Income Tax Provisions Affecting Owner-Occupied Housing: Revenue Costs and Incentive Effects

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ABSTRACT

The mortgage interest deduction, the property tax deduction, the unique treatment of capital gains on owner-occupied homes, and the absence of taxation on imputed rent from owner-occupied homes all influence the effective cost of housing services. They also affect federal income tax revenues and the distribution of income tax liabilities. We draw on household-level data from the 2004 Survey of Consumer Finances to analyze how several potential reforms would affect incentives for housing consumption as well as the distribution of income tax burdens. Our analysis recognizes that changing the mortgage interest deduction would induce changes in household financial behavior. We estimate that repealing the mortgage interest deduction in 2003 would have raised income tax revenues by $72.4 billion in the absence of any portfolio adjustments, but by only $61.9 billion if homeowners responded by drawing down a limited set of financial assets to partially replace their mortgage debt. The revenue effects of changing the property tax deduction similarly depend on how state and local governments alter their mix of revenue instruments in response to federal tax reform. Our results underscore the importance of recognizing behavioral responses when calculating the revenue costs of income tax provisions relating to owner-occupied housing.

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Income tax provisions related to owner-occupied housing account for several of the largest entries in the annual tax expenditure budget. The Joint Committee on Taxation (JCT) estimates the tax expenditure for the home mortgage interest deduction as $73.7 billion in 2007. For the state and local property tax deduction, the tax expenditure estimate is $16.8 billion, and for the favorable treatment of capital gains on owner-occupied housing JCT estimate is $28.5 billion. In addition to these implications for federal revenues, federal income tax policy toward owner-occupied housing also has first-order effects on incentives for housing consumption.

This paper explores how current federal income tax provisions affect the after-tax cost of owner-occupied housing as well as income tax revenues. While popular discussions often cite the tax-deductibility of mortgage interest and property tax payments, and the significant tax exemption for capital gains on owner-occupied homes, as the key tax benefits for homeowners, academic studies emphasize the exclusion of the imputed rental income on owner-occupied housing. We measure the tax subsidy to owner-occupied housing by comparing the last-dollar user cost of housing under the current tax law with the last-dollar cost under a Haig-Simons income tax that applies to a broadly-defined measure of economic income. The analysis is based on household-level data drawn from the 2004 Survey of Consumer Finances and the NBER TAXSIM model.

The subsidy to owner-occupied housing is substantial – over twenty percent on average – and it varies considerably by age and income. For the highest income groups the marginal cost falls by about one-third while for the lowest income groups it declines by less than ten percent. The differences by age are smaller and are almost all due to changing incomes, and corresponding changes in marginal tax rates, over the life-cycle.

We consider the effect of eliminating the mortgage interest deduction and the property tax deduction on the user cost of owner-occupied housing and on federal income tax receipts. The effect of both policies is sensitive to our assumption about taxpayer behavioral response. In the mortgage interest context, Gervais and Pandey (2008) suggest that if mortgage interest were no longer deductible, many households would retire some of their mortgage debt by drawing down their holdings of taxable financial assets. This would in turn reduce the income tax collected on interest and dividends and capital gains on other real or financial assets, thereby reducing the revenue gain from repealing the mortgage interest deduction (MID). Many earlier studies recognize that leverage on owner-occupied homes is likely to depend on the tax treatment of mortgage interest. We explore the sensitivity of the revenue effect of repealing the MID to alternative assumptions about the set of assets that households might sell to replace mortgage debt, and about the returns on those assets.

We estimate that repealing the mortgage interest deduction would raise the marginal cost of owner-occupied housing by five percent on average if households did not change their debt-to-value ratios. Under plausible assumptions, between one sixth and one third of that increase would be undone by changes in leverage. The largest changes take place among higher-income households who are more affected by the tax change and who have more discretion to make portfolio adjustments. A key determinant of the portfolio reshuffling associated with a change in the mortgage interest deduction is the cross-sectional correlation between mortgage indebtedness and financial assets. Assuming no change in house prices or housing demand, we estimate that tax revenues would increase by $910 per homeowner, or almost $62 billion, if the mortgage interest deduction were repealed.

We also estimate that repealing the property tax deduction would raise $23.8 billion, or $350 in revenue per household, after allowing localities to substitute away from such taxes and toward tax-deductible income taxes. Repealing the property tax deduction has a small impact on the marginal user cost of housing for most households. It is distributed more evenly across taxpayers than the tax increase associated with limits on mortgage interest, because almost all homeowners who itemize claim property tax deductions, while not all such itemizers have substantial mortgages.

We emphasize revenue estimates and the marginal cost of housing, rather than tax expenditures such as those estimated by the JCT, in our analysis. Tax expenditure estimates are, by construction, "static" measures of the revenue cost of particular tax provisions. They are not estimates of the change in revenues that would be associated with repeal of specific tax provisions. For most deductions, the tax expenditure estimate is likely to exceed the revenue estimate corresponding to repeal because of taxpayer behavioral response. Numerous studies, including Altshuler and Dietz (2008), U.S. General Accountability Office (2005), and Toder (2005), have identified conceptual difficulties with the current tax expenditure concept.

Our paper is divided into seven sections. Section one describes the user cost framework that underlies our analysis. Section two describes the relationship between the marginal user cost of owner-occupied housing and the tax saving associated with homeownership. While the user cost depends on last-dollar marginal tax rates, the tax saving is affected by the standard deduction and infra-marginal as well as marginal tax rates. The third section describes potential behavioral responses to changes in the mortgage interest deduction, and section four presents a brief overview of similar issues relating to the deduction for state and local property taxes. Section five presents our estimates of the user cost of housing under several modifications to the

current income tax structure, restricting either the mortgage interest deduction or the property tax deduction. Section six presents parallel calculations of the increase in tax burdens associated with such reforms, disaggregating households by age and income. A brief conclusion suggests directions for future work.

1. The User Cost of Capital for Owner-Occupied Housing: Conceptual Framework and Baseline Estimates for 2003

The user cost of capital provides a conceptual framework for analyzing the effect of tax rules on the cost of owner-occupied housing. It also helps to set the stage for analysis of the revenue cost of current tax provisions. Poterba (1992), Gyourko and Sinai (2004), and many others have used this approach to describe how tax policy parameters affect homeowners' marginal costs of purchasing additional housing services. Since the user cost can be computed under various tax policy regimes, it allows us to evaluate the relative tax subsidies to owner-occupied housing in different settings.

1.1 Conceptual Framework

We define the user cost under the current income tax regime, c, as:

$$(1) \qquad c = [1 - \{\tau_{ded}*\lambda + \tau_y*(1-\lambda)\}]*r_T + (1-\tau_y)*\beta + m + (1-\tau_{ded})*\tau_{prop} - \pi_e$$

where τ_{ded} is the marginal income tax rate that applies to mortgage interest and property tax deductions, λ is the loan-to-value ratio, τ_y is the marginal tax rate on investment income, r_T is the risk-free interest rate, β denotes the pre-tax risk premium, m is the combined cost of depreciation and maintenance, τ_{prop} is the property tax rate, and π_e is the expected nominal house price appreciation rate. This equation assumes that homeowners receive no benefits from property tax payments. If, instead, property taxes were benefit taxes, with taxpayers receiving benefits valued at $100*\kappa\%$ of their property taxes, $(1-\tau_{ded})*\tau_{prop}$ in (1) would be replaced by $(1-\kappa-\tau_{ded})*\tau_{prop}$.

Equation (1) distinguishes between the marginal income tax rate that applies to mortgage interest and property tax deductions, τ_{ded}, and the tax rate that applies to investment income, τ_y. For taxpayers who do not itemize their deductions for federal income tax purposes, $\tau_{ded} = 0$ even though τ_y is positive. Specialized tax rules that apply to some types of investment income, such as the current reduced rates for dividend income, may also generate differences between τ_y and τ_{ded}. In our calculations, we measure τ_{ded} as the household's marginal federal income tax rate on its last dollar of itemized deductions, and τ_y as the marginal tax rate on its last dollar of taxable interest income. The value of τ_y depends on the financial asset that we define as the alternative investment vis-à-vis owner-occupie housing.

Equation (1) assumes that capital gains on homes are untaxed. While homeowners with gains in excess of $500,000 face taxation under current rules, the number of such taxpayers is very small. For most taxpayers, most housing gains are likely to be untaxed.

We follow Poterba (1992) and several other studies in including a risk premium in the user cost, but our measure of the risk-adjusted cost of funds differs from that in many previous studies which have defined the cost of funds as a weighted average of the mortgage interest rate and a return on an alternative asset, typically a long-dated corporate or Treasury bond. Himmelberg, Mayer, and Sinai (2005), hereafter HMS (2005), note that mortgage interest rates reflect the risk-adjusted required return on a housing loan as well as a premium for the borrower's refinancing and default options. The cost of funds for a housing investment should not include either of these . We therefore calculate the user cost by using the risk-free rate in the bracketed term in (1) and adding a risk premium. The user cost expressions in HMS (2005) and Poterba and Sinai (2008) differ from those in (1) because they also include a term corresponding to the tax benefit of deducting the cost of the default and refinancing options. We exclude this

second-order term, which has a minimal effect on the user cost.

1.2 Household-Level Data: Balance Sheets and Tax Returns

To estimate the last-dollar user cost of owner occupied housing under the current tax regime, we use data from the 2004 Survey of Consumer Finances (SCF) and the NBER TAXSIM model. The 2004 SCF was carried out in early 2004 and asked households about their incomes for 2003, as well as their assets and liabilities, including owner-occupied homes and mortgages, in 2004. The SCF sample includes 22,595 household observations, based on five replicates for each of 4,519 underlying households. The sub-sample we analyze throughout this study excludes 1,475 observations corresponding to households that live on a farm or a ranch or in a mobile home, 812 additional observations for households headed by someone under the age of 25, 64 additional observations that report having mortgages but pay no mortgage interest, eleven additional observations with loan-to-value ratios above 1.5, and 224 additional observations with inexplicably high or negative estimated marginal tax rates. This leaves a sub-sample of 20,009 observations. We estimate marginal tax rates for the 2003 tax year using the NBER TAXSIM federal and state income tax calculators and Moore's (2003) mapping of SCF data to tax return items.

Our calculations of tax liabilities rely on the household's self-reported income, asset, and demographic characteristics. SCF households often fail to report capital income even when they report owning financial assets that should generate that income. We use the SCF data as reported. We have also tried imputing capital income to households based on their asset holdings, and obtained results broadly similar to those reported below.

Some households in the SCF report that they itemize on their tax returns even when our analysis of their income and potential deductions suggests that their taxes would be lower if they

claimed the standard deduction. Other households report that they do not itemize when our TAXSIM-based calculations suggest that they should. We categorize a household as an itemizer if TAXSIM estimates that the household's federal income tax liability would be lower if the household itemized than if it claimed the standard deduction. In our data, 16,288 observations, corresponding to 74.1 million households, self-report the same itemization status in the SCF as we calculate using TAXSIM. However, 3,721 observations, corresponding to 22 million households, differ. In the SCF, more households report that they itemize than actually do in Treasury Department statistics. In the 2004 SCF, 52.7 million households self-report that they itemize. The U.S. Department of the Treasury, Internal Revenue Service (2005) reports 43.9 million itemizers filed tax returns in 2003. Our sample, expanded to population size, includes just 44.5 million TAXSIM-estimated itemizers.

We calculate last dollar marginal tax rates by adding $1000 separately to each of the mortgage interest deduction and the property tax deduction, subtracting $1000 from taxable interest income, and using TAXSIM to compute the resulting change in tax liability in each case. These tax differentials are then divided by $1000 to find the last-dollar tax rates. We measure the pre-tax cost of funds as the risk-free medium-term interest rate plus a risk premium, and we use the ten-year Treasury bond rate as the riskless rate (r_T). We assume a pre-tax risk premium (β) of 200 basis points, a value that follows earlier studies but is admittedly not well grounded in a calculation of risk and return trade-offs. The effective property tax rate, τ_{prop}, is assumed to be 1.04 percent, which is the population-weighted average of self-reported property taxes paid divided by self-reported house value for each household in our SCF sample. Gravelle (2007) finds higher average property tax rates, on the order of 1.50 percent, which would raise our estimated user cost. We assume a depreciation and maintenance rate (m) of 2.5 percent.

In 2003, the 10-year Treasury yield was 4.01 percent and the average mortgage interest rate was 5.82 percent. The Livingston Survey showed expected CPI inflation of 1.4 percent. Real house price inflation between 1980 and 2002, measured by averaging state-level inflation rates computed from the OFHEO index, was 0.73 percent. We therefore assume an average nominal house price inflation rate of 2.13 (= 0.73 + 1.40) percent.

Table 1 reports last dollar user cost calculations for households in four different age groups, divided on the basis of the age of the household head, and in five different income categories based on 2003 annual household income. Household income is defined as Adjusted Gross Income plus income from non-taxable investments, an estimate of employer contributions for FICA, payments from unemployment insurance and workers compensation, gross Social Security income, and any AMT preference items that can be estimated from the SCF.

We compute each household's last-dollar user cost and take the average across all households in each of the various age and income categories. The table shows estimates corresponding to the actual 2003 tax law. The average user cost is 6.0 percent, but the values for various sub-samples range from 4.8 to 7.1 percent. Those with the highest household incomes – more than $250,000 – display an average user cost of 4.8 percent, compared with 5.6 percent for households with incomes of $75,000-125,000 and 6.8 percent for households with incomes below $40,000. The user cost for the high-income households with the lowest user cost is about two thirds as great as the user cost for the lower-income households who, as a result of their lower marginal income tax rates and lower probability of itemization, face higher user costs. With plausible estimates of the price elasticity of demand for housing services, the variation in the user cost of housing in Table 1 would result in substantial tax-induced differences in housing consumption across income groups.

1.3 The User Cost of Owner-Occupied Housing under Haig-Simons Taxation

The extent to which the current U.S. income tax system subsidizes homeownership depends on the alternative tax system to which it is compared. We consider a Haig-Simons broad economic income tax base, which would include the rental value of a home as well as any accruing capital gains while allowing deductions for economic depreciation and maintenance expenses as well as interest and property tax payments. While the Haig-Simons tax base has a long history as a point of reference, it seems unlikely that the U.S. would ever adopt such a broad income tax base. In Poterba and Sinai (2008) we consider another alternative tax system in which homeowners are subject to tax rules similar to those that apply to landlords – receiving a deduction for maintenance and depreciation and facing taxation on their rental income, but remaining untaxed on their accruing capital gains.

Under the Haig-Simons tax system, homeowners would be taxed on rental income and capital gains but they would receive more deductions than at present. The equilibrium condition for consuming housing services is

(2) $(1-\tau_y)*(R/P) = (1-\tau_y)*(r_T + m + \tau_{prop} + \beta - \pi_e)$.

In this expression R is the marginal rental value of a unit of housing services, and P is the market price of one unit of owner-occupied housing. The net-of-tax value of the rental services provided by a house, on the left side of the equality, equals the after-tax cost of providing these services. We can define the user cost in the Haig-Simons setting, c_{HS}, implicitly from the relationship $c_{HS} = R/P$:

(3) $c_{HS} = r_T + m + \tau_{prop} + \beta - \pi_e$.

This user cost is independent of the household's marginal tax rate, because the same tax rate applies to rental income flows as to the costs of providing rental services. For the parameter

values we described in the last section, c_{HS} equals 7.4 percent for all households. The differences between 0.074 and the entries in Table 1 measure the net last-dollar subsidy to owner-occupation under the current tax system relative to Haig-Simons taxation. Averaged over all homeowners, the net subsidy is 1.4 percentage points, 7.4 – 6.0, or almost twenty percent. The net subsidy is largest, on average, for high income households with the highest marginal tax rates. For households with incomes between $125,000 and $250,000, for example, the subsidy is 2.2 percentage points, or almost thirty percent. For those with incomes less than $40,000, it is 0.6 percentage points, an eight percent decrease.

The difference between the current user cost and that under the Haig-Simons tax base can be decomposed into three components that provide some insight on the source of the tax subsidy.

(4) $$c_{HS} - c = \tau_{ded}*\lambda* r_T + \tau_{ded}*\tau_{prop} + \{\tau_y*(1-\lambda)*r_T + \tau_y*\beta\}.$$

The first term is due to mortgage interest deductibility: $\tau_{ded}*\lambda*r_T$. The second is due to property tax deductibility: $\tau_{ded}*\tau_{prop.}$ The third is due to the untaxed return on the equity invested in the house: $\tau_y*(1-\lambda)*r_T + \tau_y*\beta$. The relative importance of the components due to mortgage interest deductibility and due to the tax treatment of housing equity depends on λ, the loan-to-value ratio.

This decomposition of the difference between (1) and (3) sheds some light on the frequent claim that the principal source of the tax subsidy to owner-occupied housing is the failure to tax net imputed rent. If the current tax treatment of owner-occupied housing was modified by creating a new tax on imputed rent and allowing deductions for maintenance and economic depreciation, the current equilibrium condition, R/P = c, would be replaced by $(R/P)*(1-\tau_y) = c - \tau_y*m$, so the effective user cost would be $(c-\tau_y*m)/(1-\tau_y)$. Defining c_{IR} as the user cost with "current tax rules plus a tax on imputed rent and a deduction for depreciation and maintenance" we find:

(5) $c_{IR} = [1 - \{\tau_{ded}*\lambda + \tau_y*(1-\lambda)\}]/[1- \tau_y]*r_T + \beta + m + [(1-\tau_{ded}) /(1- \tau_y)]*\tau_{prop} - [1/(1- \tau_y)]*\pi_e.$

The difference between (5) and the user cost under the current tax system is

(6) $c_{IR} - c = [\tau_y/(1- \tau_y)]* [1 - \{\tau_{ded}*\lambda + \tau_y*(1-\lambda)\}]*r_T + \tau_y*\beta$

$+ [(1-\tau_{ded})* \tau_y/(1- \tau_y)]*\tau_{prop} - [\tau_y/(1- \tau_y)]*\pi_e.$

For a taxpayer who itemizes, and for whom $\tau_{ded} = \tau_y$, equation (6) becomes

(6') $c_{IR} - c = \tau_y*r_T + \tau_y*\beta + \tau_y*\tau_{prop} - [\tau_y/(1- \tau_y)]*\pi_e.$

Under the same simplification, (4) becomes

(4') $c_{HS} - c = \tau_y*r_T + \tau_y*\beta + \tau_y*\tau_{prop}.$

The difference between these two expressions is $[-\tau_y/(1- \tau_y)]* \pi_e$. The user cost is higher under Haig-Simons taxation because homeowners are taxed on their housing capital gains, but they would not be taxed on these gains if the current tax law were modified to tax net imputed rental income without any change in the capital gains tax rules.

1.4 Components of the User Cost

The progressive structure of the income tax and variation in itemization rates generate non-trivial differences across age and income sub-categories in the user cost that we observe in Table 1, and in the corresponding subsidy relative to the Haig-Simons user cost of 0.074. Table 2 presents information on the average last-dollar tax rate on taxable interest income, τ_y, the average last-dollar tax rate at which mortgage interest is deducted, τ_{ded}, the fraction of homeowners who itemize on their income tax returns, and the average loan-to-value ratio, λ. The first panel shows that the average last-dollar tax rate on the assets that represent the alternative investment relative to mortgage debt rises with income, generating a higher average subsidy per dollar of housing equity for higher-income households. There is also important variation by age, with households headed by someone between the ages of 35 and 65 facing

average tax rates about two percentage points higher on average than those for households under the age of 35. The average income tax rate for households headed by someone over the age of 65 is about nine percentage points lower than that for households between the ages of 50 and 65.

The average last-dollar tax rate applicable to mortgage interest and property tax deductions, in the second panel, follows a similar, but more exaggerated, pattern. In addition to the income-driven variation in the underlying tax rate, the subsidy rate on deductions is affected by whether the household itemizes. It is worthwhile for a household to itemize when its deductions exceed the standard deduction. If total deductions are below the standard deduction, an additional dollar of deductions does not provide any marginal tax saving. Whether a household's deductions exceed the standard deduction is determined in part by its housing-related deductions, and in part by the household's other potential deductions such as charitable giving and state taxes. The third panel of Table 2 reports the fraction of homeowners in each age/income cell who itemize. Poorer and older households are less likely to itemize. More than 98 percent of homeowners with income in excess of $125,000 were predicted to itemize in 2003, compared with only 23 percent of those with incomes below $40,000. Among households headed by someone over the age of 65, the itemization rate at incomes below $75,000 is about 38 percent. It is much lower, only about four percent, for the over-65 households with family income below $40,000.

The subsidy to owner-occupied housing depends in part on how much of the house is financed with mortgage debt. Debt finance saves τ_{ded} per dollar while home equity foregoes a market return that would have been taxed at τ_y. The tax rate at which interest can be deducted can be different from the rate that would apply to returns on foregone home equity. The relative weighting on these two tax rates is determined by the loan-to-value ratio (LTV). The last panel

of Table 2 reports average loan-to-value ratios in our various age-income cells. LTVs decline with age across the income spectrum, with an average value of 68.9 percent for households headed by someone between the ages of 25 and 35 and a value of 11.6 percent for households headed by someone over the age of 65. The average LTV in our sample is 38.7 percent. The effect of the LTV on the overall tax subsidy to housing is complex, and depends on other parameters. The fact that the LTV is lower at older ages, for example, means that the low value of the mortgage subsidy rate at those ages has only a modest impact on the user cost.

2. User Cost Differentials vs. Tax Savings

While marginal user cost calculations provide some evidence on the potential demand effects associated with current income tax rules, they may not provide a very good guide to the distribution of tax savings associated with these rules. Follain and Ling (1991) and many subsequent studies have observed that the infra-marginal after-tax cost of housing services may differ from the last-dollar cost because tax rates can change between the first and last dollars of housing spending due to nonlinearities in the tax schedule, particularly those associated with the switch from the standard deduction to claiming itemized deductions. Thus the tax saving for a household that claims the mortgage interest deduction may not equal the last-dollar tax rate applicable to the mortgage interest deduction times the amount of interest paid, because the loss of the standard deduction may reduce the total tax saving. For taxpayers who itemize their deductions under the current tax system, the comparison of the last-dollar user cost under the status quo and the Haig-Simons income tax does not depend on the size of the standard deduction – but the difference in total tax payments under the two systems does. Similarly, whether we assume the presence of a standard deduction in the Haig-Simons setting only affects the user costs for those who would not itemize, while it affects the tax consequences of

homeownership for all taxpayers who do itemize.

2.1 Differences in Income Tax Payments: Status Quo vs. Haig-Simons Income Tax

The first panel of Table 3 shows the average difference in homeowners' income tax liability under the current tax system and the Haig-Simons income tax without a standard deduction, while the second panel shows the difference when the Haig-Simons tax includes the standard deduction. The difference between the two cases, as a share of the increased tax liability, is greater at lower than at higher incomes, because the amount of housing equity taxed at higher incomes is greater. We compute current tax liability for each household using TAXSIM and self-reported mortgage interest and property tax payments. We also use TAXSIM to estimate tax liability under a Haig-Simons income tax. We set the mortgage interest and property tax deductions to zero and assume the household would have earned a 6.01 percent return, comprising a 4.01 percent yield on 10-year Treasury bonds in 2004 and a two hundred basis point risk premium, on their home equity, and that this income would be taxed as interest income. Home equity is measured as the self-reported house value less self-reported housing debt and can be negative.

The entries in the first panel of Table 3 show that the average tax subsidy within our age and income cells ranges from $1,742 per household to $30,474, and averages almost $5,700 per homeowner. Higher-income households enjoy larger tax subsidies than poorer households, with the average subsidy approximately doubling for each income category. For example, households earning between $75,000 and $125,000 receive less than 60 percent of the average subsidy ($5,862) of households earning between $125,000 and $250,000 ($10,704). In general, within income category, the average subsidy rises with age. However, in some income categories, the subsidy falls for the oldest households. This same pattern is reflected in the overall means by

age in the last column of the table: the oldest households receive about half as much subsidy as do 50 to 65-year-olds, reflecting their overrepresentation in the lowest-income groups. Three factors – higher marginal tax rates, higher itemization rates, and higher home values at the higher income levels – contribute to the greater average value of the tax subsidy for those in the higher income brackets. Gyourko and Sinai (2004) find that the distribution of subsidy also varies considerably across states, cities, and towns, but the lack of geographic identifiers that are finer than large census regions makes studying this issue with the SCF virtually impossible.

The second panel of Table 3 shows parallel estimates assuming that the Haig-Simons income tax retains the standard deduction at current levels. The average value of the tax savings declines from $5696 to $4869. The difference is largest in the middle income range, when it averages nearly one thousand dollars. The elimination of the mortgage interest and property tax deductions is less onerous when the standard deduction provides a backstop. We have also computed the tax savings for homeowners using a modified version of the current income tax code, in which we suppress the standard deduction. In that case, the average subsidy under the current tax system versus the Haig-Simons system would be $5,504.

Aggregating the household-level subsidy to homeownership across all the nearly 68 million homeowners in the SCF, we estimate that the total tax subsidy was about $387 billion if the benchmark Haig-Simons tax does not include a standard deduction, and $331 billion if it does. Our estimates are substantially larger than the sum of the Joint Committee on Taxation (2003) estimates for the tax expenditures from the mortgage interest, property tax, and capital gains treatments of owner-occupied housing, and that sum is itself an over-estimate of the static revenue effect of the three provisions since it neglects the interactions among them. The JCT analysis does not consider the failure to tax imputed rent on owner-occupied homes, and it does

not recognize that the required return – and hence the amount of imputed income – is higher when capital gains on owner-occupied homes are taxed. This point follows from the capital market equilibrium condition: when capital gains on housing are taxed more heavily, owner-occupiers demand a greater "dividend," more rental income, on their investment. Our estimate of the total tax subsidy is somewhat smaller than Gyourko and Sinai's (2004) estimate of $420 billion, which was based on Census data from 2000.

2.2 Components of Tax Savings

The distribution of subsidies by age and income in Table 3 is more skewed than the distribution of last-dollar user costs in Table 1. The underlying reasons can be deduced from the distributions of some of the inputs to the tax saving, which are shown in Table 4. The first panel reports the average tax rates on interest income. The distribution looks much like that of the analogous last-dollar tax rates, reported in Table 2. To compute average tax rates for the various components of the current tax subsidy, we calculate measures of tax saving as the difference between the household's tax bill with a deduction item, such as mortgage interest, set to zero, and the household's actual tax bill. We then find an average tax rate applicable to mortgage interest, which equals this tax difference divided by the total amount of mortgage interest. For interest income, we calculate the average tax rate starting with the current reported interest income and then adding the interest income that would be received on the equity invested in the house if it were instead invested in taxable bonds.

There is a larger difference between average and last-dollar rates when we consider the tax rate applicable to mortgage interest and property tax deductions. The second panel of Table 4 presents the average rate. In every cell, the average rate is significantly lower than the last-dollar rate reported in the second panel of Table 2, but especially for lower-income households

and older households. That is because many of these households would not itemize in the absence of the mortgage interest and property tax deductions. Some of their property tax and mortgage interest payments do not generate incremental tax savings, because they are "used up" before the household reaches a level of deductions at which itemization is warranted.

The last panel of Table 4 reports average home values, which are another key source of differences across age and income groups in the value of current tax subsidies. Average house value rises with age and income, ranging from $119,400 to $1,153,000. There is a strong positive relationship between household income and house value. Home value averages $201,700 for families with incomes of $40-75,000, compared with $428,300 for those with incomes between $125,000 and $250,000. The sole exception is in the highest-income category, where the oldest households own slightly less valuable houses than do 50 to 65-year-olds. Because older households are overrepresented in the lower income categories, house values drop for households over the age of 65 when we do not condition on income. Because of the positive relationships between average tax rates and income and house values and incomes, the total subsidy, which is determined by the average tax rate times the house value, has an even stronger positive relationship with income than do any of the individual components.

2.3 The Alternative Minimum Tax

The alternative minimum tax (AMT) has almost no effect on our estimates of marginal tax rates and tax savings. If we compute the current and baseline taxes with and without the AMT, as in Table 3, our estimate of the average tax subsidy to owner-occupiers rises from $5696 to $5,740. This is because in 2003, the reach of the AMT was limited by an AMT "patch" enacted by Congress. Our TAXSIM-based calculations suggest that 5.4 percent of taxpayers in 2003 faced the AMT, although for those with household incomes over $250,000, the percentage

was over 70 percent. Conditional on paying the AMT, AMT liability averaged $1,177. Since mortgage interest is deductible under the AMT as well as the income tax, the most important housing-related deduction is still available in the AMT.

3. Behavioral Response to Repeal or Limitation of the Mortgage Interest Deduction

While the Haig-Simons baseline is a useful way of calibrating the total subsidy to owner-occupied housing, most policy discussions focus on more modest deviations from the current tax code such as repealing or limiting the mortgage interest deduction or repealing the deduction for property taxes. We apply the user cost framework to compute changes in the marginal cost of housing services for such proposals. We also examine the potential revenue effects of these reforms, which depend on how these changes affect taxpayer and local government behavior. This section considers changes in the mortgage interest deduction; the next section considers changes in the property tax deduction. Our analysis is a partial equilibrium study of these policy changes; Gervais (2002) addresses related issues in a general equilibrium setting.

Dunsky and Follain (2000), Follain and Dunsky (1997), Ling and McGill (1998), and a number of other studies suggest that households adjust their mortgage borrowing in response to changes in the after-tax cost of mortgage debt. The price elasticity of demand for mortgage borrowing appears to be close to -1.0; households adjust on the margin of drawing down other financial assets to build housing equity rather than borrowing. This margin of adjustment is particularly important for middle-aged and older households, many of whom accumulate financial assets while also incurring substantial mortgage debt. In light of the sensitivity of household balance sheets to the tax treatment of mortgage debt, it seems implausible to hold the loan-to-value ratio fixed when examining the revenue effects of eliminating the deductibility of mortgage interest. Without such deductibility, households with both financial assets and

mortgages would be borrowing at the pretax rate of return but investing at the after-tax rate of return. Those with substantial financial asset holdings might draw down those assets and repay part of their mortgage debt.

Gervais and Pandey (2008) observe that this behavioral response implies that "static" analysis of the mortgage interest deduction may substantially overstate the revenue gains that would be associated with eliminating this deduction. They analyze data from the 1998 SCF and suggest that the actual revenue cost of the mortgage interest deduction is likely to fall well below the usual estimates. While conventional analysis applied to the 1998 SCF suggests that the tax expenditure for mortgage interest is $50 billion in 1998, Gervais and Pandey's (2008) preferred set of balance sheet adjustments suggest a revenue cost of $29 billion. This calculation assumes that households draw down liquid financial assets, tax-exempt bonds, money market funds, business equity, and residential assets other than owner-occupied homes, and it assigns a single rate of return to all of these assets. A more inclusive measure of the assets that could be drawn down yields an even lower revenue estimate. Jones (1995) presents empirical evidence suggesting important effects of non-housing asset choices on mortgage debt; this suggests that reshuffling of assets and liabilities across the balance sheet is likely to be one response to changes in the mortgage interest deduction.

From the standpoint of revenue estimation, the two key questions about portfolio adjustment are which assets households will adjust, and what rate of return they would have earned on those assets. Gervais and Pandey (2008) consider three sets of assets that might be subject to adjustment. All assets yield 7.3 percent per year in their analysis. We allow different assets to yield different returns, and in particular recognize that many more liquid assets generate relatively little income tax revenue because their yields are low. We also examine the

distribution of the tax burdens associated with limiting the mortgage interest deduction under various assumptions about portfolio adjustment in response to such policies, and we update the analysis by using the 2004 SCF.

Our starting point for the analysis of portfolio adjustment is a comparison of household ownership of financial assets and current patterns of mortgage indebtedness. If households were to fully draw down their holdings of taxable financial assets to increase their home equity and avoid borrowing at the pre-tax rate of return, this comparison indicates the share of deductible mortgage debt that could be replaced by balance sheet adjustments.

Table 5 presents data on the ratio of financial assets to mortgage debt for three different sets of assets that households might choose to liquidate if mortgage interest were no longer deductible. The denominator, "mortgage debt," is the same in all three cases: the minimum of the household's outstanding mortgage debt and $1 million, which is the current cap on mortgage interest deductibility. The numerator in each corresponds to the minimum of the household's financial assets in a given category and "mortgage debt." The ratio for each household is bounded above by unity.

Households in the 2004 SCF had $6.2 trillion in mortgage debt with potentially tax-deductible interest. The first column of Table 5 shows that using only liquid financial assets, such as checking and savings accounts, money market funds, and brokerage call accounts, households could pay down about 16 percent of this debt. This would reduce the aggregate liquid financial assets held by the repaying households by just over one third. Households with small mortgages tend to have larger financial asset holdings, and vice versa, which contributes to the relatively modest amount of mortgage debt pay-down in this case.

The second and third columns of Table 5 consider what happens if households shifted not

just liquid financial assets, but other assets as well, to repay mortgage debt. In column two, we consider shifting from all non-retirement financial assets to repay mortgage debt, and in this case 31.2 percent of deductible mortgage debt could be repaid. This amounts to a $1.9 billion shift of mortgage debt -- 31 percent of outstanding mortgage indebtedness. While households with large mortgages do not have enough liquid financial assets to replace all of their mortgage indebtedness with equity, including their less liquid assets in the balance sheet adjustment increases the share of mortgage debt that could be retired. Households as a whole can use only 16.6 percent of their non-retirement financial assets to pay down their mortgage debt, but for the average household it comprises more than 62 percent of their assets. In the third column, we assume households are willing to use all non-housing, non-retirement assets to pay down mortgage debt. This includes vehicle equity and net business equity. Now we find that households would repay 56.1 percent of their deductible mortgage debt.

There are two ways to evaluate the degree of portfolio substitution that might follow changes in the tax treatment of mortgage interest. One is to use the elasticity estimates mentioned above. Table 2 shows that the average last-dollar tax rate on mortgage interest, averaged across households, is 14.1 percent. This makes the average after-tax cost of mortgage interest 0.859 times the pre-tax cost; eliminating the deduction would raise the cost of borrowing by 16.4 percent. If the elasticity of demand for mortgage borrowing is -1.0, then there would be a 16.4 percent decline in mortgage debt, financed by changes in other assets on the household balance sheet. This calculation could be refined by using household-level data on tax rates and mortgage holdings.

The other approach to estimating the potential degree of portfolio substitution in response to a change in the tax rules affecting mortgage interest deductions is to assume that households

would draw down all of the assets they could in some portfolio categories. This is the approach used in Gervais and Pandey (2008). We apply this approach as well, recognizing as noted above that different asset categories produce different amounts of taxable income. Gervais and Pandey's (2008) "preferred" estimate of the potential to repay mortgage debt using other assets implies a 42 percent reduction in the revenue cost of the mortgage interest deduction, relative to the no-behavioral-response scenario. In our baseline analysis, we assume that all non-retirement financial assets, but no non-financial assets, would be sold to replace mortgage borrowing. This is likely to overstate the actual portfolio adjustment, since it is unlikely that households would choose to set their liquid asset holdings to zero. This calculation suggests that 31 percent of the current mortgage debt would be replaced by housing equity. If this reduction in financial assets had the same average yield as all assets held in the household sector, the resulting revenue gain from eliminating the mortgage interest deduction would be 69 percent of the static estimate. However, because households would liquidate assets with below-average yields first, and because high-tax-rate households tend have more equity available to pay down housing debt, we estimate that the actual revenue gain will be just 85.4 percent of the static estimate.

Households differ in their capacities to replace mortgage debt by drawing down financial assets. For various age and income categories, Table 6 reports the fraction of deductible mortgage debt that could be replaced by selling non-retirement financial assets. The population average in each panel of Table 6 corresponds to the second row of Table 5. When we limit attention to liquid financial assets, in Panel 1 of Table 6, high income and older households are best able to substitute equity for mortgage debt. Older households usually have very little mortgage debt. In both cases, liquid financial assets are more likely to be large relative to mortgage debt. For example, households headed by someone over the age of 65 and making

more than $250,000 per year can pay off half of their deductible mortgage debt using liquid financial assets alone. By contrast, young, poorer households can cover less than five percent of their mortgage debt by drawing down their financial assets. The potential for asset reshuffling rises with age and income no matter the asset category. It also expands with the size of the asset category. When we expand the set of balance sheet components that we consider drawing down to repay mortgage debt, we find that households with incomes above $250,000 could repay between 68 and 96 percent of their mortgage debt by drawing down these assets.

4. Behavioral Responses to Eliminating the Deductibility of Property Taxes

Recognizing household portfolio adjustments in response to changes in the mortgage interest deduction can have an important effect on estimates of both the change in the user cost and the revenue gain associated with such a policy. The same point applies to changes in the deductibility of state and local property taxes. Feldstein and Metcalf (1987) find that sub-federal governments alter their mix of revenue sources in response to federal income tax changes. Metcalf (2008) reviews the subsequent literature and presents new empirical results that are broadly consistent with those findings. If local governments shift from property taxes to sales taxes, for example, then the user cost of owner-occupied housing will decline. From the standpoint of a household considering the purchase of another unit of housing capital, the key question is what taxes will be triggered by such a purchase.

We assume that the elasticity of property tax payments with respect to their net-of-federal income tax cost to the taxpayer, their tax price, is -1.0, so when the deductibility is eliminated, the use of property taxes falls. For our calculations, we assume that the marginal voter has a 20 percent tax rate and itemizes, so eliminating tax deductibility of property taxes increases the net-of-tax-rate by 25 percent, from 0.80 to 1.0. The -1.0 elasticity implies that localities would shift

one quarter of their property tax base to other tax instruments. Since state sales taxes, which appear to be the most likely alternative revenue source, do not enter the user cost of owner occupied housing, the revenue shift away from property taxation alters the user cost.

5. User Cost Estimates with Modified Mortgage Interest and Property Tax Deductions

We apply the user cost framework to compute the increases in the marginal cost of housing services when the deductions from mortgage interest and property taxes are restricted or eliminated. The corresponding increases in the user costs translate into long-run changes in the demand for housing services, which can be absorbed through lower house prices, which reduce housing expenditures for a given bundle of housing services, or by a contraction in the quantity of housing consumed. In principle both effects may operate.

5.1 Modifications to Mortgage Interest Deductibility (MID)

If mortgage interest were no longer deductible but the loan-to-value ratio remained at its current value, then the user cost would be

$$(7) \qquad c' = (1 - \tau_y*(1-\lambda))*r_T + (1-\tau_y)*\beta + m + (1-\tau_{ded})*\tau_{prop} - \pi_e.$$

Estimates of this user cost are reported in the top panel of Table 7. The results suggest an increase in the user cost of about five percent, from 6.0 to 6.3 percent. The effect would be largest on the high-income, young homeowners with high loan-to-value ratios.

The next panel in Table 7 assumes that housing leverage responds to repeal of the MID, as discussed above. When 31 percent of mortgage debt (on average) is replaced with home equity, drawn from the sale of financial assets, the user cost change is smaller than the change in the case without behavioral response. We estimate that the user cost would rise, on average, by 0.2 percentage points in this case, compared with 0.3 percentage points (0.063 − 0.060) in the case with no adjustment. Changes in the loan-to-value ratio partly offset the tax-induced

increase in the after-tax cost of mortgage borrowing.

Comparison between the first and second panels of Table 7 suggests that the balance sheet adjustment has its largest effect on user cost for young, high-income households. For 35-50 year olds with household income of over $250,000, the average user cost in Table 1 was 4.8 percent. The first panel of Table 7 shows that with no portfolio adjustment, this user cost rises to 5.3 percent. When we allow for balance sheet adjustments, the user cost rises to 5.0 percent – less than half of the increase in the no-behavioral-response case. This difference would reduce the magnitude of the housing demand effects of this policy change.

5.2 Modifications to Property Tax Deductibility

The third panel of Table 7 considers elimination of the property tax deduction. The average impact on the user cost is an increase of two-tenths of one percentage point, from 6.0 to 6.2 percent. There is less variation across subgroups for this tax reform than for elimination of the mortgage interest deduction because property taxes as a share of the cost of the last dollar of housing do not vary much with age or income whereas the mortgage interest payments' share of the cost varies with the loan-to-value ratio. The effects of repealing either the mortgage interest deduction or the property tax deduction are greater at higher income levels than at lower levels, because of these taxpayers' higher marginal income tax and itemization rates. For those with incomes of $250,000 and above, for example, the average user cost rises from 4.8 percent to 5.2 percent when the property tax deduction is repealed.

The last panel of Table 7 reports user cost calculations when the property tax deduction is repealed and there is a behavioral response on the part of state and local governments, as discussed in the last section. We now replace $(1-\tau_{ded})*\tau_{prop}$ by $.75*\tau_{prop}$. The effect is small – for many cells the behavioral response does not make a measurable difference. For the highest

income category, however, the user cost after accounting for the behavioral response is 0.002 lower. This difference could translate into a four percent increase in housing demand.

6. Revenue Calculations with Modified Mortgage Interest and Property Tax Deductions

We now consider the revenue effects of changing both the mortgage interest deduction and the property tax deduction, with and without behavioral response.

6.1 Eliminating the Mortgage Interest Deduction

Table 8 describes the effects of various changes to the mortgage interest deduction. The first panel shows the effect of repealing the mortgage interest deduction without considering the possibility that households would adjust their debt levels when the deductibility of mortgage interest was eliminated. The average tax increase in this case is $1065. This is about twice the product of the mean house value ($266,000), the mean loan-to-value ratio (.387), the mean mortgage rate (0.0582), and the mean mortgage interest subsidy rate (0.097). The product is $581; the difference reflects the positive correlation between marginal tax rate, the size of the house owned by a household, and the amount of deductible mortgage interest.

Table 8 displays the heterogeneity across groups. Not surprisingly, the largest tax payment effects are on young, high-income households. For 25-35 year olds with income between $125,000 and $250,000, for example, the tax increase averages $7736. We estimate that in the absence of any behavioral response, eliminating the mortgage interest deduction would raise $72.4 billion. By comparison the Joint Committee on Taxation (2003) estimated the tax expenditure for mortgage interest deductibility to be $69.9 billion for FY 2003.

The next panel in Table 8 considers the effect of portfolio adjustment on the revenue cost of the mortgage interest deduction. The calculations assume that households would shift all available paper and liquid assets to pay down mortgage debt, up to the current cap of $1 million,

if deductibility was eliminated. We assume that households whose available assets exceed their mortgage debt would liquidate assets in order of yield – lowest to highest – when retiring their mortgage debt. We estimate that if all available liquid assets were drawn down to repay mortgage debt, the average loan-to-value ratio would fall from 38.6 to 30.7 percent. When households liquidate their taxable financial assets to retire mortgage debt, they no longer earn taxable income on those assets. We assume the lost taxable income equals the dollar value of the asset that is reshuffled times the median yield on that asset as reported by all SCF households with that asset. This approach avoids using a household's actual self-reported yields on each asset type, which may be subject to measurement error. Our broadest definition of assets that might be sold to repay mortgage debt allows the possibility of a household selling a high-yielding business to pay off low-cost mortgage debt. Our more limited asset substitution analysis admits more limited substitution possibilities. We ignore any capital gain tax revenue consequences from selling assets to pay down mortgage debt.

The second panel of Table 8 shows that our estimate of the average tax increase allowing for portfolio adjustment is $910, about 85 percent of the tax increase when we do not consider portfolio substitution. The aggregate estimate of the revenue cost of the mortgage interest deduction is $61.9 billion. The relatively modest impact of portfolio substitution is due to the fact that only 16.2 percent of mortgage debt can be paid down using liquid financial assets. The average tax increase varies substantially by age and income group. Among households between the ages of 50 and 65 with incomes between $125,000 and $250,000, for example, the average tax increase that we associate with eliminating the mortgage interest deduction is roughly $1780. For 25-35 year old homeowners with over $250,000 in income, the tax increase is nearly four times greater ($5,654). Reflecting the lower housing tax benefits among the elderly, the average

tax increasing from eliminating the mortgage interest deduction for homeowners over 65 is only $105, and even among those with incomes of $250,000 or more it is only $1046.

6.2 Capping the Mortgage Interest Deductions

We next consider the tax increases associated with a cap of $500,000 per household, and $250,000 per household, on mortgage indebtedness. Anderson, Clemens, and Hanson (2007) discuss fixed nominal caps like these, as well as several other limits on the mortgage interest deduction. Table 9 provides information on the share of households with mortgage debt above various thresholds, and it demonstrates that substantial reductions in the current mortgage interest cap would be required before this cap would affect significant numbers of households. At present, taxpayers can deduct interest on up to $1 million of mortgage debt that is used to purchase, construct, or renovate a house. In addition, interest on up to $100,000 of housing debt is also deductible, even if the loan proceeds were used for non-housing purposes. This cap is binding for only 0.2 percent of households. Even among those with income above $250,000, it is binding for no more than 6.5 percent of any age category. Reducing the cap to $500,000 would affect 1.6 percent of households, very few of whom have incomes below $125,000. At this level the cap would only affect about 20 percent of the highest-income households.

A cap of $250,000 would bind for almost seven percent of homeowners, assuming no behavioral responses. It would be more likely to bind on younger, high-income homeowners. Among households headed by someone between the ages of 25 and 35, for example, with incomes above $250,000, 65 percent have mortgage debt in excess of $250,000. Even eliminating the mortgage interest deduction would only affect 68.5 percent of homeowners. For younger households, however, the effect would be widespread. Almost 95 percent of 25-35 year old homeowners have mortgages, compared with 28 percent of homeowners over age 65.

Returning to Table 8, the bottom four panels present revenue estimates from the two mortgage cap proposals, both with and without changes in household balance sheets. Because the mortgage caps that we consider affect relatively few households, they have a much more modest effect on average tax payments than the repeal of the mortgage interest deduction, although once again the pattern shows larger effects for young, high-income households. The second-to-last and last panels in Table 8, for example, show that a $250,000 cap on the size of mortgages that could generate deductible interest would raise taxes on average by $2,566 without portfolio adjustment, and $2,032 with such adjustment, for households with income above $250,000, and by $586 and $518 respectively for households with incomes between $125,000 and $250,000. For lower income households the average tax increase is less than $150. We estimate the aggregate revenue gain after portfolio adjustment from the $250,000 cap to be $13.6 billion. We estimate that the revenue gain from the $500,000 cap is $6.8 billion, again recognizing portfolio adjustment.

6.3 Eliminating the Property Tax Deduction

Table 10 considers eliminating the deductibility of property taxes. While the average income tax saving from the property tax deduction varies across age and income categories, the variation is less pronounced than that from eliminating the mortgage interest deduction. The upper panel shows the distribution of tax increases assuming that local governments do not change their property tax rates in response to the elimination of federal tax deductibility. The average income tax saving from this deduction peaks for middle-aged homeowners, rising from $415 for households under the age of 35 to nearly $600 for those between 35 and 65. For those over 65, the average tax saving from the property tax deduction falls to $205, reflecting both a decline in the deductions among older relative to younger households within each income group

as well as a shift in composition of the households toward lower income categories. For this over-65 group, the tax savings from the property tax deduction substantially exceed those from the mortgage interest deduction. The bottom panel of Table 9 repeats the estimation assuming that localities reduce their use of property tax revenue by 25 percent. The revenue cost falls commensurately, from an average of $468 to an average of $350. A similar reduction is seen across all age and income categories. Because property taxes are not deductible under the AMT, our results on repeal of the property tax deduction are more sensitive to assumptions about the presence or absence of the AMT than our results about the mortgage interest deduction. In the absence of the AMT, the revenue cost of eliminating the property tax deduction averages $518 assuming no behavioral response, and $393 with behavioral response. The difference between the AMT and no-AMT cases is larger for higher-income households, for whom the AMT is more often binding. For example, for households with incomes of $250,000 or more, the revenue cost assuming a behavioral response is just $1696 with the AMT in place and $2414 in its absence.

Our estimates of the aggregate revenue gains associated with repeal of the property tax deduction are larger than the tax expenditure estimates reported by Joint Committee on Taxation (2002). The estimate of the 2003 tax expenditure for the property tax deduction was $22.1 billion; our static revenue cost estimate is $31.8 billion.

4. Conclusion and Future Directions

This paper examines the revenue cost of the income tax provisions relating to owner-occupied housing, notably the deductibility of mortgage interest and property tax payments, and their effect on the marginal cost of housing. Using data from the 2004 Survey of Consumer Finances and the NBER TAXSIM model, it presents new evidence on the distribution of the tax saving associated with these deductions across age and income categories. It also explores the

sensitivity of estimates of these tax savings to the extent of behavioral response by taxpayers, in the case of the mortgage interest deduction, and local governments, in the case of the property tax deduction. We find that the extent to which homeowners draw down their holdings of other assets when mortgage interest is no longer deductible, and replace debt finance with housing equity, is an important determinant of the revenue impact of changing this tax expenditure. The standard assumption of no behavioral response that underlies tax expenditure analysis is likely to overstate the revenue effects of repealing or limiting the mortgage interest deduction.

Age- and income-related patterns of mortgage indebtedness are important for understanding the distributional effects of restricting the mortgage interest deduction. Mortgage debt is concentrated among younger homeowners, and many older homeowners do not even have a mortgage. Consequently, many homeowners would face only a modest tax increase, if any at all, if mortgage interest were no longer deductible. In contrast, the vast majority of homeowners claim property tax deductions.

Our analysis unfortunately makes a rather *ad hoc* set of assumptions about the set of assets that households might liquidate to replace mortgage borrowing. Our findings suggest that portfolio substitution effects can be an important factor in the revenue cost and the distributional burden of changes in current housing-related deductions, and they underscore the need for more empirical work measuring the key behavioral parameters related to portfolio substitution.

Our analysis focuses on how various income tax provisions affect the user cost of owner-occupied housing. We have only discussed potential effects of tax changes on housing demand in passing. Many estimates, for example those reviewed in Rosen (1985), suggest that the demand elasticity for owner-occupied housing is between -0.75 and -1.0. Our findings suggest that particularly for high-income households in high marginal tax brackets, the user cost increase

associated with eliminating the mortgage interest deduction, and to a lesser extent with eliminating the property tax deduction, would lead to a substantial decline in the demand for owner-occupied housing. These changes might lead to changes in housing demand conditional on choosing to own not rent, and to changes in the likelihood of renting versus owning. For lower- and middle-income taxpayers, the user cost changes and the associated changes in housing demand are more modest. We have not incorporated changes in housing demand into our analysis of the revenue consequences of limiting the mortgage interest and property tax deductions. Extending the analysis to allow for such demand effects is a natural next step in analyzing these tax code provisions.

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Table 1: Last-Dollar User Cost of Owner-Occupied Housing, 2003

Age of Household Head	Annual Household Income					
	<40K	40-75K	75-125K	125-250K	250+	All
25-35	0.066	0.062	0.056	0.052	0.048	0.060
35-50	0.066	0.061	0.056	0.052	0.048	0.058
50-65	0.066	0.059	0.056	0.052	0.048	0.058
> 65	0.071	0.059	0.057	0.053	0.049	0.065
All	0.068	0.060	0.056	0.052	0.048	0.060

Source: Authors' calculations using 2004 SCF and Moore's (2003) interface between NBER TAXSIM program and the SCF. Averages are weighted using the SCF's replicate weights. See text for sample construction.

Table 2: Determinants of the User Cost of Homeownership, by Household Age and Income

Age of Household Head	Annual Household Income					
	<40K	40-75K	75-125K	125-250K	250+	All
	Average Last-Dollar Tax Rate on Interest Income					
25-35	0.144	0.201	0.261	0.323	0.384	0.216
35-50	0.129	0.201	0.265	0.335	0.395	0.241
50-65	0.116	0.226	0.272	0.328	0.389	0.242
> 65	0.044	0.241	0.272	0.310	0.384	0.130
All	0.084	0.215	0.268	0.329	0.390	0.210
	Average Last-Dollar Mortgage Interest Deduction Subsidy Rate					
25-35	0.062	0.132	0.233	0.277	0.339	0.159
35-50	0.071	0.134	0.208	0.290	0.359	0.183
50-65	0.051	0.128	0.188	0.281	0.350	0.168
> 65	0.005	0.065	0.108	0.235	0.334	0.048
All	0.032	0.120	0.193	0.280	0.350	0.141
	Fraction of Home Owners Who Itemize					
25-35	54.3%	74.4%	97.3%	95.7%	100.0%	78.5%
35-50	52.4	77.8	91.7	99.9	100.0	82.6
50-65	33.7	64.2	83.1	98.7	100.0	70.6
> 65	3.8	37.5	55.8	92.0	99.6	22.9
All	23.4	66.0	85.5	98.4	99.9	63.1
	Loan-to-Value Ratio					
25-35	60.5%	72.8%	71.2%	67.3%	57.7%	68.9%
35-50	51.8	60.0	55.3	53.2	36.7	55.1
50-65	29.3	29.6	37.3	34.8	29.5	32.5
> 65	9.8	13.5	18.4	12.7	7.2	11.6
All	26.0	44.9	47.4	42.6	29.4	38.7

Source: Authors' calculations using 2004 Survey of Consumer Finances and Moore's (2003) interface between NBER TAXSIM program and the SCF. Averages are weighted using the SCF's replicate weights. See text for sample construction.

Table 3: Difference in Tax Liability Under Haig-Simons Income Tax and Current Income Tax

	Annual Household Income					
Age of Household Head	<40K	40-75K	75-125K	125-250K	250+	All
	Haig-Simons Tax Base without Standard Deduction					
25-35	1,742	2,639	5,815	8,861	19,935	4,025
35-50	2,016	3,391	5,763	10,747	27,985	6,236
50-65	2,173	4,073	5,875	10,718	30,474	7,054
> 65	1,906	5,463	6,207	11,585	27,340	4,188
All	1,971	3,844	5,862	10,704	28,838	5,696
	Haig-Simons Tax Base with Standard Deduction					
25-35	1,023	1,640	4,639	8,147	19,141	3,059
35-50	1,365	2,402	4,718	10,136	27,563	5,378
50-65	1,565	3,194	4,923	10,133	30,114	6,307
> 65	1,252	4,331	4,911	10,878	26,840	3,369
All	1,322	2,859	4,796	10,088	28,422	4,869

Source: Authors' calculations using 2004 SCF and Moore's (2003) interface between NBER TAXSIM program and the SCF. Averages are weighted using the SCF's replicate weights. See text for sample construction.

Table 4: Determinants of Homeowners' Tax Savings, by Household Age and Income

	Annual Household Income					
Age of Household Head	<40K	40-75K	75-125K	125-250K	250+	All
	Average Tax Rate on Interest Income					
25-35	0.190	0.205	0.270	0.325	0.387	0.232
35-50	0.191	0.208	0.276	0.339	0.394	0.257
50-65	0.143	0.232	0.283	0.337	0.390	0.254
> 65	0.086	0.263	0.277	0.322	0.384	0.161
All	0.126	0.224	0.277	0.336	0.390	0.228
	Average Mortgage Interest Deduction Subsidy Rate					
25-35	0.034	0.078	0.165	0.258	0.315	0.109
35-50	0.038	0.086	0.154	0.271	0.307	0.141
50-65	0.027	0.073	0.126	0.218	0.268	0.115
> 65	0.001	0.023	0.045	0.096	0.076	0.017
All	0.016	0.069	0.133	0.232	0.253	0.097
	Mean Value of Owner-Occupied Home (000s)					
25-35	$119.4	$147.5	$259.1	$343.3	$674.7	$194.6
35-50	127.8	188.1	253.7	423.3	991.1	274.2
50-65	156.1	208.0	264.6	428.2	1153.3	313.3
>65	159.8	266.8	283.5	504.5	1059.2	233.7
All	149.9	201.7	261.8	428.3	1070.3	266.2

Source: Authors' calculations using 2004 SCF and Moore's (2003) interface between NBER TAXSIM program and the SCF. Averages are weighted using the SCF's replicate weights. See text for sample construction.

Table 5: Overlap between Financial Asset Holdings and Mortgage Indebtedness

	Liquid financial assets	Total financial assets excluding retirement assets	All non-housing, non-retirement assets
Holdings of non-housing assets that can be sold to replace qualified mortgage debt	$1,003 billion	$1,927 billion	$3,466 billion
Fraction of outstanding deductible mortgage debt that can be replaced with other assets	16.2%	31.2%	56.1%
Fraction of assets in category that would have to be sold to pay down mortgage debt	34.1	16.7	13.3
Household-weighted average share of assets needed to pay down mortgage debt	67.0	62.5	54.9

Notes: Aggregate deductible mortgage debt (amount of qualified debt under $1million) equals $6.18 billion. Non-housing, non-retirement assets include all assets in the SCF (including net equity in businesses, vehicles, etc.) but exclude first and second residences, retirement accounts, cash value of life insurance, and trusts and annuities. Total financial assets excluding retirement leave exclude retirement accounts, cash value of life insurance, and trusts and annuities from the SCF's definition of financial assets as described in Bucks, Kennickell, and Moore (2006). Liquid financial assets include checking, savings, money market, and brokerage call account holdings. See text for sample construction.

Table 6: Fraction of Outstanding Deductible Mortgage Debt that Homeowners Could Replace by Liquidating Other Assets, by Household Age and Income

Age of Household Head	Annual Household Income					
	<40K	40-75K	75-125K	125-250K	250+	All
	Liquidation of liquid financial assets					
25-35	2.2%	9.9%	9.9%	20.3%	42.3%	11.1%
35-50	5.7	9.0	11.0	17.9	37.0	14.8
50-65	11.1	11.8	17.9	17.8	31.1	19.2
> 65	18.9	18.7	32.6	33.9	50.1	26.2
All	8.9	10.4	13.7	18.6	34.6	16.2
	Liquidation of all financial assets excluding retirement assets					
25-35	5.7	14.5	17.2	22.4	68.0	17.0
35-50	13.3	13.6	19.0	36.0	74.3	27.9
50-65	23.0	26.8	32.1	39.8	74.6	41.9
> 65	29.2	29.7	44.7	66.4	96.1	42.8
All	17.3	17.5	23.3	37.2	75.0	31.2
	Liquidation of all non-housing, non-retirement assets					
25-35	20.8	38.1	41.4	40.7	94.8	39.1
35-50	32.6	41.7	45.9	61.4	93.6	53.2
50-65	44.9	54.4	62.3	69.5	93.8	68.2
> 65	49.7	50.9	71.9	95.4	97.5	64.6
All	36.6	44.1	50.5	63.5	93.9	56.1

Source: Authors' calculations using 2004 SCF. Non-housing, non-retirement assets include all assets in the SCF (including net equity in businesses, vehicles, etc.) but exclude first and second residences, retirement accounts, cash value of life insurance, and trusts and annuities. Total financial assets excluding retirement leave out retirement accounts, cash value of life insurance, and trusts and annuities from the SCF's definition of financial assets as described in Bucks, Kennickell, and Moore (2006). Liquid financial assets include checking, savings, money market, and brokerage call account holdings. See text for sample construction.

Table 7: Last-Dollar User Cost of Owner-Occupied Housing When Mortgage Interest or Property Tax Deduction is Restricted

Age of Household Head	Annual Household Income					
	<40K	40-75K	75-125K	125-250K	250+	All
	Repeal of Mortgage Interest Deduction					
25-35	0.068	0.066	0.063	0.059	0.056	0.065
35-50	0.068	0.065	0.061	0.058	0.053	0.063
50-65	0.068	0.061	0.059	0.056	0.052	0.061
> 65	0.071	0.060	0.058	0.055	0.050	0.066
All	0.069	0.063	0.060	0.057	0.052	0.063
	Repeal of Mortgage Interest Deduction, Full Portfolio Adjustment					
25-35	0.068	0.066	0.061	0.058	0.051	0.064
35-50	0.068	0.064	0.060	0.056	0.050	0.061
50-65	0.067	0.061	0.058	0.054	0.050	0.060
> 65	0.071	0.059	0.057	0.054	0.049	0.066
All	0.069	0.062	0.059	0.055	0.050	0.062
	Repeal of Property Tax Deduction					
25-35	0.067	0.064	0.058	0.055	0.052	0.062
35-50	0.067	0.063	0.059	0.055	0.052	0.060
50-65	0.068	0.061	0.059	0.055	0.052	0.060
> 65	0.072	0.062	0.060	0.057	0.052	0.067
All	0.069	0.062	0.059	0.055	0.052	0.062
	Repeal of Property Tax Deduction, with Behavioral Response by Local Governments					
25-35	0.067	0.063	0.058	0.054	0.050	0.062
35-50	0.067	0.062	0.058	0.054	0.050	0.060
50-65	0.067	0.061	0.058	0.054	0.050	0.059
> 65	0.071	0.060	0.058	0.055	0.050	0.066
All	0.069	0.062	0.058	0.054	0.050	0.061

Source: Authors' calculations using 2004 SCF and Moore's (2003) interface between NBER TAXSIM program and the SCF. Averages are weighted using the SCF's replicate weights. See text for sample construction.

Table 8: Change in Income Tax Liability from Restricting the Mortgage Interest Deduction

Age of Household Head	Annual Household Income					
	<40K	40-75K	75-125K	125-250K	250+	All
	Eliminate Mortgage Interest Deduction, No Portfolio Adjustment					
25-35	219	570	1,793	3,467	7,736	1,141
35-50	250	745	1,522	3,549	6,582	1,646
50-65	160	490	1,028	2,108	5,780	1,196
> 65	5	149	312	955	1,413	149
All	101	535	1,256	2,704	5,444	1,065
	Eliminate Mortgage Interest Deduction, Allowing for Portfolio Substitution Using Non-Retirement Financial Assets					
25-35	213	528	1,683	3,169	5,654	1,046
35-50	237	693	1,374	3,051	5,119	1,432
50-65	134	427	881	1,777	4,433	986
> 65	1	115	189	701	1,046	105
All	90	485	1,117	2,309	4,184	910
	Cap Deductible Mortgages at $500,000, No Portfolio Substitution					
25-35	14	22	92	252	1,317	72
35-50	11	25	91	322	1,794	171
50-65	7	33	58	174	1,371	148
> 65	1	9	36	154	269	20
All	5	24	74	241	1,340	114
	Cap Deductible Mortgages at $500,000, Allowing Portfolio Substitution					
25-35	14	22	90	247	1,179	69
35-50	11	25	90	294	1,445	151
50-65	7	34	57	171	1,092	129
> 65	1	8	38	137	206	18
All	5	24	73	225	1,076	100
	Cap Deductible Mortgages at $250,000, No Portfolio Substitution					
25-35	14	33	254	891	3,114	189
35-50	11	61	163	889	3,178	365
50-65	7	51	119	299	2,740	282
> 65	1	9	42	260	566	33
All	5	44	148	586	2,566	234
	Cap Deductible Mortgages at $250,000, Allowing Portfolio Substitution					
25-35	14	30	245	828	2,663	176
35-50	11	58	153	785	2,531	315
50-65	6	51	108	265	2,153	234
> 65	1	8	43	208	430	27
All	5	43	139	518	2,032	200

Source: Authors' calculations using 2004 SCF and Moore's (2003) interface between NBER TAXSIM program and the SCF. Averages are weighted using the SCF's replicate weights. See text for sample construction.

Table 9: Share of Households with Home Acquisition Debt above Various Thresholds, By Age and Household Income

	Annual Household Income					
Age of Household Head	<40K	40-75K	75-125K	125-250K	250+	All
	Home Acquisition Debt > $1,000,000					
25-35	0.000	0.000	0.000	0.000	0.013	0.000
35-50	0.000	0.000	0.000	0.000	0.065	0.003
50-65	0.000	0.000	0.001	0.001	0.052	0.004
> 65	0.000	0.000	0.001	0.005	0.005	0.000
All	0.000	0.000	0.000	0.001	0.047	0.002
	Home Acquisition Debt > $500,000					
25-35	0.000	0.000	0.014	0.043	0.113	0.009
35-50	0.001	0.005	0.000	0.068	0.233	0.024
50-65	0.000	0.000	0.007	0.014	0.212	0.018
> 65	0.000	0.000	0.002	0.015	0.042	0.002
All	0.000	0.002	0.005	0.039	0.190	0.015
	Home Acquisition Debt > $250,000					
25-35	0.020	0.012	0.121	0.362	0.654	0.078
35-50	0.014	0.046	0.087	0.239	0.444	0.105
50-65	0.006	0.023	0.065	0.121	0.490	0.078
> 65	0.000	0.003	0.028	0.051	0.094	0.009
All	0.005	0.026	0.078	0.179	0.420	0.069
	Home Acquisition Debt > $0					
25-35	0.852	0.957	0.989	1.000	0.995	0.945
35-50	0.855	0.920	0.910	0.957	0.848	0.910
50-65	0.564	0.683	0.746	0.739	0.749	0.686
> 65	0.236	0.329	0.431	0.339	0.212	0.281
All	0.472	0.751	0.810	0.811	0.708	0.685

Source: Authors' calculations using 2004 SCF. Averages are weighted using the SCF's replicate weights. See text for sample construction.

Table 10: Tax Increase from Repeal of State and Local Property Tax Deduction

Age of Household Head	Annual Household Income					
	<40K	40-75K	75-125K	125-250K	250+	All
	No Change in Local Government Behavior					
25-35	134	266	612	1,108	1,781	415
35-50	129	304	603	1,132	2,456	604
50-65	117	271	526	988	2,362	569
>65	60	205	273	828	2,289	205
All	91	270	539	1,043	2,362	468
	Assuming Local Governments Shift Sources of Revenue					
25-35	103	201	463	825	1,285	313
35-50	98	234	456	836	1,785	451
50-65	87	212	402	725	1,685	423
> 65	43	161	212	636	1,628	153
All	68	209	410	771	1,696	350

Source: Authors' calculations using 2004 SCF and Moore's (2003) interface between NBER TAXSIM program and the SCF. Averages are weighted using the SCF's replicate weights. In the second panel, the elasticity of property tax revenues with respect to the net-of-tax price is assumed to be -1. We assume localities either do not spend the lost revenue or raise it with non-deductible tax instruments. See text for sample construction.