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REVENUE COSTS AND INCENTIVE EFFECTS OF THE MORTGAGE INTEREST DEDUCTION FOR OWNER-OCCUPIED HOUSING

James M. Poterba and Todd Sinai

We analyze how changes in the income tax deduction for home mortgage interest would affect loan-to-value ratios on owner-occupied homes, the distribution of income tax liabilities, and the consumption of housing services. Using the 2004 Survey of Consumer Finances, we estimate that repealing the mortgage interest deduction in 2003 would have raised federal and state income tax revenues by $72.4 billion in the absence of any household portfolio adjustments, but by only $58.5 billion if homeowners drew down financial assets to pay down their mortgage debt.

Keywords: mortgage interest deduction, tax expenditures, owner-occupied housing

JEL Codes: H24, R21, R38

I. INTRODUCTION

Income tax provisions related to owner-occupied housing account for several of the largest federal tax expenditures. The Joint Committee on Taxation (JCT) (2010) estimates that the tax expenditure for the home mortgage interest deduction in fiscal year 2010 was $103.7 billion, that for the state and local property tax deduction was $16.4 billion, and that for the reduced tax rates on capital gains on owner-occupied housing was $15.3 billion. While there are numerous concerns with the specific estimates of tax expenditures, as discussed by Altshuler and Dietz (2011) in this issue, the U.S. General Accountability Office (2005), and Toder (2005), among others, the estimates leave little doubt that the federal income tax code significantly affects incentives for the consumption of owner-occupied housing. This paper presents new estimates of the total income tax subsidy to owner-occupied housing, investigates how modifying the mortgage interest deduction would affect mortgage borrowing and the distribution of

James M. Poterba: Massachusetts Institute of Technology and NBER, Cambridge, MA, USA (poterba@mit.edu)

Todd Sinai: The Wharton School, University of Pennsylvania, Philadelphia, PA and NBER, Cambridge, MA, USA (sinai@wharton.upenn.edu)

income tax liabilities, and describes the impact of such tax changes on the after-tax cost of owner-occupied housing.

This study advances the analysis of the mortgage interest deduction in several ways. First, we contribute to the debate on how portfolio adjustment induced by changes in the mortgage interest deduction might affect tax revenues and the marginal cost of owner-occupied housing. If the mortgage interest deduction were eliminated, in the short run households might retire some of their mortgage debt by drawing down their holdings of financial assets. That would reduce taxable income from interest, dividends, and capital gains, and thereby reduce the net revenue gain from repealing the mortgage interest deduction. In the longer run, households might delay house purchases, or choose to consume less housing services.

Prior research yields conflicting evidence on how tax-induced changes in mortgage borrowing would affect the revenue gain from eliminating the mortgage interest deduction. Follain and Melamed (1998) estimate that the increase in federal tax revenues after allowing for adjustments in borrowing patterns would be only 25 percent of the "no response" estimate, Gervais and Pandey (2008) suggest that it would be 58 percent, and Gale, Gruber, and Stephens-Davidowitz (2007) conclude that it would be 84 percent. These studies make different assumptions about the set of assets that households would tap to repay their mortgages, and about the rates of return that households earn on these assets.

Using household-level data from the 2004 Survey of Consumer Finances (SCF)[1] along with the NBER TAXSIM model, we explore how estimates of the revenue raised by repealing the mortgage interest deduction depend on assumptions about household portfolio adjustment. We find that many households' capacity to repay their mortgage debt is limited, as those with large mortgages typically do not have much financial wealth, and those with substantial financial wealth do not have much mortgage debt. For example, if all households with mortgages sold all of their financial assets and paid down their mortgages, less than 30 percent of mortgage debt would be repaid, even though aggregate household financial assets are nearly six times larger than mortgage liabilities. Our preferred estimates nevertheless suggest that potential changes in mortgage borrowing significantly reduce the prospective revenue gain from eliminating the mortgage interest deduction. We find that the average homeowner's increase in tax liability from repealing the mortgage interest deduction would be roughly 80 percent of the value that would obtain if mortgage borrowing did not adjust. We demonstrate that alternative assumptions about the set of assets households tap to repay their mortgages yield substantially different estimates.

Second, we document substantial variation in the impact of the mortgage interest subsidy across age and income groups. While it is well-understood that the tax system yields larger tax savings for higher-income homeowners, we quantify the differences across age categories as well. In contrast to Poterba and Sinai (2008a) and Ling and

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[1] See Federal Reserve Board, "2004 Survey of Consumer Finances," http://www.federalreserve.gov/pubs/oss/oss2/2004/scf2004home.html.

McGill (2007), we also take into account variation across the age-income distribution in how mortgage borrowing responds to changes in mortgage interest deducibility. Young, low-income households have the least latitude in paying down their mortgages since they tend to have high debt burdens relative to assets; households age 35–50 earning less than $75,000 per year could pay down less than 5 percent of their mortgage debt by cashing in all their financial assets (excluding cash or equivalent accounts). Conversely, older, high-income households have sufficient net worth to pay off much of their mortgage debt should it cease to be tax-favored. Households age 50–65 making $250,000 per year or more could pay down more than 60 percent of their mortgage debt just by reallocating financial assets (again excluding cash or equivalent accounts).

We find that the mortgage interest deduction reduces federal and state tax liability by more than $5,400 for high-income groups, but by less than $110 for the lowest income group. However, allowing for portfolio adjustments reduces that figure, with the largest offsets occurring for older, high-income households. Accounting for potential adjustments in mortgage borrowing, the increase in tax liability is one-third lower, $3,641, for high-income groups but just 13 percent lower, $95, for the lowest income group. Households with high marginal tax rates and large mortgages — typically young, high-income households — would be most affected by repeal of the mortgage interest deduction. As a way of summarizing the potential impact of changes in mortgage interest deductibility on housing demand, we estimate age- and income-specific increases in the marginal user cost of owner occupied housing. With no changes in mortgage borrowing, the user cost would increase by 5 percent on average. Plausible adjustments in household portfolios might offset between one-sixth and one-third of this increase. For groups that typically rely heavily on mortgage debt to finance their homes, however, the increase in marginal user costs would be substantially greater than the average effect. Eliminating the mortgage interest deduction would reduce housing demand, and in the long run result in a smaller equilibrium housing stock.

Third, we consider how a tightening of the current $1 million cap on mortgage debt that qualifies for the interest deduction would affect the distribution of individual income tax liabilities. Based on 2004 data, we find that less than 7 percent of homeowners would be affected even if the cap were lowered to $250,000. Allowing for adjustments in mortgage borrowing, that change would raise the average income tax liability by $183. The tax increase for households making more than $250,000 would be almost half of the increase from eliminating the mortgage deduction entirely, whereas the tax increase for households making less than $40,000 would be about 5 percent of the increase from elimination.

This paper is divided into six sections. Section II compares the current user cost of owner-occupied housing with that under a Haig-Simons comprehensive income tax. This comparison frames our subsequent analysis. The third section describes our primary data sources, the SCF and the NBER TAXSIM model, and describes the other parameters that we need to calibrate user costs and to estimate tax liabilities. Section IV reports the distribution of the total tax saving from the current tax treatment of owner-occupied housing in comparison to a Haig-Simons income tax system. It focuses on

the average cost of owner-occupied housing, rather than the marginal cost. Section V describes how loan-to-value ratios might respond to changes in the mortgage interest deduction. Section VI estimates the changes in tax liability across household age and income categories that would result from eliminating or capping the mortgage interest deduction, with and without portfolio adjustments. Section VII reports estimates of the marginal user cost of housing services under the current tax system and if the mortgage interest deduction were repealed. There is a brief conclusion.

II. THE USER COST OF OWNER-OCCUPIED HOUSING UNDER DIFFERENT TAX REGIMES

The user cost of capital, employed by Poterba (1992), Sinai and Gyourko (2004), and many others, provides a conceptual framework for examining the overall effect of various tax provisions on the cost of housing services. The user cost measure describes the marginal cost of consuming an additional unit of housing services under a given tax regime. We can compare the cost under different tax regimes, and also compute the difference in total tax liabilities between different tax regimes by integrating the difference in marginal user cost across the total amount of housing consumed.

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

$$(1) \quad c=[1-\{\tau_{ded}*\lambda+\tau_{y}*(1-\lambda)\}]*r_{T}+(1-\tau_{y})*\beta-\tau_{ded}*\lambda*(r_{M}-r_{T})+m+(1-\tau_{ded})*\tau_{prop}-\pi_{e}$$

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, r_{M} is the mortgage interest rate, β denotes the pre-tax housing risk premium, m is the combined cost of depreciation and maintenance, τ_{prop} is the property tax rate, and π_{e} is the expected rate of nominal house price appreciation.

We follow Poterba (1992) and several other studies in including a risk premium in the user cost expression as a shorthand for a more complete analysis of owner-occupied housing as a portfolio asset. This approach recognizes that because the total return to an investment in owner-occupied housing is risky, households would apply an effective discount rate higher than the riskless rate to any stream of future housing services. The inclusion of a risk premium in (1) does not imply that when households make portfolio adjustments in response to tax changes that they only draw down risky assets with risk premium β as they repay their mortgages.

We also follow Himmelberg, Mayer, and Sinai (2005) and Poterba and Sinai (2008a) by recognizing that the tax code subsidizes the options to prepay and to default that are embedded in a standard fixed rate mortgage. This subsidy is reflected in the $-\tau_{ded}*\lambda*(r_{M}-r_{T})$ term in (1). The interest rate premium over equivalent duration Treasury bonds that lenders charge for a mortgage, $r_{M}-r_{T}$, is due to the risk that the borrower prepays the loan or defaults. From the borrower's perspective, the options to prepay and to default reduce the risk of owning a home. We assume that the prepayment and default options are fairly priced, which means that the reduction in the user cost due to the tax subsidy

to these options is exactly equal to the value of these options times the tax rate at which mortgage interest can be deducted.

A complete model of household optimal portfolio choice in the presence of the mortgage interest deduction and the taxation of investment returns, which is beyond the scope of the current study, would recognize that changes in the tax treatment of mortgage interest would induce not only changes in the financing of housing purchases but also changes in the level and timing of housing consumption, household saving, and the consumption of non-housing goods. A change in the structure of mortgage contracts, for example, to disallow prepayment, is an example of a general equilibrium response that might follow from changes to the tax treatment of mortgage interest. Our analysis suppresses these potential effects, and assumes in addition that global capital markets determine both pre-tax rates of return and risk premia, which means that they are unaffected by changes in the tax treatment of mortgage interest.

Equation (1) assumes that households do not receive any benefits in return for their property tax payments. If property taxes are "benefit taxes" and taxpayers receive benefits valued at $100*\kappa$ percent of their tax payments, then $(1-\tau_{ded})*\tau_{prop}$ in (1) would become $(1-\tau_{ded}-\kappa)*\tau_{prop}$. Zodrow (2000) reviews the unsettled debate on the extent to which local property taxes are in fact benefit taxes. Rather than choosing a particular value of κ in the analysis below, we present user cost calculations below under two polar assumptions, $\kappa = 0$ and $\kappa = 1$, to bound the effects of different assumptions about the effects of the property tax.

In (1), we distinguish between the marginal income tax rate that applies to mortgage interest and property tax deductions, τ_{ded}, and the marginal tax rate that applies to investment income, τ_y. For taxpayers who do not itemize their deductions for federal and state income tax purposes, $\tau_{ded} = 0$ even though $\tau_y > 0$. Special tax rules that apply to some types of investment income may also generate differences between τ_y and τ_{ded}. We measure τ_{ded} as the household's marginal federal and state income tax rate on its last dollar of itemized deductions, and τ_y as the marginal tax rate on the household's last dollar of taxable interest income. In computing income tax burdens we recognize that itemizers can deduct state income taxes in computing their federal taxable income.

Equation (1) assumes that capital gains on homes are untaxed. While homeowners are currently taxed on their capital gains on primary residences in excess of $500,000 ($250,000) for married couples (singles), and on all gains on second homes, Wilson and Liddell (2010) report that in 2007, just 132,000 tax returns reported any type of capital gain from selling a home, including both primary and secondary residences. The average reported gain was $110,000.

Many previous studies of the user cost of owner-occupied housing have adopted formulations similar to, but not precisely equivalent to, that in (1). There is no consensus on how to model the risky element of owning a home. A common approach has been to measure the cost of funds as a weighted average of the mortgage interest rate and a return on an alternative asset, typically a long-term corporate or Treasury bond. An alternative approach is to add a risk premium to a riskless measure of the cost of funds. We follow the second approach and assume that the risk premium is 2 percentage points.

To compute the total tax savings associated with the current tax treatment of housing, one must determine the relevant benchmark. We consider a Haig-Simons comprehensive income tax that would include in income the rental value of a home as well as any accruing capital gains, while allowing deductions for economic depreciation, maintenance expenses, interest, and property tax payments, the latter under the assumption that there are no offsetting benefits from the property tax. In Poterba and Sinai (2008a), we followed a different approach and compared the status quo to a tax system under which homeowners were taxed on imputed rental income, were allowed to deduct maintenance and depreciation, but were still not taxed on accruing housing capital gains.

One could construct a Haig-Simons income tax system either with or without a standard deduction. While this choice does not affect the marginal user cost comparison for a taxpayer who would itemize under either system, it can have a large effect on the average tax saving attributed to current tax provisions. Our baseline comparison is between the United States income tax code in 2003 and a Haig-Simons tax system with a standard deduction set at 2003 levels. However, we also consider a Haig-Simons income tax system without a standard deduction.

Under the Haig-Simons tax system, the equilibrium condition for consuming housing services is

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

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 capital. 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. The user cost in the Haig-Simons setting, c_{HS}, is simply

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

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.

The difference between the user cost under the current income tax system and that under the Haig-Simons income tax system can be decomposed into four constituent parts

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

The first term reflects mortgage interest deductibility, while the second is due to property tax deductibility. The third term is attributable to the untaxed return on housing equity. This term arises because income from financial assets is taxed, while the implicit rental income and the capital gain associated with housing investment are not taxed. The relative importance of the first and third elements in this decomposition depends on λ, the loan-to-value ratio. The fourth term corresponds to the value of the tax subsidy to the borrower's option to prepay or to default on her mortgage.

If the mortgage interest deduction were eliminated and the loan-to-value ratio did not respond to this tax change, then the user cost would become

$$(5) \quad c' = (1 - \tau_y^*(1 - \lambda))^* r_T + (1 - \tau_y)^* \beta + m + (1 - \tau_{ded})^* \tau_{prop} - \pi_e.$$

The difference between (5) and (1) is simply $\tau_{ded}^* \lambda^* r_M = \tau_{ded}^* \lambda^* r_T + \tau_{ded}^* \lambda^* (r_M - r_T)$. To estimate the revenue effects of such a tax change, we need to compute the difference in the total cost of owner-occupied housing under the current tax code and under this modified tax system. If the tax system had a single marginal tax rate and no standard deduction that could be claimed as an alternative to itemized deductions, the change in the total cost of owner-occupied housing would equal the product of the marginal user cost and the amount of housing consumed. With progressive marginal tax rates and a standard deduction, however, the marginal user cost of housing may depend on the level of housing consumed. Follain and Ling (1991) and many others have noted that the infra-marginal after-tax cost of owner-occupied housing services may differ from the last-dollar cost because of non-linearities in the income tax schedule. In this setting, the tax saving for a household that claims the mortgage interest deduction may not equal the product of the last-dollar tax rate applicable to the mortgage interest deduction and the amount of interest paid, as the loss of the standard deduction may reduce the total tax saving.

III. THE SURVEY OF CONSUMER FINANCES DATABASE AND OTHER DATA INPUTS

Our empirical analysis of tax subsidies is based on household-level data from the 2004 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. Home equity is measured as self-reported home value less self-reported housing debt; in 64 cases out of 20,189, this value is negative.

The SCF sample includes 22,595 household observations, based on five replicates for each of 4,519 underlying households. These replicates are created with different values for any variables that are imputed because of missing values or other incompleteness of the data record. This approach recognizes the uncertainty that is inherent in various imputation procedures. 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 age 25, 56 additional observations that report having mortgages but pay no mortgage interest, 11 additional observations with loan-to-value ratios above 1.5, and 52 additional observations with inexplicably high estimated marginal tax rates. This leaves a sub-sample of 20,189 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 returns. Because the SCF does not identify taxpayers by state of residence, we randomly assign SCF respondents to states based on

relative state populations, and we then compute state income taxes for the "assigned" states.

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. Imputing capital income to households based on their asset holdings generated 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 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, 52.7 million households self-report that they itemize, while Parisi and Hollenbeck (2005) report 43.9 million itemizers filed tax returns in 2003. Our sample, expanded to population size, includes 44.5 million TAXSIM-estimated itemizers.

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 measure the pre-tax cost of funds as the risk-free medium-term interest rate plus a risk premium, and we use the 10-year Treasury bond rate as the riskless rate (r_f). In 2003, the 10-year Treasury bond yield was 4.01 percent; by comparison, the average mortgage interest rate was 5.82 percent. 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.

While tax rates, interest rates, and current interest payments are the only inputs we need to compute the effects of the mortgage interest deduction on tax liabilities, we need several other inputs to evaluate the user cost in later sections. 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. This would raise our estimated user cost. We assume a depreciation and maintenance rate (m) of 2.5 percent. We calibrate the expected rate of house price inflation using the Livingston Survey,[2] which showed expected CPI inflation of 1.4 percent in 2003. Real house price inflation between 1980 and 2002, measured by averaging state-level inflation rates computed from the Federal Housing Finance Agency (FHFA) index,[3] was 0.73 percent. Combining these two measures, we assume an average nominal house price inflation rate of 2.13 (= 0.73 + 1.40) percent.

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[2] See http://www.philadelphiafed.org/research-and-data/real-time-center/livingston-survey/.

[3] See http://www.fhfa.gov/Default.aspx?Page=87.

IV. DISTRIBUTION OF TAX SAVINGS: CURRENT TREATMENT OF OWNER-OCCUPIED HOUSING

The first panel of Table 1 shows the average difference in homeowners' income tax liability under the current tax system and the Haig-Simons income tax with a standard deduction. The measures combine federal and state income tax liabilities. The entries are divided into four different age groups based on the age of the household head, and five different income categories based on 2003 household income. Household income is defined as Adjusted Gross Income (AGI) 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.

The entries in the first panel of Table 1 show substantial diversity in the average age- and income-specific values for the total tax subsidy. For all homeowners, the average value is $4,842. The average value for homeowners with incomes below $40,000 who are under age 35 is $1,017, compared with a maximum value of $29,960 for homeowners between ages 50 and 65 with incomes above $250,000. The average values for high-income households are, not surprisingly, much greater than those for lower-income households. The second panel of Table 1 shows similar calculations, but makes the

Table 1

Difference in Income Tax Liability (Dollars): Taxing Owner-Occupied Housing Under a Haig-Simons Tax Base versus the Current Income Tax System

Age of Household Head	Annual Household Income					
	<40K	40–75K	75–125K	125–250K	250K+	All
	Haig-Simons tax base with standard deduction					
25–35	1,017	1,641	4,638	8,124	19,123	3,033
35–50	1,211	2,401	4,715	10,090	27,606	5,329
50–65	1,555	3,193	4,923	10,111	29,960	6,291
> 65	1,250	4,315	4,903	10,803	26,761	3,358
All	1,291	2,855	4,794	10,051	28,349	4,842
	Haig-Simons tax base without standard deduction					
25–35	1,692	2,645	5,818	8,843	19,924	3,990
35–50	1,844	3,393	5,764	10,703	28,021	6,185
50–65	2,165	4,075	5,879	10,697	30,316	7,040
> 65	1,904	5,448	6,207	11,508	27,243	4,177
All	1,933	3,843	5,864	10,667	28,758	5,668

Notes: Averages are weighted using the SCF's replicate weights. See text for sample construction.

comparison to a Haig-Simons tax system without a standard deduction. In this case the tax saving from the status quo appears larger, averaging $5,668 per homeowner. The tax saving from the current tax system in this case is the *sum* of the saving from the standard deduction and the saving from the mortgage interest deduction and other housing-related provisions. The largest proportionate effects are for lower-income households, who are more likely to claim the standard deduction than are their higher-income counterparts.

Under both variants of the Haig-Simons system, higher-income households receive larger *total* tax savings than lower-income households. For example, in the comparison that preserves the standard deduction under the Haig-Simons system, households with incomes between $75,000 and $125,000 receive less than 50 percent of the average subsidy ($4,794) of households with income of between $125,000 and $250,000 ($10,051). For most income categories the average tax saving from the mortgage interest deduction rises with age, but this trend does not appear for the oldest households. This same pattern is reflected in the overall means by age in the last column of Table 1. The average tax saving for the oldest households is about half of the average saving of those age 50–65, reflecting the high number of low-income households in the oldest group. The age pattern of subsidies is similar to that in other studies, notably Ling and McGill (2007), although we find somewhat greater subsidy variation across age categories.

Aggregating the household-level subsidy to homeownership across the nearly 68 million homeowners in the SCF, we estimate that the total federal and state tax subsidy relative to a benchmark Haig-Simons income tax with a standard deduction is about $330 billion. The federal income tax subsidy alone is $280 billion. When we compare the 2004 federal and state tax system with a Haig-Simons income tax without a standard deduction, the comparable value is $387 billion. Even our estimate for the federal subsidy alone is substantially larger than the sum of the JCT (2002) estimates for the tax expenditures from the mortgage interest, property tax, and capital gains treatments of owner-occupied housing. The sum of the JCT estimates may themselves be an overestimate of the static revenue effect since it neglects the interaction effects that would emerge if all three provisions were changed simultaneously. The principal source of the disparity between our estimates and the sum of the JCT estimates is our inclusion of the tax saving from the non-taxation of imputed rent as a tax benefit. Our tax subsidy estimate is smaller than the Sinai and Gyourko (2004) estimate of the combined federal and state tax subsidy of $420 billion, which was based on Census data from 2000.[4]

Table 1's skewed distribution of subsidies by age and income is a result of higher marginal tax rates, higher itemization rates, and higher home values at the higher income levels. Table 2 presents descriptive data that document these patterns. The first panel reports average tax rates on the "additional interest income" that a household would receive if it invested its housing equity in interest-bearing assets. The entries combine federal tax rates and imputed net-of-federal-tax state income tax rates. We calculate this tax rate in two steps. First, we calculate the difference between the household's tax bill with its reported interest income, augmented by the interest yield we assume that

[4] See U.S. Census Bureau, "Census 2000 Gateway," http://www.census.gov/main/www/cen2000.html.

Table 2

Inputs to Homeowners' Tax Savings Under Current Tax Rules

Age of Household Head	Annual Household Income					
	<40K	40–75K	75–125K	125–250K	250K+	All
	Average tax rate on "additional" interest income					
25–35	0.195	0.206	0.270	0.325	0.387	0.233
35–50	0.168	0.208	0.276	0.338	0.394	0.252
50–65	0.143	0.232	0.283	0.336	0.387	0.253
> 65	0.087	0.262	0.276	0.320	0.382	0.161
All	0.124	0.224	0.277	0.335	0.389	0.227
	Average mortgage interest deduction subsidy rate					
25–35	0.032	0.078	0.165	0.258	0.315	0.108
35–50	0.037	0.086	0.154	0.270	0.307	0.140
50–65	0.027	0.073	0.126	0.218	0.267	0.115
> 65	0.001	0.023	0.044	0.096	0.075	0.017
All	0.016	0.070	0.133	0.231	0.253	0.097
	Mean value of owner-occupied home ($ thousand)					
25–35	115.9	147.5	259.1	343.3	674.7	192.9
35–50	124.2	188.1	253.7	422.3	993.0	272.9
50–65	156.1	208.0	264.6	428.2	1,155.0	313.4
> 65	159.8	266.8	283.5	504.4	1,060.6	233.7
All	148.7	201.7	261.8	427.8	1,072.0	265.6
	Mean LTV ratio (percentages)					
25–35	61.7	72.8	71.2	67.3	57.7	69.0
35–50	50.2	60.0	55.3	53.2	36.7	54.8
50–65	29.3	29.6	37.3	34.8	29.5	32.5
> 65	9.8	13.5	18.4	12.6	7.2	11.6
All	26.1	44.9	47.4	42.6	29.4	38.7

Notes: Averages are weighted using the SCF's replicate weights. See text for sample construction.

it could have earned on its housing equity, and its actual tax bill. Then, we divide this difference by the total amount of additional interest we have imputed to the household, and we average the resulting ratio across all households in each age-income category. We compute a weighted average using SCF household weights. We compute the average mortgage interest subsidy rate for each household by dividing the difference between its tax liability if it had no mortgage interest deduction and the household's current tax

liability by the current mortgage interest deduction. For each household, this measure is an average across all mortgage interest payments. Table 2 reports the weighted average of this ratio across all the households in each age-income cell.

The first two panels in Table 2 show the average tax rates on "additional interest income" and on mortgage interest deductions. For all household annual income categories above $40,000, the average tax rate on additional interest income exceeds 20 percent. The average for all homeowners is 22.7 percent. For those with incomes above $250,000, it exceeds 38 percent. These average tax rates are substantially different from those on mortgage interest, which are shown in the second panel. The average tax rate applicable to the mortgage interest deduction is 9.7 percent, and the only household age-income cells with average rates above 20 percent are those with incomes above $125,000 and under age 65. The reason for these large differences is the low rate of itemization among the lower-income homeowners, and the cost of the foregone standard deduction, which reduces the *average* tax saving per dollar of mortgage interest.

The third panel of Table 2 reports average home values by age-income class. Not surprisingly, as Ling and McGill (2007) and others have reported, these values rise with income and generally rise with age. Home values average $201,700 for families with incomes of $40,000–75,000, compared with $427,800 for those with incomes between $125,000–250,000. In the highest-income category, the oldest households own slightly less valuable houses than do those age 50–65 — the only exception to the positive age-house value gradient within income classes. Because older households are overrepresented in the lower income categories, house values are lower for households over age 65 when we do not condition on income than when we do. The positive pairwise correlations between average tax rates, house values, and income cause the total tax saving from the mortgage interest deduction, which is determined by the average tax rate times the house value, to rise even faster with income than home value or the tax rate.

The last panel of Table 2 reports average loan-to-value ratios (LTVs) in various age-income cells. LTVs decline with age across the income spectrum, with an average value of 69 percent for households headed by someone between ages 25 and 35 and a value of 11.6 percent for households headed by someone over age 65. The average LTV in our sample is 38.7 percent. Lower LTVs at older ages mean that the low value of the average tax rate on mortgage interest has a smaller effect on total tax saving than it would for younger households.

The alternative minimum tax (AMT) has almost no effect on our estimates of homeowners' tax savings. If we compute the current and baseline taxes with and without the AMT, our estimate of the average tax subsidy to owner-occupiers rises from $4,842 to $4,885. This is because in 2003, the AMT's impact was limited by a "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.

V. PORTFOLIO ADJUSTMENT AND CHANGES IN THE MORTGAGE INTEREST DEDUCTION

If the tax rules affecting mortgage interest deductions changed, it is likely that taxpayers would respond by making portfolio adjustments and altering the loan-to-value ratios on their homes. There is a substantial literature on the elasticity of household mortgage borrowing with respect to the after-tax cost of debt, with notable contributions including Follain and Dunsky (1997), Ling and McGill (1998), and Dunsky and Follain (2000). These studies suggest that households adjust their mortgage borrowing in response to changes in both mortgage interest rates and marginal tax rates, and they yield estimates of the price elasticity of demand for mortgage borrowing between –1.0 and –1.5. These are short-run elasticities, identified either from cross-sectional differences in household marginal tax rates or, in the case of Dunsky and Follain (2000), legislation-induced changes in marginal tax rates between 1983 and 1989. These estimates may be contaminated if there are unobserved variables associated with differences in marginal tax rates, particularly in the cross-section, that are also correlated with the demand for housing or for mortgage debt.

Follain and Dunsky (1997) and Dunsky and Follain (2000) also estimate long-run elasticities of mortgage demand using a partial adjustment model in tandem with the cross-sectional differences in marginal tax rates. The elasticities in this case are much larger, between three and four in absolute value. To achieve changes of this magnitude in household borrowing would require adjustments not only in portfolio structure, but also in housing demand and potentially also in household saving.

For young households with few financial assets, elimination of the mortgage interest deduction might delay the transition from renting to owning. For middle-aged and older households with substantial financial assets as well as mortgage debt, portfolio adjustment and changes in the loan-to-value ratio would be more likely. These households could sell financial assets and use the proceeds to increase their housing equity, thereby reducing their mortgage borrowing. If mortgage interest were no longer tax deductible, but portfolio income were taxed, then households with mortgages as well as financial assets would be borrowing at the pre-tax interest rate but investing at the after-tax rate of return. These households would have an incentive to draw down their other financial asset holdings and repay their mortgage debt.

A number of previous studies, including Jones (1995), Follain and Melamed (1998), Gale, Gruber, and Stephens-Davidowitz (2007), and Gervais and Pandey (2008), have observed that such portfolio adjustments lead "static" analyses of the mortgage interest deduction, holding loan-to-value ratios constant, to overstate the revenue gains that would be associated with repeal of this deduction. Gervais and Pandey (2008) present results from the 1998 SCF. Their preferred set of balance sheet adjustments suggests that the revenue gain from eliminating the mortgage interest deduction would be only $29 billion, compared with a static estimate of $50 billion. Their 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. It also assigns an annual return of 7.3 percent to all assets. Follain and Melamed (1998), using

a *long-run* elasticity of mortgage demand of –3.7 based on their analysis of the 1989 SCF, estimate that the revenue cost of eliminating the mortgage interest deduction recognizing changes in the loan-to-value ratio might be only one-quarter of the static revenue cost. Gale, Gruber, and Stephens-Davidowitz (2007) report smaller estimates of the difference between the revenue gain with and without portfolio adjustment. Under the important assumption that all assets yield the mortgage interest rate, their analysis of 2006 tax return data suggests that the revenue gain with portfolio adjustment is 84 percent of the static estimate.

From the standpoint of revenue estimation, the two key questions about portfolio adjustment are (1) which balance sheet components households will adjust, and (2) what returns households would have earned on those assets had they continued to hold them. We allow different assets to yield different returns, and in particular recognize that many relatively liquid assets with low yields generate relatively little income tax revenue. This observation is even more important in 2010 than it was in 2004 when our data were collected.

Since there are few if any estimates of how changes in the after-tax cost of mortgage borrowing affects demand for various household balance sheet components, we consider a hierarchy of potential adjustments. We begin by assuming that households would only draw down a limited class of liquid assets to repay mortgage debt. We then broaden the set of assets that households might adjust, in several steps. It seems unlikely that households would draw down all assets proportionately. Whether households would tap business assets, or assets in retirement plans, to replace mortgage borrowing with housing equity is an open question. Poterba, Venti, and Wise (1996), in studying the patterns of asset accumulation in the late 1980s, find no evidence that households with more rapid growth of retirement plan assets also incurred more mortgage debt. Amromin, Huang, and Sialm (2007) find that 38 percent of households that prepay their mortgages could have increased their after-tax net worth by contributing to a tax-qualified plan instead of paying down their mortgage. This suggests that households may not consider only after-tax returns in making their portfolio decisions, and provides some support for our approach of creating groups of arguably similar assets and then exploring the robustness of our findings to different assumptions about the degree of portfolio adjustment.

We consider the liquidation of existing financial assets, and exclude another margin on which households might adjust: incurring additional investment debt to retire mortgage debt. Interest on investment debt would still be deductible even if mortgage interest were not. For households with substantial financial assets, borrowing against these assets would be a viable alternative to liquidation of these assets. It is difficult to gauge the extent of such adjustment. From the standpoint of revenue raised and tax burdens on households, this strategy would deviate from the liquidation strategy only to the extent that the interest rate on loans backed by financial assets might differ from the pre-tax returns earned on these assets. We do not model this potential adjustment, in part because we do not have estimates of this potential borrowing cost.

We use the 2004 SCF to examine the distribution of the tax burdens associated with limiting the mortgage interest deduction under various assumptions about portfolio adjustment. Table 3 provides background information for our analysis by comparing

Table 3

Household Ownership of Financial Assets and Mortgage Indebtedness

	Non-Transaction Financial Assets	Financial Assets	Non-Housing, Non-Retirement Assets	All Non-Housing Assets	Financial Assets with Returns between Pre-Tax and After-Tax Mortgage Interest Rate
Value of assets that could be sold to replace qualified mortgage debt ($ trillion)	1.208	1.806	3.429	4.304	0.467
Percentage of deductible mortgage debt that could be replaced	19.5	29.2	55.4	69.6	7.5
Aggregate value of assets ($ trillion)	8.254	10.592	25.621	34.041	1.190
Percentage of assets in category that would have to be sold to pay down mortgage debt	14.6	17.0	13.4	12.6	39.2
Household-weighted average percentage of assets needed to pay down mortgage debt	58.5	62.9	55.1	48.0	91.8

Notes: Sample construction is described in the text. The aggregate value of deductible mortgage debt (qualified debt under $1 million per taxpayer) equals $6,187 billion. The assets considered in the first column are: CDs, stocks, corporate and foreign bonds, government bonds, mortgage-backed bonds, tax-exempt bonds (state and local), tax-free bond mutual funds, stock mutual funds, other bond mutual funds, government bond mutual funds, combination and other mutual funds, and other mutual funds. The second column includes all assets from the first column plus checking, savings, money market, and brokerage call accounts. The third column includes those in the second column plus vehicles, non-residential real estate, business interests, other financial assets (e.g. royalties, futures, etc.), other non-financial assets (e.g. jewelry, furniture, etc.), and other residential real estate. The fourth column includes column three plus retirement accounts, cash value of life insurance, and "other managed assets" such as trusts and annuities. We assume yields of zero on checking accounts, 1.12 percent on savings deposits, money market accounts, brokerage call accounts, and CDs, 3.7 percent on tax-exempt bonds and tax-free bond mutual funds, 4.5 percent on corporate, foreign, government and mortgage-backed bonds, 4.5 percent on bond mutual funds and combination and other mutual funds, 4.75 percent on stocks, and 7.5 percent on stock mutual funds. Realized capital gains are assumed to be 2.75 percent per year on equities and "other financial assets," and 5.50 percent on equity mutual funds (reflecting the higher frequency of realizations). For households with multiple mortgages, we use the maximum after-tax mortgage interest rate and the minimum pre-tax mortgage interest rate in our calculations.

household ownership of financial assets with current patterns of mortgage indebtedness. It reports information on mortgage debt and five broad asset categories. SCF households in 2004 had $6.2 trillion in mortgage debt with potentially tax-deductible interest. The first column of Table 3 considers the case where we assume households would be willing to sell only non-transaction financial paper assets (those not in transaction accounts such as checking, saving, and money market accounts) to repay mortgage debt. These assets, which are among the most liquid in a household's portfolio, include CDs, stocks, corporate and foreign bonds, government bonds, mortgage-backed bonds, tax-exempt bonds (state and local), tax-free bond mutual funds, stock mutual funds, other bond mutual funds, government bond mutual funds, combination and other mutual funds, and other mutual funds. However, we exclude transaction accounts, assuming that households would retain those for liquidity.

If each household sold non-transaction financial assets until it had repaid the minimum of its existing mortgage debt or $1 million of mortgage debt, or sold all of its liquid financial assets, then in the aggregate households would sell $1.2 trillion in financial assets. They would replace 19.5 percent of outstanding mortgage debt with 14.6 percent of aggregate non-transaction financial assets. Households with large mortgages tend to have few non-transaction financial paper assets, while households with small mortgages tend to have extensive non-transaction financial paper assets. The mismatch between households with assets to sell and households with mortgage debt to pay down persists as we expand the set of assets that we assume households would draw down to repay their mortgages. This bounds the amount of mortgage debt that could be replaced with housing equity in response to a change in the tax deductibility of mortgage interest.

The second column of Table 3 repeats the foregoing exercise, but assumes that households shift not just non-transaction financial paper assets, but all financial paper assets, to repay their mortgage debt. This adds checking, savings, money market, and brokerage call accounts to the set of assets that can be drawn down. With this expanded definition, households could liquidate as much as $1.8 trillion of assets, or 30 percent of outstanding aggregate mortgage debt. In column three, the asset base for draw-down includes all non-housing, non-retirement assets. This group of assets, which is somewhat broader than that used by Gervais and Pandey (2008), adds vehicles, non-residential real estate, business interests, other financial assets (e.g., royalties, futures, etc.), other non-financial assets (e.g., jewelry, furniture, etc.), and other residential real estate to the previous asset group. By drawing down assets in this category, households could pay down more than $3.4 trillion, or 55 percent, of aggregate mortgage debt.

The calculations in column four of Table 3 assume that households would be willing to liquidate retirement accounts, life insurance policies, trusts, and annuities, as well as all the assets considered in column three, to repay their mortgage debt. In this case they could pay down nearly 70 percent of aggregate mortgage debt ($4.3 trillion).

The bottom row of Table 3 reports the average share of their assets that each household would have to sell to achieve the reported aggregate mortgage reduction. The average household would have to liquidate between 48 and 63 percent of the assets in each of the

asset groupings in the first four columns. Because of the negative relationship between outstanding mortgage borrowing and asset holdings, the household-weighted average is much higher than the dollar-weighted average in the previous row. To achieve the mortgage debt reduction reported in the second row, many households have to sell all of their assets in the category.

Some households appear to hold assets with expected after-tax returns below their after-tax mortgage interest cost, and whatever leads them to hold such assets might make them unwilling to liquidate them if the tax treatment of mortgage interest changed. For this reason, in the last column of Table 3, we restrict the set of assets that are drawn down to repay mortgage debt to those financial paper assets with expected after-tax returns between the after-tax mortgage rate and the pre-tax mortgage rate. We base this calculation on the mortgage rates reported by each household, household level tax rates as imputed from TAXSIM, and on the imputed expected rates of return to various financial assets that are described in Table 4. The set of assets that we exclude from draw-down may be excessively broad. We do not adjust expected returns for differences in expected risk, we assume inelastic demand for assets with after-tax returns below the after-tax mortgage rate, and we have only coarse measures of expected returns. These limitations notwithstanding, we find that by drawing down only assets in this limited class, households could repay only 7.5 percent of their outstanding mortgage debt ($467 billion).

Households differ in their capacities to replace mortgage debt by drawing down financial assets. For various age and income categories, Table 4 reports the fraction of deductible mortgage debt that could be replaced by selling assets in each of the categories defined in Table 3. The population average in the lower right corner of each panel of Table 4 corresponds to the second row of Table 3. When we limit attention to non-transaction financial paper assets, as in the first panel, high-income and older households are best able to substitute housing equity for mortgage debt. Older households usually have very little mortgage debt, and high-income households tend to have substantial holdings of financial assets. In both cases, non-transaction financial paper assets are likely to be large relative to mortgage debt. For example, on average a household headed by someone over age 65 with a household income of more than $250,000 per year can pay off nearly 90 percent of their deductible mortgage debt using non-transaction financial paper assets alone. The potential for drawing down assets rises with age and income for each of the asset categories that we consider.

The bottom panel of Table 4 shows how much mortgage debt could be repaid if we assume that households would only draw down those assets that would be attractive to sell to repay debt from the standpoint of after-tax returns — the same definition that we used in the last column of Table 3. While households over age 65 and with income of $250,000 or more could pay down 60 percent of their mortgage debt using assets in this limited asset class, no other age-income cell could pay down more than 28 percent. Households with income of less than $125,000 could pay down less than ten percent of their mortgage debt and those with incomes of less than $40,000 could pay down virtually none.

Table 4

Percentage of Outstanding Deductible Mortgage Debt That Homeowners Could Replace by Drawing Down Other Assets

Age of Household Head	Annual Household Income					
	<40K	40–75K	75–125K	125–250K	250K+	All
	Non-transaction financial assets					
25–35	3.4	6.8	6.5	1.9	27.0	6.3
35–50	4.9	4.6	8.9	22.4	54.5	16.2
50–65	15.5	17.1	18.0	29.3	61.3	30.2
> 65	13.8	17.5	29.7	54.3	88.5	29.3
All	9.1	8.4	11.8	24.1	58.3	19.5
	Total financial assets					
25–35	5.5	13.4	15.3	17.3	56.7	14.9
35–50	9.7	12.1	17.4	34.6	68.2	25.7
50–65	21.5	25.7	30.1	38.6	73.4	40.5
> 65	26.1	26.6	42.5	63.3	94.6	40.0
All	15.1	16.1	21.5	35.5	71.5	29.2
	All non-housing, non-retirement assets					
25–35	20.5	37.4	40.5	36.0	85.0	37.6
35–50	32.6	41.0	45.3	61.0	93.2	52.7
50–65	44.2	54.1	62.1	69.2	93.6	67.9
> 65	48.1	50.0	71.4	95.3	97.5	63.7
All	36.0	43.5	50.0	62.8	93.2	55.4
	All non-housing assets					
25–35	23.2	46.9	54.2	56.4	100.0	49.3
35–50	40.2	53.4	65.1	81.5	97.8	68.2
50–65	57.7	63.8	78.4	89.8	99.5	81.6
> 65	68.2	68.4	75.0	99.5	99.9	76.4
All	46.5	55.1	66.6	82.7	98.9	69.6
	Total financial assets with returns higher than the after-tax mortgage interest rate and lower than the pre-tax mortgage interest rate					
25–35	0.6	0.1	1.4	0.7	20.9	1.4
35–50	0.1	0.5	3.6	10.4	27.1	7.0
50–65	1.1	3.2	5.5	10.9	27.6	11.0
> 65	0.3	5.4	8.9	27.3	60.0	11.6
All	0.5	1.3	3.8	10.4	28.4	7.5

Notes: Averages are weighted using the SCF's replicate weights. See the notes to Table 3 for the asset category definitions.

The data reported in Tables 3 and 4 can be used to compute an upper bound on the short-run elasticity of mortgage borrowing with respect to the average tax rate on mortgage interest. This bound varies substantially by age and income category. We compute upper bounds assuming that households draw down *all* of their assets in particular portfolio categories. Recall that in Table 2 we reported that the average tax rate on mortgage interest deductions was 9.7 percent. This makes the average after-tax cost of mortgage interest 0.903 times its pre-tax cost; eliminating the deduction would raise the average cost of borrowing by 10.7 percent [(1/.903) –1]. If households reallocated all possible non-transaction financial assets to pay down mortgage debt, as our calculations in the first column of Table 3 assume, they would pay down 19.5 percent of their existing mortgage debt and the implied elasticity of borrowing with respect to the average tax subsidy to mortgage debt would be –1.8 (–19.5/10.7). If households only sold the assets for which the after-tax return was between the before-tax and after-tax mortgage interest rate, as in the last column of Table 3, the implied upper bound on the elasticity of mortgage demand would be –0.7. For some of the other, broader, asset categories, the implied upper bound on the elasticity would be greater. The upper-bound estimates that result from this computation are close to existing estimates of short-run mortgage demand elasticities with respect to after-tax borrowing costs.

While these calculations are based on *average* after-tax costs of mortgage borrowing, the same exercise could be repeated using the *marginal* cost of mortgage borrowing, the after-tax interest cost calculated using the last-dollar marginal income tax rate on interest deductions that we report below. This calculation would yield a smaller upper bound elasticity. Instead of –1.8, for example, the upper bound would be –1.2. The short-run upper bounds we calculate typically are lower than the *long-run* elasticities described in Dunsky and Follain (2000).

VI. TAX LIABILITIES AND RESTRICTIONS ON THE MORTGAGE INTEREST DEDUCTION

We now consider how eliminating or restricting the mortgage interest deduction would affect the distribution of tax liabilities, recognizing potential responses in the loan-to-value ratio. Table 5 shows the effect of repealing the mortgage interest deduction under different assumptions about which assets households would sell to retire mortgage debt. The first panel, which assumes no portfolio response, shows an average tax liability increase of $1,066. Note that the product of the mean house value ($265,600), the mean loan-to-value ratio (0.387), the mean mortgage interest rate (0.0582), and the mean mortgage interest subsidy rate (0.097) is $580. The difference between $1,066 and $580 reflects the positive correlations among these variables. Absent any behavioral response, eliminating the mortgage interest deduction would have resulted in an increase in federal taxes of $63.0 billion and state taxes of $9.4 billion in 2004, for a total of $72.4 billion. The JCT (2002) estimated the federal tax expenditure for mortgage interest deductibility to be $69.9 billion for FY 2003.

Table 5

Change in Income Tax Liability from Eliminating the Mortgage Interest Deduction (Dollars)

Age of Household Head	Annual Household Income					
	<40K	40–75K	75–125K	125–250K	250K+	All
	No portfolio adjustment					
25–35	212	571	1,801	3,468	7,711	1,132
35–50	244	747	1,525	3,534	6,575	1,639
50–65	161	491	1,034	2,095	5,741	1,194
> 65	21	178	329	981	1,322	166
All	109	542	1,262	2,697	5,408	1,066
	Portfolio substitution with non-transaction financial assets					
25–35	188	535	1,619	3,328	5,654	1,024
35–50	229	698	1,351	2,842	4,479	1,356
50–65	130	414	844	1,586	3,876	901
> 65	16	134	169	676	643	104
All	95	488	1,083	2,149	3,641	858
	Portfolio substitution with total financial assets					
25–35	187	529	1,590	3,256	5,375	1,004
35–50	226	687	1,339	2,845	4,814	1,363
50–65	130	412	846	1,618	3,990	914
> 65	17	145	207	708	739	115
All	94	484	1,079	2,162	3,812	864
	Portfolio substitution with non-retirement non-housing assets					
25–35	168	388	1,064	1,753	879	637
35–50	161	405	934	1,841	2,041	846
50–65	79	308	292	670	2,089	435
> 65	5	107	19	184	695	52
All	64	321	632	1,197	1,822	493
	Portfolio substitution with non-housing assets					
25–35	168	388	1,064	1,753	879	637
35–50	161	405	934	1,841	2,041	846
50–65	79	308	292	670	2,089	435
> 65	–48	–90	2	110	531	–29
All	37	285	630	1,190	1,797	472
	Portfolio substitution with total financial assets with returns between after-tax and pre-tax mortgage interest rate					
25–35	207	566	1,710	3,363	5,677	1,071
35–50	243	728	1,411	3,108	5,377	1,472
50–65	144	451	939	1,814	4,505	1,021
> 65	20	161	241	707	825	126
All	104	520	1,161	2,363	4,270	943

Notes: Averages are weighted using the SCF's replicate weights. See the notes to Table 3 for the asset category definitions and imputed returns. We assume that households draw down their assets in order of returns and that non-itemizers, who would face no change in their tax treatment, would not make any portfolio adjustments.

There is substantial dispersion by age and income in the change in income tax liabilities attributable to repealing the mortgage interest deduction. The largest effects are for young, high-income households. For those age 25–35 with incomes above $250,000, for example, the tax increase averages $7,711. For households over age 65 with incomes of less than $40,000, the annual tax increase averages just $21. The key determinants of the size of the subsidy are house value, the household's average tax rate, and the debt-to-value ratio. The extra tax liability incurred when the mortgage interest deduction is eliminated rises with income because both house value and average tax rates also rise with income. But the extra tax liability rises and then falls with age, peaking for those age 35–50, both because a high fraction of those age 35–50 are in higher income categories and because housing leverage decreases rapidly after age 65.

The subsequent panels in Table 5 consider the tax liability change from repealing the mortgage interest deduction under each of the assumptions that we employed in Table 4 with regard to the set of assets that households would draw down to repay their mortgage debt. The calculations assume that households would shift all assets in a given category to pay down mortgage debt, up to the current cap of $1 million, if deductibility were eliminated. We assume that households would liquidate assets in order of after-tax return — lowest to highest — when retiring their mortgage debt, and that the lost taxable income equals the product of the dollar value of the asset that is drawn down and the dollar-weighted median return on that asset category in the SCF (see the notes to Table 3). We follow this approach because there appear to be substantial measurement errors in households' self-reported asset returns. We construct after-tax returns recognizing the differential taxation of interest, dividends, and capital gains; we do not consider the capital gains tax liability that might result when households sell assets to retire mortgage debt. This would be at most a one-time transitional revenue effect.

The second panel of Table 5 shows that our estimate of the average tax increase from repeal of the mortgage interest deduction, allowing for draw-down of non-transaction financial paper assets, is $858. This is about 80 percent of the tax increase without any portfolio substitution. The aggregate federal and state revenue cost of the mortgage interest deduction falls to $58.5 billion ($51.5 billion of which is federal), reflecting the fact that only 19.5 percent of mortgage debt can be paid down using non-transaction financial paper assets.

The difference between the changes in tax liability in the first and second panels varies by age and income group, indicating that allowing for portfolio adjustment has a significant impact on the estimated distribution of the tax subsidy. Those households with little scope to draw down non-transaction financial paper assets, the young and the poor, report similar values in the two panels, whereas there are larger differences for older, high-income households. This result stands in contrast to the finding in Gale, Gruber, and Stephens-Davidowitz (2007) that the tax increase with a behavioral response was close to 84 percent of the static estimate across most of the income distribution. In our estimates, with portfolio adjustment we find that poorer households' taxes rise by 87 percent of the static estimate, while the highest income households experience a tax increase of 67 percent of that amount. The tax increase for those in the oldest

high-income cell is less than 50 percent of the static estimate. The lower panels in Table 5 show that the average increase in tax liability from repealing the mortgage interest deduction declines as we expand the set of assets that households may draw down to replace their mortgage debt.

While recognizing the possibility of asset draw-down offers more realistic information on the change in tax liabilities associated with repeal of the mortgage interest deduction than the static loan-to-value case, our algorithm for modeling asset draw-down can yield some paradoxical results. We assume that when deductibility is eliminated, households sell all of the assets in whatever asset category we are considering until they have either completely paid down their mortgage or they have run out of assets. In some cases, following this procedure can *lower* a household's tax bill relative to its starting point. This is because in all asset categories except the one in the last column in Table 3, it is possible that households are selling assets with higher returns than the after-tax cost of mortgage debt, even when mortgage interest is not deductible. This selling can reduce the household's tax bill by reducing its capital income. As we expand our definition of the assets that might be drawn down to replace mortgage debt, we include assets with higher returns and this issue becomes more significant. When we allow for portfolio substitution with all non-housing assets, this effect is large enough to generate negative average tax changes in some age-income cells. This is one reason we consider, in the bottom panels of Tables 4 and 5, the restriction that any asset sold to retire mortgage debt must have a return between the pre- and post-tax mortgage interest rates. The calculations reported in these panels also assume that households who hold assets with returns lower than the cost of debt even when mortgage interest was deductible would continue to do so. With these restrictions, in the last panel of Table 5 the average tax increase with portfolio adjustment is about 88 percent of the static case. This ratio declines as household income rises.

Gervais and Pandey (2008) estimate that the portfolio response to eliminating the mortgage interest deduction would reduce its revenue effects by 42 percent relative to the no-behavioral-response scenario. Our baseline analysis, which assumes that all non-retirement financial assets would be sold to replace mortgage borrowing, suggests that 19.5 percent of outstanding mortgage debt would be drawn down and replaced with equity finance, and that this would translate into a revenue gain of 85 percent of the no-adjustment case. This scenario may overstate actual portfolio adjustments, since few households would choose to set their liquid asset holdings to zero, as our algorithm assumes some would.

Table 6 explores the sensitivity of the findings in Table 5 to several key assumptions. We report only averages by income group, and use just the non-transaction financial paper asset category, shown in the second panel of Table 5, as the set of assets that are drawn down to replace mortgage debt. The first row of Table 6 corresponds to the bottom row of the second panel of Table 5. In Table 5 we assumed assets would be sold in the order of yield, low-yield first, since that strategy maximizes household income. In the second row of Table 6, we instead assume that assets are sold pro-rata. That raises the average yield of the assets that are sold, lowering household taxable income after

Table 6

Impact of Assumptions About Returns and Asset Substitution on the Change in Income Tax Liability from Eliminating the Mortgage Interest Deduction (Dollars)

	Annual Household Income					
	<40K	40–75K	75–125K	125–250K	250K+	All
Base case	95	488	1,083	2,149	3,641	858
Draw down assets in proportion to existing holdings	94	487	1,075	2,131	3,405	843
Assume 7.3% yield for all assets	89	473	1,039	1,928	2,422	761

Notes: "Non-transaction financial assets" as defined in the notes to Table 3 are drawn down. In the base case, returns are assumed to be those noted in Table 3. Assets are drawn down starting with the assets with the lowest returns. In the proportional case, assets are drawn down pro-rata based on their portfolio share. In the case of the 7.3 percent yield, all assets are assumed to have the same return, as in Gervais and Pandey (2008).

portfolio adjustment, and thus reducing the subsequent tax liability. This effect is more pronounced for higher-income households since they have more relatively high-return assets to sell. To compare our findings with those of Gervais and Pandey (2008), in the third row of Table 6 we assume that all assets yield a taxable return of 7.3 percent. That lowers the increase in tax liabilities from eliminating the mortgage interest deduction, since 7.3 percent is well above the average yield that households report on the assets that they might draw down. In this case, repaying mortgage debt results in a larger drop in taxable income than in the base case, which results in a larger tax saving from portfolio adjustment.

Table 7 relates our estimates of the feasible degree of asset draw-down to more traditional elasticity estimates of mortgage borrowing. The first panel reports our estimate of the percentage change in mortgage debt as a result of asset draw-down divided by the percentage change in the average after-tax mortgage interest rate that would result from eliminating the mortgage interest deduction. We assume that portfolio adjustment is limited to non-transaction financial paper assets. This elasticity-like measure would be higher if we used a broader asset class, and lower if we restricted our attention to the set of assets that would be "optimal" to draw down based on after-tax returns. We find an average "elasticity" of –0.715, with considerable variation across age-income cells. This household-average elasticity estimate is smaller in magnitude than the dollar-weighted –1.2 we found using aggregate assets since, in general, households with more mortgage debt have higher elasticities. Younger households and lower-income households tend

Table 7

Changes in Mortgage Debt from Restricting the Mortgage Interest Deduction and Allowing Portfolio Adjustment

Age of Household Head	Annual Household Income					
	<40K	40–75K	75–125K	125–250K	250K+	All
	"Elasticity" of mortgage debt with respect to after-tax interest rate					
25–35	0.783	0.494	0.424	0.114	0.455	0.431
35–50	0.504	0.397	0.527	0.633	0.824	0.665
50–65	0.779	0.720	0.624	0.792	0.843	0.805
> 65	0.588	0.709	0.716	0.864	0.944	0.814
All	0.656	0.546	0.565	0.682	0.826	0.715
	Change in LTV allowing portfolio adjustment of non-transaction financial assets					
25–35	–0.026	–0.042	–0.051	–0.013	–0.145	–0.043
35–50	–0.018	–0.023	–0.047	–0.110	–0.206	–0.074
50–65	–0.040	–0.056	–0.071	–0.134	–0.253	–0.125
> 65	–0.019	–0.062	–0.104	–0.143	–0.301	–0.087
All	–0.026	–0.036	–0.057	–0.111	–0.233	–0.085
	Percentage change in LTV allowing portfolio adjustment of non-transaction financial assets					
25–35	–3.3	–5.4	–6.5	–1.8	–23.8	–5.8
35–50	–3.7	–4.1	–8.7	–21.7	–52.2	–15.5
50–65	–8.6	–4.2	–16.8	–29.2	–59.8	–29.1
> 65	–5.9	–13.9	–27.7	–47.9	–81.7	–24.2
All	–5.3	–7.1	–11.3	–23.4	–56.3	–18.5

Notes: Averages are weighted using the SCF's replicate weights; in the second and third panels, averages are also weighted by household mortgage debt. See the notes to Table 3 for asset category definitions and imputed returns. We assume that only itemizers draw down assets when the mortgage interest deduction is eliminated and that the lowest-return assets are sold first. The "elasticities" in the first panel show the percentage change in each cell's aggregate housing debt with deductible interest, with the change allowing portfolio adjustment of financial assets, divided by the percentage change in the cell's average interest cost in going from deductible to non-deductible mortgage interest. "Housing Debt with Deductible Interest" refers to debt on both primary and secondary residences totaling up to $1 million.

to exhibit lower elasticities. While the amount of debt reduction is lower for poorer households and for younger households, their change in the average after-tax interest rate also is lower because of their lower marginal tax rates and itemization probabilities.

The second panel of Table 7 reports the change in the loan-to-value ratio. On average, it declines by 8.5 percentage points, which translates as shown in the third panel to an 18.5 percent decline in the loan-to-value ratio. The percentage point decline is greatest for high-income, older households and falls with both age and income. Older households, especially at high incomes, have a large percentage decline in the loan-to-value ratio since they start from low levels.

While our analysis has focused on the elimination of the mortgage interest deduction, some proposals call for reducing the current cap of $1 million on the debt that can generate interest deductions. We consider caps 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 8 presents estimates of the change in tax liabilities from the $250,000 mortgage cap, with and without households rebalancing portfolios to replace no-longer-deductible mortgage borrowing with housing equity drawn from

Table 8

Average Tax Increase from Tightening the Cap on Mortgage Interest Deduction (Dollars)

Age of Household Head	Annual Household Income					
	<40K	40–75K	75–125K	125–250K	250K+	All
	Cap deductible mortgages at $250,000, no portfolio substitution					
25–35	13	33	254	892	3,108	187
35–50	10	61	162	885	3,174	363
50–65	7	51	119	299	2,732	282
> 65	1	9	40	260	563	33
All	5	44	148	585	2,560	233
	Cap deductible mortgages at $250,000, allowing for portfolio substitution					
25–35	13	33	242	879	2,302	173
35–50	10	60	153	734	2,188	291
50–65	7	50	108	243	1,847	210
> 65	1	13	35	193	215	22
All	5	44	138	489	1,726	183

Notes: Averages are weighted using the SCF's replicate weights. We assume only non-transaction financial assets are drawn down to repay mortgage debt. See notes to Table 3 for asset definition and the imputed returns. Only itemizers draw down assets; assets are liquidated in ascending rate of return order.

non-transaction financial paper assets. The limits on the deductibility of mortgage interest have much more modest effects on average tax payments than the repeal of the entire mortgage interest deduction. We estimate the aggregate federal and state revenue gain after portfolio adjustment from the $250,000 cap to be $12.5 billion ($11.3 billion federal alone). We also estimate, but do not report in detail, the federal and state revenue gain from the $500,000 cap to be $6.3 billion, again recognizing portfolio adjustment. Table 8 also shows larger effects for young, high-income households. A $250,000 cap on the size of mortgages that could generate deductible interest would raise taxes on average by $2,560 without portfolio adjustment, and by $1,726 with such adjustment, for households with incomes above $250,000, and by $585 and $489 respectively for households with incomes between $125,000 and $250,000. For lower-income households the average tax increase is less than $150.

Mortgage interest caps have modest effects on tax liabilities because they are not binding for very many households. The current rules allow taxpayers to deduct $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 are used for non-housing purposes. This cap is binding for only 0.2 percent of households. Even among households with incomes above $250,000, the probability that the cap is binding is only 4.7 percent. For households with incomes above $250,000 headed by someone between ages 35 and 50, the group that is most likely to face the cap, this probability is 6.5 percent. Reducing the cap to $500,000 would affect 1.5 percent of all households, and very few with incomes below $125,000. A $500,000 cap would be binding for 19 percent of households with incomes above $250,000, and for 3.9 percent of households with incomes of $125,000–250,000. A cap of $250,000 on deductible mortgage debt would bind for 6.9 percent of all homeowners, but at this level, 42 (18) percent of households with income above $250,000 (between $125,000 and $250,000) would be constrained by the cap. To place these statistics in context, it is helpful to remember that 68.4 percent of all households have outstanding mortgage debt.

VII. USER COST ESTIMATES: CURRENT LAW AND ALTERNATIVES

The effect of eliminating the mortgage interest deduction on the marginal incentive for a homeowner to consume housing services depends on the last-dollar marginal tax rates that apply to mortgage interest deductions and on the other components of the user cost. Eliminating the mortgage interest deduction would raise the user cost and reduce the demand for housing services. This reduction in demand would lead to lower house prices in the short run, and to lower prices, a smaller housing stock, or both in the longer run.

We calculate each household's last dollar marginal tax rate on the mortgage interest deduction by adding $1,000 to its mortgage interest deduction and using TAXSIM to compute the resulting change in tax liability in each case. We divide this tax differential by $1,000 to estimate τ_{ded}. We perform a similar calculation to estimate the last-dollar marginal tax rate on interest income. Table 9 presents estimates of the relevant marginal

Table 9

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	0.159	0.201	0.261	0.323	0.384	0.219
35–50	0.135	0.202	0.265	0.335	0.394	0.241
50–65	0.115	0.226	0.272	0.328	0.387	0.241
> 65	0.047	0.239	0.272	0.309	0.380	0.131
All	0.088	0.215	0.268	0.329	0.388	0.210
	Average last-dollar mortgage interest deduction subsidy rate					
25–35	0.060	0.132	0.233	0.278	0.339	0.157
35–50	0.069	0.134	0.207	0.290	0.359	0.182
50–65	0.051	0.128	0.188	0.281	0.350	0.168
> 65	0.005	0.065	0.108	0.234	0.332	0.048
All	0.032	0.120	0.193	0.280	0.350	0.140
	Percentage of home owners who itemize					
25–35	55.3	74.6	97.3	97.1	100.0	78.6
35–50	51.2	77.8	92.2	99.9	100.0	82.4
50–65	33.7	64.5	83.0	99.2	100.0	70.7
> 65	4.0	38.2	55.5	92.0	99.6	23.1
All	23.7	66.3	85.5	98.7	99.9	63.3

Notes: Averages are weighted using the SCF's replicate weights. See text for sample construction.

tax rates that enter the user cost calculation. The progressive structure of the income tax and variation in itemization rates generate non-trivial differences across age and income sub-categories. The first panel of Table 9 shows the average last-dollar tax rate on taxable interest income, τ_y, and the second reports the average last-dollar tax rate at which mortgage interest is deducted, τ_{ded}. The third panel shows the fraction of homeowners who itemize on their income tax returns, which is also a key determinant of the average marginal user cost in each cell.

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 ages 35 and 65 facing average tax rates about 2 percentage points higher on average than those for households under age 35. The average income tax rate for households headed by someone over age 65 is about 11 percentage points lower than that for households between ages 50 and 65.

The average last-dollar tax rate applicable to mortgage interest deductions, in the second panel, follows a similar pattern, but it is more exaggerated due to differences in itemization rates across groups. The second panel in Table 9 shows that higher-income households, particularly those headed by someone below age 65, have the highest last-dollar marginal tax rates on mortgage interest deductions. The next panel shows that lower-income and older households are less likely to itemize than are their younger, higher-income counterparts. More than 98 percent of homeowners with income in excess of $125,000 were predicted to itemize in 2003, compared with only 24 percent of those with incomes below $40,000. Among households headed by someone over age 65, the itemization rate at incomes between $40,000 and $75,000 is about 38 percent. It is much lower, only about 4 percent, for the households over age 65 with family income below $40,000.

The loan-to-value ratio, which affects the user cost, was summarized in Table 2. Recall that households save τ_{ded} per dollar of mortgage interest deduction, while the return on investment assets that might have been held in place of home equity is taxed at τ_y. When these two tax rates differ, the loan-to-value ratio affects the marginal user cost of owner-occupied housing.

Table 10 reports average last dollar user costs across all households. The first panel shows estimates corresponding to the actual 2003 tax law. The average user cost is 5.9 percent, but the values for various age-income cells range from 4.5 to 7.0 percent. Those with the highest household incomes — more than $250,000 — display an average user cost of 4.6 percent, compared with 5.4 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 is about two-thirds that for the lower-income households, who face lower marginal tax rates and have a lower probability of itemization.

The second panel of Table 10 reports user cost estimates that treat property taxes as benefit taxes. This amounts to subtracting the property tax rate, 0.0104, from every cell. The result is a decline in the user cost of about 15 percent for low-income households, and 22 percent for high-income households. Because the absolute change in the user cost associated with repealing the mortgage interest deduction is the same whether the property tax is treated as a benefit tax or not, but the level of the user cost is lower in the former case, the proportional increase in the user cost is larger if property taxes are benefit taxes.

The user costs reported in Table 10 reflect a substantial tax subsidy relative to the Haig-Simons tax system, when the user cost c_{HS} would be 0.074 for all households in the no-property-tax-benefits case. The estimates of the user cost in the first panel of Table 10 are all substantially lower than 0.074, and the differences between the two measure the net last-dollar subsidy to the user cost under the current tax system relative to Haig-Simons income taxation. Under the benefit view of the property tax, the Haig-Simons user cost averages 0.061. The differences in user costs between the second panel of Table 10 and 0.061, which approximately measure the net last-dollar subsidy to the user cost under the benefit tax view, are comparable in absolute magnitude to the non-benefit tax view, but are larger in percentage terms since the base user cost is

Table 10

Last-Dollar User Cost of Owner-Occupied Housing Under Current Tax Law and With Repeal of Mortgage Interest Deduction

Age of Household Head	Annual Household Income					
	<40K	40–75K	75–125K	125–250K	250+	All
	2003 Law					
25–35	0.065	0.060	0.053	0.048	0.045	0.058
35–50	0.065	0.059	0.054	0.049	0.046	0.056
50–65	0.066	0.059	0.055	0.050	0.046	0.057
> 65	0.070	0.059	0.056	0.053	0.049	0.065
All	0.068	0.059	0.054	0.050	0.046	0.059
	Last-dollar user cost under benefit tax view of property tax					
25–35	0.055	0.050	0.042	0.038	0.034	0.048
35–50	0.055	0.049	0.044	0.039	0.035	0.046
50–65	0.056	0.048	0.044	0.040	0.036	0.046
>65	0.060	0.049	0.046	0.042	0.037	0.055
All	0.058	0.049	0.044	0.039	0.036	0.049
	Repeal of mortgage interest deduction (MID)					
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	0.053	0.061
> 65	0.071	0.060	0.058	0.055	0.050	0.066
All	0.069	0.063	0.060	0.057	0.053	0.063
	Repeal MID, portfolio adjustment using non-transaction financial assets					
25–35	0.066	0.067	0.063	0.060	0.055	0.065
35–50	0.067	0.065	0.061	0.057	0.051	0.062
50–65	0.067	0.061	0.059	0.055	0.050	0.060
> 65	0.069	0.059	0.057	0.053	0.049	0.064
All	0.068	0.063	0.060	0.056	0.051	0.062
	Repeal of MID, with portfolio adjustment and benefit view of property tax					
25–35	0.056	0.056	0.052	0.049	0.044	0.054
35–50	0.056	0.055	0.051	0.047	0.041	0.052
50–65	0.057	0.051	0.049	0.045	0.040	0.050
> 65	0.058	0.049	0.047	0.043	0.038	0.054
All	0.057	0.053	0.050	0.046	0.040	0.052

Notes: Averages are weighted using the SCF's replicate weights. See text for sample construction.

lower. This calculation is not exact because, under the benefit tax view, the Haig-Simons user cost varies by age-income cell since the difference in the user costs between the benefit tax and "traditional tax" settings depends on a term, $\tau_p/(1 - \tau_y)$, that includes the income tax rate. The impact is minor, however; the Haig-Simons user cost ranges only between 0.057 and 0.063.

We report the effect of eliminating the mortgage interest deduction on last-dollar user costs for three cases. The first assumes no changes in household portfolio structure, the second assumes full portfolio adjustment with the baseline set of assets from above, and the third combines the mortgage draw-down with the assumption that the property tax is a benefit tax. The results with a constant loan-to-value ratio, shown in the third panel of Table 10, suggest an average increase in the user cost of about 7 percent, from 5.9 to 6.3 percent. The effects are largest for the high-income, young homeowners with high loan-to-value ratios. However, changes in the loan-to-value ratio would partly offset the tax-induced increase in the after-tax cost of mortgage borrowing. Allowing for portfolio adjustment, and adopting our base case assumption that households draw down all non-transaction financial paper assets to repay mortgage debt, the user cost change is smaller than with a fixed loan-to-value ratio. We estimate that the user cost would rise on average by 0.3 percentage points, or 5 percent, in this case. Allowing for shifts in the level of mortgage borrowing has the largest effect on the user cost change for young, high-income households. For those age 35–50 with household income of over $250,000, the average user cost is 4.6 percent. Elimination of the mortgage interest deduction with no portfolio adjustment raises this user cost to 5.3 percent, an increase of more than 15 percent. When we allow for portfolio adjustments, the user cost rises to 5.1 percent — an 11 percent increase, and just over two-thirds of that in the no-behavioral-response case. In our sample, there are some households for which the estimated user cost falls slightly when the mortgage interest deduction is eliminated and portfolios adjust. This is primarily due to our decision to randomly assign state income taxes to each of the replicates for each household, and then to average the results. The findings in Table 10 are not sensitive to excluding these households from the analysis, but for completeness we have retained them in the sample.

The absolute change in the user cost from eliminating the mortgage interest deduction is about the same in the fourth and fifth panels of Table 10, but the percentage increase is greater in the benefit tax case because the current value of the user cost is lower. On average, the user cost would rise by 0.3 percentage points, or 6 percent. There is substantial variation across age and income cells. For young, high-income households, the user cost rises from 0.034 to 0.044, a 29 percent rise, even after portfolio adjustment.

Higher user costs should reduce demand for owner-occupied housing. An increase in the price of housing services could also affect other aspects of household behavior, such as the household saving rate and the choice of which portfolio assets to hold. While a full general equilibrium analysis of such a change is beyond the scope of our study, it is possible to illustrate the nature of the potential change in housing demand associated with a rise in the user cost. In doing this illustrative calculation, we exclude the 39 household observations whose housing debt exceeds their house value. We assume

a user cost elasticity of housing demand of minus one. Glaeser and Gyourko (2006) observe that –1.0 is a common finding with regard to housing demand elasticities, but they note that estimates range from almost zero to –2.0.

With unit elastic demand, a 5 percent increase in the user cost results in a 5 percent decrease in housing demand. If households did not change their total wealth accumulation profiles, and if they invested the funds that they would otherwise have invested in housing equity pro rata in the other assets in their portfolio, earning corresponding returns, then average tax revenue would be about 7 percent higher than in our earlier calculations that assumed a fixed demand for housing and focused only on portfolio substitution. This calculation assumes a constant loan-to-value ratio but a reduced demand for housing. Our discussion of how eliminating the mortgage interest deduction would affect housing demand and portfolio choices ignores the short-run adjustments in house prices, analyzed for example in Poterba (1984), that would be associated with any policy change. A drop in house prices associated with this tax change could affect household portfolios, household saving, the rate of homeowner mobility, and other aspects of behavior. These changes, in turn, could have implications for tax receipts.

The effect of incorporating the response of housing demand on our estimates of the total change in tax liability associated with repeal of mortgage interest deductibility varies by age and income. The tax liability is almost 9 percent higher on average for the highest income category, and it generally rises with income because the user cost change is larger at higher incomes. It also increases with age. In an earlier draft, Poterba and Sinai (2008b), we report user cost results that allow the change in housing demand to affect itemization status and thus to have a feedback effect on the user cost. This channel has very little effect on the results.

VIII. CONCLUSIONS

This paper examines the impact of the mortgage interest deduction on the level and distribution of income tax liabilities and on the user cost of owner-occupied housing. We use data from the 2004 SCF and the NBER TAXSIM model to estimate the distribution across taxpayers of the tax saving associated with this deduction. We focus in particular on the extent to which homeowners could draw down their holdings of other assets if mortgage interest were no longer deductible. This behavioral response is an important determinant of the revenue impact of changing 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. In addition, only about two-thirds of homeowners itemize on their federal income tax return. Consequently, many homeowners would face only a modest tax increase, if any at all, if mortgage interest were no longer deductible. Our findings underscore the need for more empirical work on the key behavioral parameters related to portfolio substitution.

We have sketched, but not considered in detail, how eliminating the mortgage interest deduction might affect housing demand and house prices. Particularly for households in high marginal tax brackets, the user cost increase associated with eliminating the mortgage interest deduction could lead to a substantial decline in the demand for owner-occupied housing. This would be reflected in changes in housing demand conditional on choosing to own, and potentially also in changes in the demand for renting versus owning. For lower- and middle-income taxpayers, the user cost changes and the changes in housing demand are more modest.

Perhaps the most important direction for extending our analysis is the consideration of general equilibrium effects that might be associated with changes in the mortgage interest deduction. Repealing this tax provision could affect interest rates, homeownership rates, household saving, and lifecycle patterns of housing demand more generally. While we have followed in the tradition of many previous studies that have examined housing tax policy in a partial equilibrium setting, several notable studies, including Slemrod (1983), Berkovec and Fullerton (1992), and Gervais (2002), address this issue in general equilibrium models.

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