

Capping the Mortgage Interest Deduction

John E. Anderson
Department of Economics
University of Nebraska-Lincoln
Lincoln, NE 68588-0405
janderson4@unl.edu

Jeffrey Clemens
Department of Economics
Harvard University
Littauer Center
1805 Cambridge Street
Cambridge, MA 02138
clemens@fas.harvard.edu

Andrew Hanson
Department of Economics
Syracuse University
110 Eggers Hall
Syracuse, NY 13244
ahanson@maxwell.syr.edu

Original Draft: September, 2006
Revised Draft: April, 2007
Final Draft: August, 2007

Abstract - *In this paper we examine the economic implications of several policy options for capping the mortgage interest deduction (MID.) We extend the standard user cost model of owner-occupied housing to include a cap on the mortgage size receiving tax-favored status. Our user cost estimates for taxpayers with mortgages above the current-law cap are 4.41 percent higher than estimates from a model without the cap. We simulate the share of mortgage dollars that would be subject to three alternative cap policy variants and summarize the distributional impacts of each proposal, computing the share of mortgage dollars impacted across U.S. Metropolitan Areas.*

INTRODUCTION AND BACKGROUND

Public policy designed to encourage home ownership in the United States operates primarily through incentives contained in the federal income tax system. The largest housing-related subsidy in the federal income tax code is the mortgage interest deduction (MID), which, as estimated by the Office of Management and Budget (OMB), reduced income tax revenues by \$79.9 billion in fiscal year 2007 (Executive Office of The President, 2007). This makes the MID the second largest tax expenditure, exceeded only by the exclusion of employer contributions for medical insurance premiums and medical care.

The MID alters the user cost of owner-occupied housing for taxpayers, making it more attractive to purchase a home.¹ However, its effectiveness at encouraging home ownership has been a point of contention. Since the subsidy is based on the amount of interest paid on a mortgage, larger subsidies are provided to those purchasing more expensive homes (subject to the current cap of \$1 million). While this certainly provides an incentive for people to increase their consumption of housing, it may not be particularly effective in altering the choice between renting and owning (i.e. tenure choice). Policies like those considered here, which lower the cap on the number of mortgage dollars that qualify for the MID may better target the subsidy towards those on the margin between owning and renting, and away from inframarginal households that would choose to own a home whether they receive a subsidy or not.

In order to examine the economic implications of capping the MID we extend the standard user-cost model of the rental price of housing to include a cap on the amount of

¹ It should be noted, however, that the Office of Management and Budget estimates the cost of the MID as a tax expenditure using a simple estimation method based on the number of itemizing households and the size of the interest deductions. Some research suggests that behavioral responses to the elimination of the MID may make the actual cost much smaller. For example, Follain and Melamed (1998) argue that elimination of the MID would induce households to refinance their homes, substituting equity for debt. Taking this portfolio shuffling into account, they estimate that elimination of the MID would add only \$10 billion in additional revenue each year.

mortgage that receives tax-preferred status. Although a \$1 million cap currently exists, this feature has not been included in earlier user-cost models.² We use this model to show that capping the MID changes the user cost of housing through the share of the mortgage exceeding the cap.

The issue of capping the MID is becoming increasingly important for two primary reasons. First, the current law cap is not adjusted for inflation, and hence will affect more mortgages over time as home-price inflation pushes increasing numbers of tax payers over the \$1 million ceiling. Second, the recommendation by the President's Advisory Panel on Federal Tax Reform (The Panel) to create partially regionally adjusted caps for the MID (based on median home prices) makes it clear that policy advisers have an interest in changing current law. Our paper examines several ways of capping the MID: lowering the national limit, creating a set of limits that are fully adjusted for local home prices, and the partially regionally-adjusted limits recommended by the Panel.

We use data on individual mortgages to simulate the average share of each mortgage in excess of the caps that apply through current law as well as our three alternative policies. For the current-law cap, our national estimates show that less than one-half of one percent (0.39 percent) of mortgage originations exceed the cap, and on average just 0.13 percent of mortgage dollars are subject to the cap. The caps recommended by the Panel would raise the number of mortgages subject to the cap to approximately 13 percent, and the average share of mortgage dollars subject to the cap to 3.44 percent. Regional variation in the effect of the Panel's caps is striking, ranging from negligible effects in some MSAs to a high of 67 percent of the mortgages (and, on average, 23 percent of mortgage dollars) subject to the cap in the San Francisco, CA

² Homeowners may also deduct interest payments on loans for up to \$100,000 that are backed by home equity, which raises the effective cap on tax-preferred debt borrowing to \$1.1 million.

Metropolitan Statistical Area (MSA). We also provide MSA-level simulations for a uniform national cap and a fully regionalized cap, both designed to affect the same share of mortgage dollars as the caps in the Panel's proposal to facilitate comparison.

Our analysis shows that estimates that do not consider caps can significantly under-state user costs for mortgages (both under current law and alternative policies). For the average mortgage in excess of the current-law cap, for example, not accounting for the cap would understate the user cost by about 4.4 percent (around \$4,000 annually).

The remainder of the paper begins with a summary of previous studies that have examined the tax treatment of housing in general, and the MID in particular. Then we present our extension of the standard user cost model. The main section of the paper then discusses three alternative proposals for changing the cap applied to the MID. The simulations in this section show the fraction of mortgages and the average share of mortgage dollars in excess of each cap. We then provide estimates of how each cap would affect the user cost of housing. The final section of the paper summarizes the main results.

PREVIOUS STUDIES

Economists have long been concerned about the efficiency and equity effects of housing subsidies. Rosen (1985) reviews the early literature, showing that these subsidies have significant effects on both the tenure choice and on the quantity of housing consumed. Conditional on home ownership, Rosen (1979a) estimates that without tax subsidies U.S. residents would have lived in homes that were 9-17 percent less valuable than their current homes in 1970, depending on their income level. King (1981) similarly estimates that the elimination of tax subsidies for housing in the United Kingdom would reduce the quantity of housing consumed by about 13.7 percent.

Rosen (1979a, 1985) also translates these consumption distortions into efficiency loss estimates. He calculates that his estimates for 1970 translate into an average annual excess burden of about \$192 in 1980 dollars. Rosen (1985) also notes that some of the early literature expressed a concern that subsidy-induced housing consumption comes at the expense of business investment, e.g. Summers (1980). However, he notes that prior to 1985 the econometric evidence on this issue was insufficient to establish this relationship conclusively.

Mills (1989) provides evidence on the efficiency of the allocation of the capital stock in the United States. He uses national income data over the period 1929-1986 and computes the return to housing capital compared to all other private fixed capital. His results indicate that the real returns to capital have been smaller in housing than for non-housing fixed capital, suggesting overinvestment in housing. The President's Advisory Panel report (2005) includes a comparison of the effective tax rates on different types of investment, as calculated by the Treasury Department. Their estimates report that the marginal effective tax rate for owner occupied housing is zero percent, while the rate is 17 percent for non-corporate business, 26 percent for corporate business, 22 percent for the business sector as a whole, and 14 percent economy-wide. Such differences in effective tax rates are ultimately bound to distort the allocation of capital.

Rosen (1985) also discusses two significant early studies on the tenure choice between owner-occupied and rental housing. Rosen and Rosen (1980) estimate that tax subsidies for owner-occupied housing raised the home-ownership rate by about 4 percent in 1974. Hendershott and Shilling (1982) provide slightly higher estimates in the range of 5 to 6.5 percent, depending on the assumed average marginal income tax rate.

On the equity front, both Rosen (1979a) and King (1981) extend their analyses to assess the distributional implications of eliminating housing tax subsidies. Both studies find that the elimination of these subsidies would tend to reduce income inequality relative to the *status quo*. Rosen (1979a) shows that this result would hold in the United States (although to a lesser degree) even if total tax revenues are held constant via a proportional tax cut. Anderson and Roy (2001) examined the distributional impact of eliminating housing tax preferences, including the elimination of both the mortgage interest and property tax deductions. Their simulations show that elimination of these housing tax preferences would increase the progressivity of the income tax significantly, as measured by the change in the Suits index with a bootstrapped confidence interval.

Effects of major tax reforms on housing have also been examined in the literature. Notably, Follain and Ling (1991) analyzed the effects of the Tax Reform Act of 1986 (TRA86) on both renters and home owners. TRA86 reduced the overall size of the federal housing subsidy by more than 30 percent. It did that by reducing subsidies for both renters and owners. For owner-occupants, the value of the MID fell as marginal tax rates were reduced. Their most surprising result was that the distribution of the housing subsidy was just as skewed in favor of high-income households after TRA86 as it was before. Their result was surprising since TRA86 reduced marginal income tax rates (an important determinant of the size of the housing subsidy), and reduced them most significantly for high-income taxpayers. However, other elements of TRA86 reduced the value of the MID for low and moderate income households. These elements included an increase in the standard deduction and a reduction of the number and size of non-housing deductions. Follain and Ling show that the MID was made essentially worthless for many households with incomes below \$42,500. Poterba (1992) also analyzed the distribution of

the MID before and after TRA86, finding a similar pattern. More recent confirmation of this result is provided by Bourassa and Grigsby (2000), who report that in 1998 deductions were itemized by only 3 percent of owner-occupants with incomes below \$20,000 per year, 16 percent of those with incomes between \$20,000 and \$29,000, and 34 percent of those with incomes between \$30,000 and \$39,000.

The advantages of the MID also apply unevenly across regions of the country due to variations in the rate of itemization and housing prices. Consequently, the incentive effects of the MID are not uniform, but vary in systematic ways across regions and metropolitan areas. Using 1995 IRS tax data, Brady, Cronin and Houser (BCH) (2003) find that just 21 percent of taxpayers itemize in the West-South-Central region of the United States, while 38 percent itemize in the New England and Mid-Atlantic regions. For those taxpayers that do itemize, the average size of the MID varies from \$5,700 in the West-North-Central region to \$10,000 in the Pacific region. The average tax savings due to the MID ranged from \$1,100 in the East-South-Central region to \$2,100 in the Pacific region. BCH also investigated the regional causes of MID variation, finding that both individual characteristics (e.g. income, age, tax filing status, and number of dependents) and regional characteristics (e.g. housing prices and state/local taxes) account for a substantial share of the variation in MID usage and size. Regional variation in house prices and state/local taxes account for 61 percent of the regional variation in the probability of itemizing, and 67 percent of the variation in the amount of mortgage interest deducted.

Past work has also looked at the potential for new policies to better target housing subsidies towards those on the margin between owning and renting. For example, Green and Vandell (1999) examine a hypothetical revenue-neutral switch from the current MID and

property tax deduction to an appropriately configured housing tax credit. Using a user cost framework and a tenure choice model; they demonstrate that such a policy change could feasibly increase aggregate homeownership rates by 3 to 5 percent. Additionally, these potential increases in homeownership rates are highest in low-income neighborhoods.

MODELING HOUSING TAX SUBSIDIES

We begin with the user cost framework which has been developed and employed in much of the research in this field, including notable studies by Rosen (1979a, 1979b, 1985), Poterba (1984, 1992), Green and Vandell (1999), Glaeser and Shapiro (2002), and Himmelberg, Mayer and Sinai (2005). We extend the standard user cost model of home ownership, to include a cap on the mortgage amount on which interest paid qualifies for a tax deduction. The previous models highlight many of the factors affecting the size of the housing tax subsidy provided by the U.S. tax system, but do not incorporate the fact that the size of a mortgage on which interest is deductible is capped.

We begin with a model of the user cost of ownership that assumes the real economic return to homeownership is fully taxed. Using that model as a benchmark, we then introduce tax incentives found in the U.S. tax system and consider the effects for tax payers who itemize deductions. The model reveals how the size of the housing tax subsidy varies with the home price, mortgage interest rate, share of the house price that is debt financed, marginal income tax rate, and the property tax rate. Our extension of this model shows how the housing tax subsidy varies with the imposition of a cap on the size of mortgage.

The benchmark case is that of fully taxing the real economic return to homeownership.³

The net-of-tax income (or economic profit) from owning a home with price P_H and imputed rental value R for a homeowner with a marginal income tax rate of τ is:

$$[1] \quad (1-\tau)[R - (i + \tau_p + m - \pi)P_H]$$

Where i is the interest rate, τ_p is the property tax rate, m is the maintenance and depreciation cost rate, and π is the house price inflation rate. The term in the parentheses captures the homeowner's forgone equity cost minus capital gain. The equity cost includes the foregone interest on the housing asset plus the property taxes and maintenance and depreciation costs. The nominal capital gain to the owner is the rate of inflation applied to the price of the house.

In a competitive equilibrium the net economic income from homeownership is driven to zero. Setting the above expression equal to zero and solving for R results in the equilibrium condition of the imputed rent expression:

$$[2] \quad R = [i + \tau_p + m - \pi]P_H$$

This is the competitive equilibrium rent that would occur if the income tax system fully taxed the net income from housing as it taxes the interest earned on other investments. It represents the cost of housing to the homeowner.

Housing Subsidy for Itemizers

We now consider the effects of the U.S. income tax system, which deviates from this standard. Most importantly, the U.S. income tax system does not tax the implicit rental income from housing, while it does permit deductions for mortgage interest and local property taxes. For an itemizer, the user cost is reduced due to deductibility of mortgage interest and property taxes. The foregone interest on the equity in the housing asset is the after-tax interest rate

³ We ignore capital gains taxation in this treatment.

$(1 - \tau)i$. The interest rate paid on the debt portion of the housing asset is the same after-tax interest rate due to the MID. Using these features of the income tax code the rental price of housing for an itemizer R_I can be expressed as:

$$\begin{aligned}
 [3] \quad R_I &= [(1 - \tau)(i + \tau_p) + m - \pi]P_H \\
 &= R - \tau(i + \tau_p)P_H
 \end{aligned}$$

The cost reduction provided by the federal tax code, or subsidy amount $\tau(i + \tau_p)P_H$ varies directly with the taxpayer's marginal tax rate, the interest rate, the property tax rate, and the house price. The housing subsidy is more valuable for high-income, home-owning taxpayers in regions of the country where home prices are high and property tax rates are also high.

However, the MID is also currently limited to mortgages of \$1 million or less for a married couple (\$500,000 for a single filer). Consequently, we introduce two new parameters in the user cost model: s , which represents the share of the mortgage in excess of the cap, and θ , which represents the share of the house price that is financed by debt. The product of these two parameters, θs , is the share of the house price that is debt financed and exceeds the cap, or the share of the house price that loses its tax preference. Since the tax subsidy for mortgage interest only applies to the share of the mortgage that does not exceed the cap, the introduction of a cap in the user cost model yields the following expression for the rental price of housing for an itemizing taxpayer:

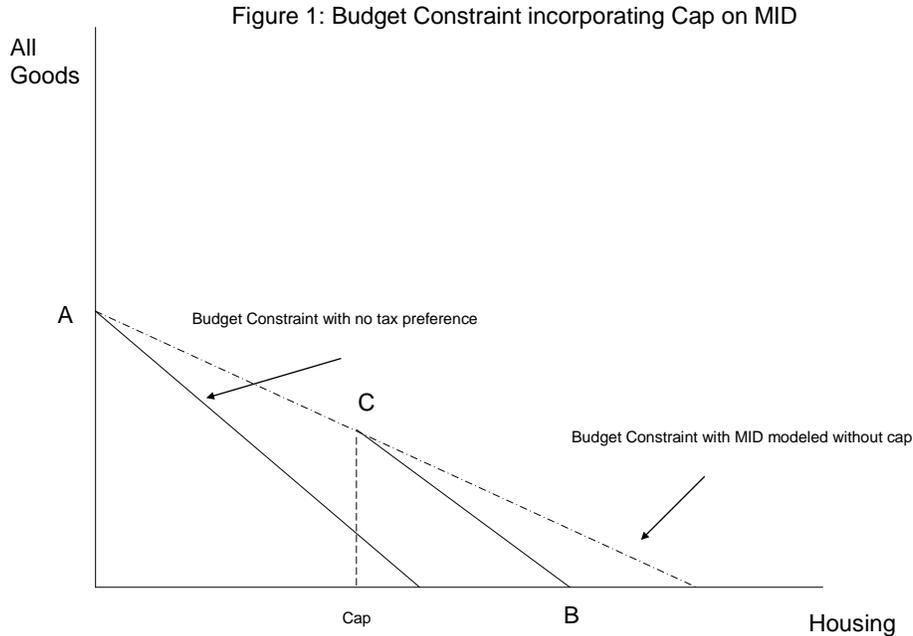
$$\begin{aligned}
 [4] \quad R_{I_{Cap}} &= [(1 - \tau)\tau_p + (1 - \tau)i(1 - \theta) + is\theta + i\theta(1 - s)(1 - \tau) + m - \pi]P_H \\
 &= R - \tau[i(1 - \theta s) + \tau_p]P_H \\
 &= R_I + \tau(\theta si)P_H
 \end{aligned}$$

The second term inside of the brackets in the un-simplified equation [4] represents the after-tax cost of equity financing (including the portions above and below the cap). The third and fourth terms capture the relative price of debt above and below the cap. The third term is the cost of

financing with debt above the cap, while the fourth term is the cost of financing with debt below the cap. The two simplified versions of equation [4] show how the user cost equation changes compared to the no-tax case and itemizer case when a cap is included in the model.

The share of a mortgage that exceeds the cap will not be subject to the differential net of tax interest rate on debt and equity if a taxpayer does not itemize, so the cap will not change the budget constraint for non-itemizers. For itemizers subject to the mortgage cap, the greater the share of mortgage that exceeds the cap, the higher the user cost of housing. Hence, the more binding the cap, the greater the impact on user cost. The size of this effect depends on the marginal income tax rate, the interest rate, and the house price.

The impact of a cap on a home-purchaser's budget constraint is illustrated graphically in Figure 1, by line segments AC and CB. Relative to the benchmark of fully taxing the real economic return to homeownership, the MID reduces the budget constraint's slope, providing an incentive for households to consume more housing. Capping the size of mortgage that can be applied towards the deduction introduces a kink in the budget constraint. Beyond the kink, the constraint has the same slope as the pre-tax-subsidy budget constraint. This discrete change in user costs leads us to expect that, if user costs significantly impact household decision making, there would be a cluster of homeowners at the kink point.

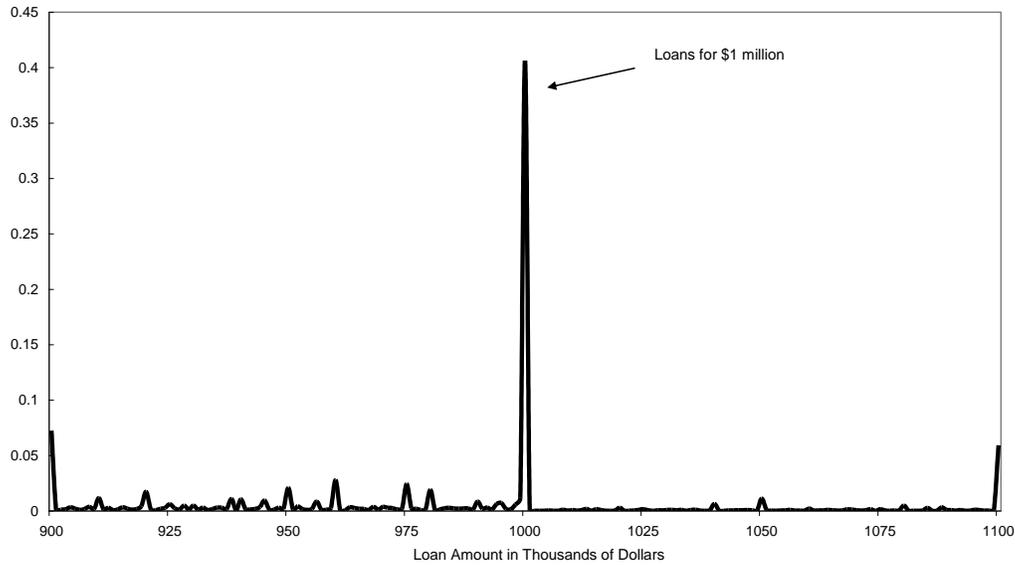


As figure 2 shows, this clustering is in fact what we observe, suggesting that the change in user cost resulting from the current-law cap is an important determinant of household behavior. About 40 percent of mortgages for amounts between \$900,000 and \$1.1 million in 2004 were for exactly the amount of the \$1 million current law cap. No other loan amount in the range shown in figure 2 accounts for more than 7 percent of the mortgage originations. This paper does not investigate other sources of the peculiar distribution of mortgage size. It does appear, however, like the subsidy reduction that results from the current-law cap on the MID is a contributing factor.

Capping the deduction based on mortgage sizes reduces the subsidy by the amount $\tau\theta siP_H$ relative to the previous model. Under current law, the vast majority of both new mortgages and new mortgage dollars are not constrained by the \$1 million cap. In 2004, less than one-half of one percent of all originated mortgages were for amounts in excess of \$1 million; the average share of new mortgage dollars in excess of the current-law cap was just 0.13

percent. However, this is not to say that the current cap is not affecting home purchases. Nearly 25,000 mortgage originations exceeded \$1 million, and those mortgages had an average of 24 percent of their value lose tax preference. At the MSA level, a high of nearly 4.8 percent of mortgage originations exceeded the current-law cap in the San Francisco MSA, and on average 1.44 percent of mortgage dollars were affected.

Figure 2: Density of Mortgage Originations by Loan Amount (\$900,000 to \$1.1 Million)



Source: Authors Calculations using 2004 HMDA data

It should be kept in mind that these simulations, and those in the remainder of the paper, are static in nature. They do not account for any behavioral changes in home purchasing or financing that are (or would be) induced by the caps being considered. Although the current-law cap is not binding now for most home purchasers, home price inflation is certainly pushing more mortgages toward the cap, especially in higher priced areas.

MORTGAGE CAP SIMULATIONS

In this section we simulate the effects of three alternative cap proposals. First among the alternatives is the Panel's recommendation, which partially adjusts the cap level on the basis of regional house prices. We also examine a uniform national cap and a cap that is fully adjusted for regional house prices. The levels of the uniform national cap and the fully regionalized cap have been chosen so that, at the national level, the same average percentage of mortgage-origination dollars is constrained by these caps as by the Panel's recommendation. Holding this factor constant will facilitate comparisons of the distributional effects of the various caps across regions of the country. Results for cap simulations of current law and all three alternatives are given at the MSA level in Table 1 for a sample of MSAs that represent important quantiles in the distribution of home prices. Results for all U.S. MSAs are available from the authors on request.

To estimate the number of mortgage originations and the share of mortgage dollars affected by these caps, we use a dataset that provides both individual mortgage amounts and geographic location identifiers. This dataset originated with the Home Mortgage Disclosure Act (HMDA), enacted by the U.S. Congress in 1975. HMDA was implemented by the Federal Reserve Board in its Regulation C, which requires lending institutions (banks, savings associations, credit unions, and other mortgage lending institutions) to report loan data. In 2005, for example, the HMDA dataset reports on approximately 33.6 million loan records for calendar year 2004, reported by 8,853 financial institutions. The HMDA dataset includes both mortgage amounts and indicators for the metropolitan area and county of residence. It includes not only mortgage originations, but also mortgage applications; we use only the observations where a mortgage was originated for the purchase of a home.

President's Advisory Panel Proposed Cap

The Panel recommended capping the size of mortgage that can be used to offset tax liability according to regional home values.⁴ The regional mortgage limits were set by the Panel using a formula that is based on the Federal Housing Administration's (FHA) limit for insuring mortgages. The FHA insures loans from private lenders to qualified high risk borrowers for purchasing a home. The maximum amount of these loans varies by county, and is linked to the median house price for all other counties within the MSA. A more detailed description of the Panel's proposal can be found in the published version of its final report.

The caps that we have calculated based on the Panel's recommendation use the 2004 FHA loan limits, ranging from a low of \$210,758 to a high of \$381,999. The FHA's national floor takes effect in calculating the caps for 2,598 counties; the FHA ceiling takes effect in calculating the caps for 90 counties, mostly in large metropolitan or coastal areas including 25 of the 58 counties in California and 12 of the 21 counties in New Jersey. We use the HMDA data for 2004, merged with a listing of the FHA limits by county for our analysis.

After matching originations in the HMDA data with the proposed county-specific caps we were able to determine which borrowers would have lost tax-preferred status on some portion of the mortgage, as well as the share of their mortgage, s , that would have exceeded the cap.⁵

Row 3 of Table 1 reports that nationally about 13 percent of mortgage originations in 2004 would have been partially affected by a loss of tax preference.⁶ Of the 6.36 million total

⁴ The Panel also recommended replacing deductibility of mortgage interest paid with a new "Home Credit" to be claimed against tax liability. The proposed credit would be for 15% of the interest paid on a mortgage in any given tax year and would not be allowed for interest paid on mortgages of second homes or home-equity loans (as is allowed under current law).

⁵ HMDA data does not include the price of the home for which a mortgage was originated. Therefore, our estimates will need to be multiplied by θ , the share of the house price that is debt-financed, in order to determine the effect on user cost.

⁶ Again, it should be kept in mind that these are static estimates which do not take potential behavioral responses to the introduction of lower caps into account.

mortgage originations in the United States, 837,871 (13.16 percent of the total) were for amounts exceeding the proposed caps. The average share of mortgage dollars subject to the caps would be 3.44 percent, compared to 0.13 percent under current law. There are stark regional differences in the impact of the Panel's caps across MSAs. The share of mortgage holders that would have some fraction of their mortgage affected by the Panel caps varies from a low of less than 1 percent in Odessa, TX, to a high of over 67 percent in San Francisco, CA. At least 5 percent of mortgage holders are subject to the Panel caps in about 80 percent of the MSAs in the HMDA data.

Taken as an average across MSAs (weighted by the number of mortgages taken out in 2004), the mean share of mortgage dollars subject to the Panel's cap is 3.44 percent. The average share of mortgage dollars subject to the Panel's proposed caps varies from as little as 0.15 percent in Odessa, TX, to as much as 23 percent in San Francisco, CA. Ten MSAs in the United States would have an average of at least 10 percent of mortgage dollars exceeding the caps, and 35 MSAs would have at least 5 percent.

The average subsidy for a typical itemizing taxpayer in 2004 (with a marginal income tax rate of 25 percent and an annual mortgage interest rate of 6 percent) would have been \$2,344 compared to \$2,626 under current law (again taken as a mortgage-weighted average), with standard deviations of \$1,465 and \$2,197 respectively. There is not much change in the subsidy amounts for MSAs at the bottom of the home-price distribution; however, the top of the distribution would experience significant declines. The average subsidy in San Francisco, for example, would decline by nearly \$2,400 per year, from \$7,303 to \$4,909. For MSAs in the top 25 percent of the mortgage-amount distribution,⁷ the average annual subsidy for new mortgage

⁷ We have tabulated MSAs according to their average mortgage amounts, and then examined the top 25 percent of MSAs according to this measure.

holders would be \$3,070, which is \$422 smaller than under current law. For MSAs in the bottom 25 percent of the same distribution, the average annual subsidy for new mortgage holders would be \$1,442, which is \$66 smaller than under current law. MSAs in the middle 50% of the distribution would experience an average decrease in subsidy of \$178, from \$1,967 to \$1,790.

A Uniform National Cap

As an alternative to the Panel's recommendation, we simulate the effect of imposing a uniform national cap. We choose the national cap so that the same share of total mortgage dollars exceeds the cap as with the Panel's proposal. We find that a uniform national cap of \$312,000 will have this effect, binding about 3.4 percent of mortgage dollars nation wide. Slightly fewer mortgage originations would exceed the national cap than the Panel's caps: 811,730 mortgages or 12.75 percent of the total (again, this is a static estimate that does not account for potential behavioral responses to changes made to the cap). With this cap, the share of mortgage holders that would have some fraction of their mortgage affected by the Panel caps varies from a low of 0.15 percent in Odessa, TX, to a high of over 77.14 percent in San Francisco, CA.

High-priced MSAs would once again be most affected in terms of the share of mortgage dollars that lose tax preference, and to a greater extent than with the Panel's caps (which were partially adjusted on the basis of regional home prices). The average share of mortgage dollars subject to the Panel's proposed caps varies from as little as 0.05 percent in Odessa, TX, to as much as 32.02 percent in San Francisco, CA. 16 MSAs in the United States would have an average of at least 10 percent of mortgage dollars exceeding the caps, and 30 MSAs would have at least 5 percent.

The average subsidy for a typical itemizing taxpayer in 2004 (with a marginal income tax rate of 25 percent and an annual mortgage interest rate of 6 percent) would have been \$2,325 compared to \$2,626 under current law (again taken as a mortgage-weighted average). There is very little change in the subsidy amounts for MSAs at the bottom of the home-price distribution. Differences at the top of the distribution, on the other hand, would be noticeably larger than with the Panel's caps. The average subsidy in San Francisco, for example, would decline by about \$3,150 per year, from \$7,303 to \$4,153. For MSAs in the top 25 percent of the mortgage-amount distribution, the average annual subsidy for new mortgage holders would be \$2,933, which is \$558 smaller than under current law. For MSAs in the bottom 25 percent of the same distribution, the average annual subsidy would be \$1,415, which is only \$26 smaller than under current law. MSAs in the middle 50% of the distribution would experience an average decrease in subsidy of \$98, from \$1,967 to \$1,869.

A Cap That Binds the Same Percent of Mortgage Dollars across MSAs

Finally, we consider a cap that is binding for the same percent of mortgage dollars across MSAs, with the percent chosen to be consistent with the share of dollars affected by both the Panel caps and the national cap. This gives us what could be called a fully regionally adjusted cap for each MSA by keeping the share of mortgage dollars in excess of the cap equal to approximately 3.44 percent.⁸ Caps calculated in this manner range from a low of \$102,000 in Odessa, TX to a high of \$769,000 in San Francisco. There are 14 MSAs with caps in excess of \$500,000, and 43 MSAs with caps higher than the uniform national cap from the previous section. Using this system, 13.7 percent of mortgage originations would have been for amounts in excess of the caps (slightly more than under the alternatives discussed above). The share of

⁸ Since the HMDA data reports mortgages to the nearest \$1,000, our caps are calculated with that level of precision.

mortgage holders that would have some fraction of their mortgage affected by the fully regionalized caps varies from a low of 8.93 percent in Brunswick, GA, to a high of over 23.08 percent in Fairbanks, AK.

High priced MSAs would not lose as much tax preference under the fully regional cap as under the other types of caps. By design, the fully regional cap would hold the share of mortgage dollars subject to the cap constant at roughly 3.4 percent.

The average subsidy for a typical itemizing taxpayer in 2004 (with a marginal income tax rate of 25 percent and an annual mortgage interest rate of 6 percent) would have been \$2,374 compared to \$2,626 under current law. Average subsidies would fall less severely for those in MSAs towards the top of the home-price distribution than under either the Panel's caps or the uniform national cap. The average subsidy in San Francisco, for example, would decline by about \$342 per year from \$7,303 to \$6,961. For the top 25 percent of MSAs, the average annual subsidy would be \$3,183, which is \$309 smaller than under current law. For MSAs in the bottom 25 percent of the distribution, the average annual subsidy would be \$1,297, which is \$144 smaller than under current law. MSAs in the middle 50% of the distribution would experience an average decrease in subsidy of about \$213, from \$1,967 to \$1,755. (For all three groups the decrease in subsidy is from 8.8 to 10.8 percent of the original subsidy amount.)

The Effect of Caps on the User Cost of Owner-Occupied Housing

What ultimately matters to home purchasers is how capping the MID will affect the user cost of housing. We follow equations [2], [3], and [4] and use our estimates of s to estimate differences in the user cost with and without the caps to the MID. To keep our focus on the effects of the caps, we hold other parameter estimates constant across MSAs. We assume an annual maintenance rate of 2 percent, property tax rate of 1.75 percent, mortgage interest rate of

6 percent, marginal tax rate of 25 percent, and house-price inflation net of depreciation at a rate of 1.3 percent. We must also make an adjustment to move from the share of mortgage dollars that lose tax preference (estimated above using the HMDA data) to the share of the house price that loses tax preference (which is the product θs). Since we are dealing with mortgage origination data, we do this by assuming the conventional initial loan-to-value ratio of 80 percent across the board.

Table 2 shows how the current-law cap and the three alternatives increase the average user cost of housing in MSAs across the house-price distribution. On average, the user cost of 2004 mortgage originations was increased very little by the current-law cap of \$1 million relative to a no-cap baseline (by only 0.02 percent for the U.S. as a whole). The small subset of houses that were affected, however, experienced user costs that were about 4.4 percent above the no-cap baseline. That is to say that we would under estimate the actual user cost of housing for these taxpayers by about 4.4 percent annually if we did not take the current law cap into account. The increase in user cost for mortgages above the cap are a reflection of the average share of mortgage value exceeding the cap, which is almost 24 percent for these tax-payers.

The changes to the cap outlined by the Panel, as well as our national and fully regional caps would all increase the user cost for the average mortgage in the United States by about 0.61 percent annually. For mortgages that are in excess of the current cap, the user cost under these alternative proposals would increase by between 7.4 and 9.2 percent from current law.

The bulk of the increase in user cost caused by the Panel's caps and the uniform national cap would be on mortgage holders in high priced areas. Under the Panel's proposal, the 5 lowest-priced MSAs would all experience a user cost increase that is 0.12 percent or less relative to the current-law baseline. The 5 highest-priced MSAs would experience user costs ranging

from 2.00 to 3.95 percent higher than under the current-law baseline. The uniform national cap widens the difference between the user cost changes experienced by those in MSAs at the bottom and the top of the house-price distribution. With this cap, the bottom 5 MSAs would all experience user cost increases of less than 0.04 percent, and the top 5 MSAs would experience increases ranging from 3.03 percent to 5.62 percent (the hardest hit MSA being San Francisco). The fully regionalized caps would have only a slightly different impact on the user costs experienced by all MSAs, with the increases over the current-law baseline ranging from 0.37-0.63 percent. The differences in user cost increases from the fully regional cap across MSAs are the result of looking at changes relative to the current-law baseline, which already incorporates the current-law cap.

An important caveat about these calculations must be noted before concluding. The shares of mortgages and house prices that exceed the various caps have been calculated using mortgage origination data. Naturally, this share would be expected to fall towards zero over the lifetime of the mortgage as mortgage-holders increase their equity share in their homes. Consequently, the shares exceeding the various caps as calculated here will overstate the shares exceeding the caps over the lifetime of the mortgage.⁹

SUMMARY AND CONCLUSIONS

We have shown that capping the mortgage interest deduction alters the user cost of housing through the share of mortgage dollars above the cap. Our estimates show that while the current-law cap affects a negligible number of mortgages, its impact on the mortgages that are affected is not insubstantial (raising the average user cost for this sub-population of mortgages by

⁹ By way of illustration, if there is a \$600,000 mortgage taken out in an MSA with a \$400,000 cap, we would estimate a first-year s of 0.33. If we assume that the mortgage will be fully paid down over the course of 30 years (with annual payments), however, the value of s over the lifetime of the mortgage would be about 0.17.

an estimated 4.4 percent). We also simulate how a set of alternative caps would increase the share of mortgage dollars in excess of the cap, thus increasing the user cost of housing.

The President's Advisory Panel's recommendation to create caps based partially on regional home prices would increase the user cost of housing by about 0.61 percent on average across the country. Some MSAs would be relatively severely impacted, with the estimated user cost increasing by a high of 3.95 percent in the San Francisco MSA. High-priced homes which exceed the current law cap of \$1 million would see their estimated user costs increase by an average of 8.79 percent. As catalogued in our mortgage-simulations section, these changes can amount to MSA-wide average losses in tax savings ranging from less than \$100/year in low-priced MSAs to over \$3,000/year.

The other two alternative caps presented in this paper, a uniform national cap and a fully regionally adjusted cap, are designed to impact the same share of mortgage dollars as the Panel's caps at the national level. These caps highlight the geographic distributional differences of moving from a national cap to a cap based on regional prices. The national cap would have a greater impact on high-priced areas than the Panel's caps, with the average user cost increasing by a high of 5.62 percent in San Francisco. The fully regional cap shifts the burden towards low-priced MSAs relative to the Panel's caps, increasing average user costs by an estimated 0.37-0.63 percent in all MSAs.

Policy makers have already begun the discussion of whether the cap on the MID should be uniform or adjusted on the basis of regional differences in home prices. This choice will have implications for both efficiency and equity aspects of the subsidy. The equity question forces policy makers to weigh conflicting notions of fairness. A uniform national cap is fair in the sense that it does not provide households with larger subsidies simply because they live in areas

with high home prices, while a regionally adjusted cap is fair in the sense that it reduces the current subsidy proportionately across regions, regardless of home prices. The first notion of fairness may more accurately capture a conception of how new home purchasers ought to be treated, while the second may better relate to how we ought to treat current home owners. That is, going forward it would be inappropriate to provide larger subsidies for people who seek out homes in areas with high prices (effectively blunting the price mechanism). On the other hand, it would also be unfair to take different amounts of the subsidy away from people in different areas given that they made their home-purchase decisions on the basis of current law. The Panel's recommendation, which is a compromise between a uniform national cap and fully adjusted regional caps, may appear attractive to those who prefer to split the difference between these conflicting notions of fairness. Either transitional assistance or the gradual phasing in of caps that are not fully adjusted on the basis of regional home prices may also help to mediate along these lines.

Acknowledgments

The authors wish to thank Rosanne Altshuler for her encouragement and helpful suggestions, and two anonymous referees for insightful comments and suggestions for revisions.

REFERENCES

- Anderson, John E. and Atrayee Ghosh Roy. "Eliminating Housing Tax Preferences: A Distributional Analysis." *Journal of Housing Economics* 10 No. 1 (March, 2001): 41-58.
- Brady, Peter, Julie-Anne Cronin, and Scott Houser.. "Regional Differences in the Utilization of the Mortgage Interest Deduction." *Public Finance Review* 31 No. 4 (July, 2003): 327-366.
- Bourassa, Steven C. and W. G. Grigsby. "Income Tax Concessions for Owner-Occupied Housing." *Housing Policy Debate* 11 No. 3 (2000): 521-546.
- Executive Office of the President. Office of Management and Budget. *Analytical Perspectives, Budget of the United States Government Fiscal Year 2008*. Washington, DC: U.S. Government Printing Office, 2007.
- Follain, James R. and David C. Ling. "The Federal Tax Subsidy to Housing and the Reduced Value of the Mortgage Interest Deduction." *National Tax Journal* 44 No.2 (June, 1991):147-168.
- Follain, James R. and Lisa Sturman Melamed. "The False Messiah of Tax Policy: What Elimination of the Home Mortgage Interest Deduction Promises and a Careful Look at What it Delivers," *Journal of Housing Research* 9 No.2 (1998): 179-199.
- Glaeser, Edward L. and Jesse M. Shapiro. "The Benefits of the Home Mortgage Interest Deduction." Cambridge, MA: National Bureau of Economic Research working paper number 9284, 2002.
- Green, Richard K. and Kerry D. Vandell. "Giving Households Credit: How Changes in the U.S. Tax Code Could Promote Homeownership." *Regional Science and Urban Economics* 29 No. 4 (July, 1999): 419-444.
- Hendershott, Patric H. and James D. Schilling. "The Economics of Tenure Choice, 1955-79." in *Research in Real Estate, Volume 1*, edited by C. Sirmans. Greenwich, CT: JAI Press, 1982.
- Himmelberg, Charles, Christopher Mayer, and Todd Sinai. "Assessing High House Prices: Bubbles, Fundamentals, and Misperceptions." *Journal of Economic Perspectives* 19 No. 4 (Fall, 2005): 67-92.
- King, Mervyn A. "The Distribution of Gains and Losses from Changes in the Tax Treatment of Housing." London, UK: Social Science Research Council Programme number 20, 1981.
- Mills, Edwin S. "Social Returns to Housing and Other Fixed Capital." *Journal of the American Real Estate and Urban Economics Association* 17 No. 2 (Summer, 1989): 197-211.
- Poterba, James M. "Taxation and Housing: Old Questions, New Answers." *American Economic Review* 82 No. 2 (May, 1992): 237-242.

Poterba, James M. "Tax Subsidies to Owner-Occupied Housing: An Asset Market Approach." *Quarterly Journal of Economics* 99 No.4 (November, 1984): 729-752.

President's Advisory Panel on Federal Tax Reform. *Simple, Fair, and Pro-Growth: Proposals to Fix America's Tax System*. Washington, DC:,U.S. Government Printing Office, 2005.

Rosen, Harvey S. "Housing Subsidies: Effects on Housing Decisions, Efficiency, and Equity." in *Handbook of Public Economics*, Volume 1, edited by M. Feldstein and A. Auerbach. Amsterdam: North-Holland, 1985.

Rosen, Harvey S. "Housing Decisions and the U.S. Income Tax: An Econometric Analysis." *Journal of Public Economics* 11 No.1 (February, 1979a): 1-23.

Rosen, Harvey S. "Owner Occupied Housing and the Federal Income Tax: Estimates and Simulations." *Journal of Urban Economics* 6 No. 2 (April, 1979b): 247-266.

Rosen, Harvey S. and Kenneth T. Rosen. "Federal Taxes and Homeownership: Evidence from Time Series." *Journal of Political Economy* 88 No. 1 (February, 1980): 59-75.

Summers, Lawrence. "Inflation, the Stock Market and Owner-Occupied Housing." Cambridge, MA: National Bureau of Economic Research working paper number 606, 1980.

Table 1: The Effect of Capping the MID for Select MSA's

				5 Lowest Priced Markets					10th Percentile	25th Percentile	50th Percentile
MSA Summary		United States Totals	Mortgages \$1 Million or more	Odessa, TX	Danville, IL	Pine Bluff, AR	Johnstown, PA	Weirton-Steubenville, WV-OH	Midland, TX	Rockford, IL	Grand Rapids-Wyoming, MI
		Population (Census 2000)	281,421,906		121,123	83,919	107,341	152,598	132,008	116,009	320,204
	Population Growth (1990-2000)	13.2		1.8	-4.9	0.4	-6.4	-7.4	8.8	12.9	14.6
	Number of Mortgages	6,365,501	35,532	1,350	1,045	997	1,536	1,221	2,254	7,873	14,904
	Average Mortgage Amount	\$179,000	\$1,702,979	\$64,584	\$68,415	\$76,068	\$76,944	\$78,834	\$93,773	\$105,763	\$124,029
	S.D	\$223,710	\$1,863,738	\$42,546	\$49,979	\$154,177	\$56,257	\$60,005	\$79,387	\$68,983	\$92,766
Current Law	# Mortgages Exceeding Cap	24983	24983	0	0	1	0	0	1	4	10
	% Mortgages Exceeding Cap	0.39%	70.31%	0.00%	0.00%	0.10%	0.00%	0.00%	0.04%	0.05%	0.07%
	Share Mortgage \$ Subject to Cap	0.13%	23.92%	0.00%	0.00%	0.08%	0.00%	0.00%	0.02%	0.01%	0.02%
	S.D	2.54%	24.26%	0.00%	0.00%	2.49%	0.00%	0.00%	1.13%	0.41%	1.09%
	Ave. Subsidy	\$2,626	\$15,000	\$969	\$1,026	\$1,086	\$1,154	\$1,183	\$1,399	\$1,585	\$1,852
	S.D	\$2,197	\$0	\$638	\$750	\$901	\$844	\$900	\$1,036	\$1,011	\$1,209
	Max Subsidy	\$15,000	\$15,000	\$7,875	\$7,650	\$15,000	\$7,500	\$12,300	\$15,000	\$15,000	\$15,000
President's Panel Cap	# Mortgages Exceeding Cap	837871	35532	11	23	18	52	30	109	423	1398
	% Mortgages Exceeding Cap	13.16%	100.00%	0.81%	2.20%	1.81%	3.39%	2.46%	4.84%	5.37%	9.38%
	Share Mortgage \$ Subject to Cap	3.44%	73.71%	0.15%	0.45%	0.50%	0.57%	0.65%	1.12%	1.13%	2.24%
	S.D	11.38%	9.88%	2.30%	3.81%	4.88%	3.88%	5.22%	6.35%	6.22%	8.88%
	Ave. Subsidy	\$2,344	\$5,147	\$961	\$1,004	\$1,052	\$1,129	\$1,141	\$1,336	\$1,521	\$1,724
	S.D	\$1,465	\$920	\$589	\$646	\$686	\$753	\$684	\$791	\$760	\$799
	Max Subsidy	\$5,730	\$5,730	\$3,161	\$3,161	\$3,161	\$3,161	\$3,161	\$3,161	\$3,161	\$3,161
National Cap (same "s" as Panel Cap)	# Mortgages Exceeding Cap	811730	35532	2	4	6	7	11	29	94	391
	% Mortgages Exceeding Cap	12.75%	100.00%	0.15%	0.38%	0.60%	0.46%	0.90%	1.29%	1.19%	2.62%
	Share Mortgage \$ Subject to Cap	3.44%	76.26%	0.05%	0.09%	0.19%	0.06%	0.23%	0.29%	0.26%	0.58%
	S.D	11.59%	7.57%	1.26%	1.53%	3.45%	1.17%	3.06%	3.43%	3.30%	4.74%
	Ave. Subsidy	\$2,325	\$4,680	\$965	\$1,021	\$1,069	\$1,151	\$1,163	\$1,376	\$1,562	\$1,804
	S.D	\$1,382	\$0	\$611	\$713	\$749	\$825	\$762	\$903	\$869	\$978
	Max Subsidy	\$4,680	\$4,680	\$4,680	\$4,680	\$4,680	\$4,680	\$4,680	\$4,680	\$4,680	\$4,680
Fully Regional Cap (Same "s" as Panel Cap)	Cap	Variable	Variable	102000	111000	119000	134000	125000	151000	155000	184000
	# Mortgages Exceeding Cap	871956	35532	191	140	136	202	170	321	1224	2072
	% Mortgages Exceeding Cap	13.70%	100.00%	14.15%	13.40%	13.64%	13.15%	13.92%	14.24%	15.55%	13.90%
	Share Mortgage \$ Subject to Cap	3.45%	66.27%	3.39%	3.43%	3.40%	3.42%	3.42%	3.42%	3.45%	3.44%
	S.D	11.23%	17.17%	10.28%	11.09%	10.79%	10.49%	11.13%	10.82%	10.54%	10.92%
	Ave. Subsidy	\$2,374	\$6,564	\$882	\$920	\$970	\$1,040	\$1,057	\$1,258	\$1,443	\$1,678
	S.D	\$1,614	\$2,444	\$422	\$461	\$517	\$569	\$504	\$645	\$626	\$723
Max Subsidy	\$11,535	\$11,535	\$1,530	\$1,665	\$1,785	\$2,010	\$1,875	\$2,265	\$2,325	\$2,760	

Source: Population from U.S Census, all other reported statistics are from the author's calculations using HMDA data

Note: The Amount of subsidy is calculated for each mortgage originated using a marginal tax rate of 25%, a 6 % annual interest rate. The share of mortgage above cap is calculated at the individual level. This is done to compare various cap, and does not represent actual subsidy amounts which depend on taxpayer itemization.

* Indicates that the area is defined as a Metropolitan Division, which is part of a larger MSA, median home price given for full MSA

Table 1 (Continued): The Effect of Capping the MID for Select MSA's

		75th Percentile	90th Percentile	5 Highest Priced Markets				
		Durham, NC	*Lake County-Kenosha County, IL-WI	Napa, CA	*Santa Ana-Anaheim-Irvine, CA	Santa Barbara-Santa Maria-Goleta, CA	San Jose-Sunnyvale-Santa Clara, CA	*San Francisco-San Mateo-Redwood City, CA
MSA Summary	Population (Census 2000)	426,493	793,933	124,279	2,846,289	399,347	1,735,819	1,731,183
	Population Growth (1990-2000)	23.8	23.2	12.2	18.1	8.0	13.1	8.0
	Number of Mortgages	9,395	21,118	2,969	60,303	7,549	39,146	29,500
	Average Mortgage Amount	\$160,803	\$205,421	\$389,186	\$389,260	\$391,212	\$404,668	\$518,097
	S.D	\$147,862	\$181,951	\$304,901	\$431,906	\$395,038	\$304,127	\$420,437
Current Law	# Mortgages Exceeding Cap	12	110	64	1564	259	594	1413
	% Mortgages Exceeding Cap	0.13%	0.52%	2.16%	2.59%	3.43%	1.52%	4.79%
	Share Mortgage \$ Subject to Cap	0.06%	0.17%	0.67%	0.84%	1.19%	0.42%	1.44%
	S.D	1.87%	2.69%	5.42%	6.02%	7.34%	4.05%	7.67%
	Ave. Subsidy	\$2,383	\$3,030	\$5,610	\$5,527	\$5,459	\$5,934	\$7,303
	S.D	\$1,699	\$2,249	\$3,103	\$3,536	\$3,759	\$3,299	\$3,771
	Max Subsidy	\$15,000	\$15,000	\$15,000	\$15,000	\$15,000	\$15,000	\$15,000
President's Panel Cap	# Mortgages Exceeding Cap	1528	3058	1359	25618	2567	20924	19916
	% Mortgages Exceeding Cap	16.26%	14.48%	45.77%	42.48%	34.00%	53.45%	67.51%
	Share Mortgage \$ Subject to Cap	4.41%	3.96%	11.54%	12.44%	12.48%	14.04%	22.96%
	S.D	12.71%	12.69%	17.68%	19.55%	21.30%	18.44%	22.34%
	Ave. Subsidy	\$2,091	\$2,669	\$4,512	\$4,258	\$4,106	\$4,572	\$4,909
	S.D	\$943	\$1,300	\$1,671	\$1,801	\$1,750	\$1,707	\$1,520
	Max Subsidy	\$3,450	\$4,688	\$5,730	\$5,730	\$5,730	\$5,730	\$5,730
National Cap (same "s" as Panel Cap)	# Mortgages Exceeding Cap	684	3058	1902	34733	3675	26426	22755
	% Mortgages Exceeding Cap	7.28%	14.48%	64.06%	57.60%	48.68%	67.51%	77.14%
	Share Mortgage \$ Subject to Cap	1.81%	3.97%	19.57%	19.32%	17.65%	22.64%	32.02%
	S.D	8.42%	12.71%	20.86%	22.72%	24.42%	21.51%	24.16%
	Ave. Subsidy	\$2,229	\$2,668	\$3,937	\$3,738	\$3,684	\$3,937	\$4,153
	S.D	\$1,181	\$1,299	\$1,304	\$1,421	\$1,409	\$1,317	\$1,144
	Max Subsidy	\$4,680	\$4,680	\$4,680	\$4,680	\$4,680	\$4,680	\$4,680
Fully Regional Cap (Same "s" as Panel Cap)	Cap	251000	329000	550000	615000	674000	582000	769000
	# Mortgages Exceeding Cap	1236	2659	424	7916	921	6278	3976
	% Mortgages Exceeding Cap	13.16%	12.59%	14.28%	13.13%	12.20%	16.04%	13.48%
	Share Mortgage \$ Subject to Cap	3.46%	3.45%	3.48%	3.45%	3.44%	3.45%	3.45%
	S.D	11.33%	11.99%	11.49%	11.56%	11.83%	10.61%	11.12%
	Ave. Subsidy	\$2,137	\$2,702	\$5,215	\$5,126	\$5,083	\$5,518	\$6,961
	S.D	\$1,014	\$1,354	\$2,334	\$2,737	\$2,983	\$2,546	\$3,185
	Max Subsidy	\$3,765	\$4,935	\$8,250	\$9,225	\$10,110	\$8,730	\$11,535

Source: Population from U.S Census, all other reported statistics are from the author's calculations using HMDA data

Note: The Amount of subsidy is calculated for each mortgage originated using a marginal tax rate of 25%, a 6 % annual interest rate. The share of mortgage above cap is calculated at the individual level. This is done to compare various cap, and does not represent actual subsidy amounts which depend on taxpayer itemization.

* Indicates that the area is defined as a Metropolitan Division, which is part of a larger MSA, median home price given for full MSA

Table 2: User Cost of Housing: Tax Considerations and Caps

				Current Law Cap		Panel's Caps		National Cap		Fully Regional Caps	
		Non-Tax User Cost	After-Tax User Cost Without Cap	After-Tax User Cost	% Change from No-Cap	After-Tax User Cost	% Change from Current-Law	After-Tax User Cost	% Change from Current-Law	After-Tax User Cost	% Change from Current-Law
5 Lowest Priced Markets	Odessa, TX	0.0845	0.0651	0.0651	0.00%	0.0651	0.03%	0.0651	0.01%	0.0655	0.63%
	Danville, IL	0.0845	0.0651	0.0651	0.00%	0.0652	0.08%	0.0651	0.02%	0.0655	0.63%
	Pine Bluff, AR	0.0845	0.0651	0.0651	0.01%	0.0652	0.08%	0.0651	0.02%	0.0655	0.61%
	Johnstown, PA	0.0845	0.0651	0.0651	0.00%	0.0652	0.10%	0.0651	0.01%	0.0655	0.63%
	Weirton-Steubenville, WV-OH	0.0845	0.0651	0.0651	0.00%	0.0652	0.12%	0.0652	0.04%	0.0655	0.63%
10th Percentile	Midland, TX	0.0845	0.0651	0.0651	0.00%	0.0653	0.20%	0.0652	0.05%	0.0655	0.63%
25th Percentile	Rockford, IL	0.0845	0.0651	0.0651	0.00%	0.0653	0.21%	0.0652	0.05%	0.0655	0.63%
50th Percentile	Grand Rapids-Wyoming, MI	0.0845	0.0651	0.0651	0.00%	0.0654	0.41%	0.0652	0.10%	0.0655	0.63%
75th Percentile	Durham, NC	0.0845	0.0651	0.0651	0.01%	0.0657	0.80%	0.0653	0.32%	0.0655	0.63%
90th Percentile	*Lake County-Kenosha County, IL-WI	0.0845	0.0651	0.0651	0.03%	0.0656	0.70%	0.0656	0.70%	0.0655	0.61%
5 Highest Priced Markets	Napa, CA	0.0845	0.0651	0.0652	0.12%	0.0665	2.00%	0.0675	3.48%	0.0655	0.52%
	*Santa Ana-Anaheim-Irvine, CA	0.0845	0.0651	0.0652	0.15%	0.0666	2.13%	0.0674	3.40%	0.0655	0.48%
	Santa Barbara-Santa Maria-Goleta, CA	0.0845	0.0651	0.0653	0.22%	0.0666	2.08%	0.0672	3.03%	0.0655	0.42%
	San Jose-Sunnyvale-Santa Clara, CA	0.0845	0.0651	0.0652	0.08%	0.0668	2.51%	0.0678	4.09%	0.0655	0.56%
	*San Francisco-San Mateo-Redwood City, CA	0.0845	0.0651	0.0653	0.26%	0.0679	3.95%	0.0690	5.62%	0.0655	0.37%
United States Totals		0.0845	0.0651	0.0651	0.02%	0.0655	0.61%	0.0655	0.61%	0.0655	0.61%
All Mortgages at or Above Current Cap		0.0845	0.0651	0.0680	4.41%	0.0740	8.79%	0.0743	9.24%	0.0731	7.47%

Source: Markets are sorted into percentiles on the basis of the average value of mortgage originations at the MSA level. User costs are calculated assuming a 25% marginal tax rate, 6% interest rate, 2% maintenance costs, 2.5% depreciation, a 1.75% property tax rate, and house-price inflation of 3.8%. Changes due to the various caps are calculated using the authors' estimates of the average share of mortgages above the caps in each MSA.

* Indicates a metropolitan division, a smaller area than the entire MSA