binding interest limitations would be a change in the ownership form to general partnerships and sole proprietorships.

III. Results

The results are discussed in three parts. First, the equilibrium change in rents is computed. This is the relevant statistic for inclusion in both the tenure-choice and quantity-demanded (for those who rent) decisions. Second, the likely impact of the reform on homeownership rates for households at the five income levels are reported. Third, percentage changes in the rental price for owner-occupied housing services are provided.

A. The Equilibrium Rent Level

The top part of Table 3 contains calculations of the impact on "rents" of (1) all provisions of the Administration plan except the personal tax rate cut and (2) the cut in the personal tax rate. The basic valuation model is varied in two dimensions: the refinancing assumption and the discounting method. The first calculation assumes zero refinancing; the others allow for continuous refinancing. More specifically, in the first variant the project is initially financed with a 75%-25 year 11 percent amortizing loan. In the other calculations, the loan is two-thirds of initial value and then stays at two-thirds of value over time.

As for discounting, the first two calculations are based on a single 0.152 discount rate, calculated as the ten-year tax-exempt rate -- 0.7 times our 0.11 interest rate -- plus a risk premium of 0.075. The remaining calculations follow the dual-discount method; the exempt rate plus 0.01 is used for the relatively certain tax depreciation and construction period interest and property tax write-offs, and a higher 0.239 equity rate is applied to the other cash flows. This equity rate is that which, in conjunction with the 0.087 tax-exempt rate, gives the same present value of the cash flows under current law as does the single 0.152 discount rate.

Note the difference the model changes make: going from zero refinancing and a single discount rate to continuous refinancing and the dual rate lowers the projected increase in residential rents from 12% to -6%. Taking the continuous refinancing first attributes 15 of the 18 point decline to the dual discount rate and only 3 to the refinancing; taking the dual discount rate first would lay 12 of the points on the discount rate and 6 on the refinancing.

The next number in Table 3 is the estimated impact on residential rents of the cut in the personal tax rate from 0.53 (a fifty percent Federal rate plus a deductible six percent state and local rate) to 0.41. The result is a 15 percent increase in rents. This sharp increase in response to a tax cut illustrates just how negatively taxed rental housing is under current law. Because a major goal of tax reform is to improve economic efficiency by taxing different sources of income and returns from capital assets more equally, one would anticipate that negatively taxed activities would not fare well.

Results for the full impact of the plan, both with and without a one percentage point decline in interest rates, are then reported. With the rate decline, the increase in rents is 7 percent. This rise is modest, especially in light of the fact that renters are scheduled to receive most of the personal tax cut contained in the Administration plan. For two of the three household types, the average tax rate will fall by 0.021 or more at the \$17,500 level and by larger amounts at higher income levels. That is, even if these households spend 30 percent of their incomes on rent, they would be able to continue to rent the same units (would spend $.3 \times .07 = .021$ on rent) and still purchase the same amount or more of other goods and services. For the third household type (married, two earners, no dependents), the tax cut is lower (the cut would be about as great if for the other household for two-earner households with two dependents).

The last number in Table 3 is a crude rent calculation for commercial properties. These properties are treated less favorably under current law than residential properties are because a different recapture provision causes most investors to choose straight-line depreciation. Thus, a switch to a new tax regime that treats residential and commercial properties symmetrically will have a less negative impact on commercial properties than on residential. The Administration plan should actually be slightly favorable to commercial real estate (initial net operating incomes will be lower after enactment of the reform than before).

B. Tenure Choice

Because the Administration plan both raises the zero bracket amount and reduces nonhousing-related deductions, some housing deductions will be wasted. This increases the average cost of obtaining services from owner-occupied housing. However, the increase is generally less than the 7 percent computed increase in rents, so the homeownership rate will tend to rise.

To deduce the expected change in homeownership, the equation estimated by Hendershott and Shilling (1982b) is employed. This equation relates the odds of owning to the average cost of housing services in the two tenure modes. The resulting changes in homeownership rates for the three household types at the five income levels are listed in Table 4. As can be seen, the rate generally rises, but the increase is minimal at higher income levels (above \$60,000). Moreover, for single households the rate would decline slightly at incomes above about \$30,000. A one or two percentage point increase in the aggregate homeownership rate is likely.

C. Owner-Occupied Housing

Table 5 contains percentage changes in the rental price for owner-occupied housing services for the three household types at the five income levels. Table 6 lists the percentage change in the after-tax cost of mortgage and property tax payments. Each reports results for the current level of interest rates and a one percentage point decline. Only the calculations based upon the reasonable decline in rates are discussed; the other numbers are reported for comparison purposes only. Each table also reports results for an increase in the net-of-tax property tax rate (a constant rate but lost deductibility) and a constant net-of-tax rate (a decline in property tax rates to offset the loss of deductibility).

In the absence of affordability constraints, the rental price, after-tax income and tastes determine a household's demand for housing services. As can be seen in the top panel of Table 5, the rental price falls for low and middle income joint filers even without a decline in property tax rates. For single earners with two dependents, housing demand will rise at income levels up to about \$35,000; for two-earners with no dependents, the cut off is about \$50,000. In contrast, the price will rise for virtually all single owning households and the percentage increase exceeds 10 percent for those with incomes above about \$55,000. This is because marginal tax rates are cut more sharply for singles, especially at higher income levels.

Where affordability is a problem, after-tax mortgage and property tax payments are a useful measure of "price". The percentage changes of these, shown in Table 6, have the same general pattern as the percentage changes in rental prices in Table 5. The difference is a slightly greater increase for high-income joint filers and a near doubling of the increase for singles at all

levels. The near doubling follows from the base upon which percentage increases are computed being about half as large for the payment calculation as for the rental price calculation.

The net-of-tax property tax rate is the price of obtaining municipally-provided services (Tiebout, 1956). Should the price rise owing to a reduction in federal deductibility, the demand for these services will decline and a call for a cut in the property tax rate will arise. In the limit (a perfectly elastic demand for municipal services), the property tax rate will decline sufficiently to offset the reduced deductibility. The second panel of Tables 5 and 6 present this limiting case. The expected result falls somewhere between the lower-interest-rate portions of the top and bottom panels.

The net impact of the changes for owner-occupied housing is difficult to discern. There are far fewer single owning households than joint filers, and median household income is under \$30,000. On the other hand, the median income of owners, especially joint-filers is probably about \$40,000. Moreover, higher income households obviously spend more on housing than lower income households so even if more households experience price declines than increases, the total demand for housing by owners could decline. Overall, we expect no change in the quantity of housing demanded by existing owners and a slight increase in total owner demand owing to a small projected increase in the homeownership rate.

IV. Summary

Our analysis of the impact of the Administration tax reform proposal differs from that of most others in a number of important respects. First, two general-equilibrium effects have largely been ignored in earlier studies: (1) the level of interest rates will decline by a percentage point in response to both a decline in the demand for funds to finance real capital outlays and an increase in the supply of funds and (2) the property tax rate on primary residences will decline because the loss of the deductibility of property taxes raises the price of municipally-supplied services and lowers the demand for them. Second, the basic rental housing model is misspecified in two ways: (1) risky net operating income and near-riskless tax depreciation cash flows are discounted at the same rate and (2) refinancing to keep the loan-to-value ratio near its optimal level is prohibited, thereby creating artificial gains from trading.

Our results differ significantly from those of most studies. The general-equilibrium effects on owner-occupied housing -- the one point decline in interest rates and the decline in property tax rates -- will offset the negative direct effects -- the cut in marginal tax rates and loss of deductibility of property taxes -- in the aggregate. There will, however, be distributional effects. Owner-occupied housing will generally be cheaper for households with incomes below \$40,000 -- especially below \$25,000 -- but will be more expensive for those with incomes above \$60,000. This constitutes an improvement in both efficiency and equity because under current law the price of owner housing services is far lower for high income households than for low income households. Homeownership rates should increase by 2 to 3 percentage points for households with incomes below \$40,000 and 1 to 2 percentage points in the aggregate.

A 7 percent increase in market rents (11 percent without the decline in interest rates) is projected. Consideration of the individual components of the Administration plan suggests that the only significant negative provision is the cut in the personal tax rate from 0.53 (including a 6 percent state and local rate deductible at the Federal level) to 0.41. Without this cut (and the decline in interest rates which is largely attributable to the cut), market rents would fall by 6 percent. Rents rise only because rental housing is a negatively taxed asset in the sense that a tax cut lowers the supply of the asset. Given that a major motivation of tax reform is to improve efficiency and equity by taxing different sources of income and returns from assets more equally, the 7 percent increase in rents (and the expected 2 percent decline in "rents" on commercial property) is surprisingly low.

The special provisions of the tax plan -- the elimination of tax-exempt financing, of the deductibility of interest for second homes, and of the special treatment of low-income housing -- have not been analyzed. These provisions do not affect market rents generally, and much of the benefit from the provisions is not even targeted to especially needy households. Part of the benefits are captured by developers, builders, and lenders, and the deductibility for second homes provides significant benefits only for households with second homes valued above \$100,000. Finally, even the "targeted" programs are known to be poorly targeted (Gainer, 1985 and Olsen, 1982).

FOOTNOTES

¹For our analysis of the first three proposals see Hendershott and Ling (1984c); the Treasury plan was considered in Hendershott and Ling (1985).

²The interest sensitivity of foreign net saving to international interest rate differentials. However, the tendency for foreign central banks to move their interest rates with American rates, the large role the U.S. plays in world capital markets, and differences in preferences and risks across national boundaries all ensure that a significant decline will occur.

³Even with low supply price elasticities, long-run price changes are small relative to long-run rent changes. Short-run price changes will also be small if investors anticipate future rent increases, which they will almost certainly do in light of the wide publicity given the most outlandish rent increase numbers. On both of these points, see Hendershott and Ling (1984a).

⁴Alternatively, we take into account the gains from optimally trading taxable bonds [see Hendershott's application (1985) of Constantidines and Ingersoll's analysis (1984) to the determination of tax-exempt coupon].

⁵These calculations follow the methodology of Hendershott and Slemrod (1983).

⁶For example, under current law the marginal federal tax rate for the \$17,500 AGI owner is 14 percent. With a 3 percent state and local rate, the total marginal rate is equal to $.14 + (1-.14).03 = .166$. For the \$17,500 renter, the total marginal rate (.19) is the federal marginal rate of 16 percent plus the full 3 percent state and local rate because this household does not itemize.

⁷ Disallowed losses for real estate investments would generally be carried forward until the year of sale because the amount at risk during the operating years will usually not otherwise increase; only when principal repayment of debt exceeds tax depreciation will taxable income exceed cash distributions. In the year of sale, loss carry forwards can be written off against ordinary income to the extent that gains from the sale increase the at-risk basis, i.e., the capital gain (net selling price minus the adjusted basis) is greater than sales proceeds or the selling price less the outstanding mortgage balance. This will usually be the case because the rate of tax depreciation will generally exceed the rate of mortgage principal amortization. Thus, tax deductions would not be eliminated, but merely postponed to the year of sale.

⁸ Net investment income is gross income less deductions directly connected with the production of investment income. Interest is not included in investment expenses for this purpose, and depreciation deduction is limited to the amount that would have been allowed had the property been depreciated under the straight-line method over its useful life.

REFERENCES

- Brealey, R. and S. Myers, Principals of Corporate Finance, McGraw-Hill, 2nd edition, 1984.
- Constantinides, G.M., and J.E. Ingersoll, Jr., "Optimal Bond Trading with Personal Taxes," Journal of Financial Economics, 13, September 1984, 299-335.
- Downs, A., "Impacts of the President's Proposed Tax Reforms Upon Real Estate," Urban Land, August 1985, 7-14.
- Follain, J.R., "Federal Income Tax Policy Toward Existing Housing: Past, Present and Future," mimeo, July 1985.
- Gainer, W.J., "Mortgage Revenue Bonds: Their Costs Outweigh Their Benefits to Homebuyers," Housing Finance Review, October 1984, 457-465.
- Hendershott, P.H., "Tax Reform and Financial Markets," NBER Working Paper, September 1985.
- Hendershott, P.H. and D.C. Ling, "Prospective Changes in Tax Law and the Value of Depreciable Real Estate," Journal of the American Real Estate and Urban Economics Association, Fall 1984a.
- _____, "Trading and the Tax Shelter Value of Depreciable Real Estate," National Tax Journal, June 1984b.

_____, "Tax Reform and Housing," NBER Working Paper No. 1524, November 1984c.

_____, "The Treasury's Tax Reform Proposal and Housing," Tax Notes, March 11, 1985, 1041-46.

Hendershott, P.H. and J.D. Shilling, "The Economics of Tenure Choice, 1955-79," in Sirmans (ed.) Research in Real Estate, Vol I, JAI Press, 1982a, 105-133.

_____, "The Impacts on Capital Allocation of Some Aspects of the Economic Recovery Tax Act of 1981," Public Finance Quarterly, April 1982b, 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.

National Association of Home Builders, "Summary Analysis of the Impacts of Tax Reform Proposals on Housing Cost and Housing Activity," January 23, 1985a.

_____, "Impacts of the President's Tax Proposal on Housing," July 1985b.

Maisel, S.J. and J.M. Quigley, "Tax Reform and Real Estate," Working Paper 85-100, Center for Real Estate and Urban Economics, University of California, Berkeley, July 1985.

Olsen, E.O., "Housing Programs and the Forgotten Taxpayer," Public Interest, Winter 1982, 97-109.

Tiebout, C., "A Pure Theory of Local Expenditures," Journal of Political Economy, October 1956, 416-424.

Table 1

Tax Rates of Owners and Renters:
Three Different Household Types

	Adjusted Gross Income (thousands)				
	17.5	27.5	40	70	130
<u>Married; 1 Earner; 2 Dependents</u>					
Current Law					
Renter Marginal	.190	.255	.309	.411	.483
Owner Marginal	.166	.189	.251	.364	.455
Tenure Choice	.146	.211	.279	.402	.476
Administration Plan					
Renter Marginal	.180	.185	.290	.300	.410
Owner Marginal	.180	.185	.190	.300	.410
Tenure Choice	.099	.135	.198	.300	.410
<u>Married; 2 Earners; No Dependents</u>					
Current Law					
Renter Marginal	.190	.255	.309	.411	.483
Owner Marginal	.166	.209	.251	.364	.455
Tenure Choice	.176	.223	.283	.400	.475
Administration Plan					
Renter Marginal	.180	.185	.290	.300	.410
Owner Marginal	.180	.185	.290	.300	.410
Tenure Choice	.099	.135	.228	.300	.410
<u>Single; No Dependents</u>					
Current Law					
Renter Marginal	.230	.363	.405	.525	.530
Owner Marginal	.224	.325	.366	.525	.530
Tenure Choice	.214	.327	.396	.510	.530
Administration Plan					
Renter Marginal	.180	.285	.390	.400	.410
Owner Marginal	.180	.285	.298	.400	.410
Tenure Choice	.132	.228	.278	.400	.410

Table 2

Major Tax Provisions Affecting Rental Housing

	Current Law	Administration Plan
Maximum Personal Tax Rate		
Federal	.50	.35
Total	.53	.41
Capital Gains		
Land	Nominal Gains at 40% of Regular Rate	Nominal Gains at 50% of Regular Rate or Real Gains at Regular Rate
Structures	Nominal Gains at 40% of Regular Rate	Real Gains at Regular Rate
Depreciation Tax Deductions	175% DB or SL over 18 years, 10% in year 1	112% DB or SL over 28 years, indexed, 4% in year 1
Construction Period Interest and Property Taxes	Amortized over 10 Years	Capitalized
Limited Partners Subject to Investment Interest Rules	no	yes
All Investors Subject to At-Risk Rules	no	yes

Table 3

Impact of Administration Plan on "Rents"

Components of Plan	% Change in Rents
Administration Plan Excluding Cut in Personal Tax Rate	
Zero Refinancing, Single Discount Rate	12
Continuous Refinancing, Single Discount Rate	9
Continuous Refinancing, Dual Discount Rate	-6
Cut in Personal Tax Rate	15
Full Administration Plan, Continuous Refinancing, Dual Discount Rate	
No Change in Interest Rates	11
One Percentage Point Decline	
Residential Property	7
Commercial Property ^a	-2

^aDiffers from residential property only in that straight-line depreciation is assumed under current law.

Table 4
Changes in Homeownership Rates
Induced by the Administration Plan

Household Type Income Level	HH1	HH2	HH3
17,500	.052	.040	.030
27,500	.029	.024	.009
40,000	.019	.026	-.003
70,000	.001	.002	-.018
130,000	.004	.005	-.017

HH1: married, one earner, two dependents.

HH2: married, two earners, zero dependents.

HH3: single, zero dependents.

Table 5

Percentage Change in the Marginal Costs of Obtaining
Housing Services from Owner-Occupied Housing

Increase in Net-of-Tax Property Tax Rate

AGI	11% Interest Rate			10% Interest Rate		
	HH1	HH2	HH3	HH1	HH2	HH3
17,500	-	-	6	-6	-6	-
27,500	2	4	9	-4	-2	2
40,000	8	1	12	2	-5	6
70,000	11	11	21	5	5	14
130,000	12	12	20	6	6	14

Constant Net-of-Tax Property Tax Rate

AGI	11% Interest Rate			10% Interest Rate		
	HH1	HH2	HH3	HH1	HH2	HH3
17,500	-1	-1	4	-7	-7	-3
27,500	-	2	5	-6	-4	-1
40,000	6	-2	8	-1	-8	1
70,000	7	7	13	1	1	7
130,000	6	6	13	-	-	6

HH1: married, one earner, two dependents.

HH2: married, two earners, zero dependents.

HH3: single, zero dependents.

Table 6

Percentage Change in the After-Tax Cost
of Mortgage and Property Tax Payments

Increase in Net-of-Tax Property Tax Rate

AGI	12% Mortgage Rate			11% Mortgage Rate		
	HH1	HH2	HH3	HH1	HH2	HH3
17,500	1	1	8	-6	-6	1
27,500	3	5	10	-4	-1	4
40,000	11	-1	16	4	-7	9
70,000	15	15	37	8	8	26
130,000	16	16	33	9	9	26

Constant Net-of-Tax Property Tax Rate

AGI	12% Mortgage Rate			11% Mortgage Rate		
	HH1	HH2	HH3	HH1	HH2	HH3
17,500	-1	-1	5	-8	-8	-2
27,500	-	2	5	-6	-4	-2
40,000	7	-4	10	-	-10	3
70,000	9	9	22	2	2	14
130,000	7	7	21	1	-	14

HH1: married, one earner, two dependents.

HH2: married, two earners, zero dependents.

HH3: single, zero dependents.